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20th March 2020

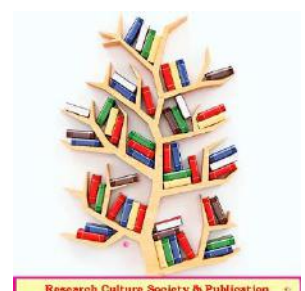


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Sri RangaPoopathi College of Engineering was established in the year 2009 under the aegis of Sri Rangapoopathi Educational and Charitable Trust. The College is duly approved by AICTE, New Delhi and Affiliated to Anna University-Chennai. A passion for teaching, commitment to research, real world experience and a global perspective the bedrock of any academic institution is the quality of it's faculty and in this arena Sri rangapoopathi college of engineering is at the forefront. The faculty of Sri rangapoopathi college of engineering comprises a mixture of youth, experience, academic excellence and industrial practice. In addition to our faculty, the institute also utilizes upon the expertise of visiting and associate faculty from various industries and reputed Educational Institution.



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Sri Rangapoopathy College of Engineering, Alampoondi, Tamilnadu, India

An Intelligent Bus Management System Using Arduino

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Abstract: College buses are used by college students who are paying the bus fee. In some cases, the students who are not paid their bus fee can also use the college buses. To avoid these kind of situation, and to ensure the students using college bus are whether paid their bus fee with the location of the college bus is identified which can be tracked by the students and college management. The number of students using the particular college bus can also be identified. The location is sent to the cloud so the buses are tracked by mobile application. The RFID tags are scanned when the students entered into the college bus, if the students paid their fee they can enter into the bus, otherwise they are not allowed into the college bus and the intimation is sent to the driver and also to the parent. The students using the particular bus can be counted by the number of RFID tags present within the college bus.

Key Words: GPS, Cloud, RFID tags, RFID reader.

INTRODUCTION:

The main task in the project is to identify the bus location and to identify whether the students whether paid their fee or not. For the college bus location to calculate the Wi-Fi module is used and also the RFID based technology is needed for knowing the students using the college bus details and also ensure they paid their fee properly. It also includes the students who missed the bus. The following Wi-Fi module and the RFID technology are described.

LITERATURE REVIEW:

BUS TRACKING WITH QR CODE AND RFID

In this paper using RFID for developing bus tracking systems. This project addresses two major problems: unnecessary waiting time for bus, higher cost for the tracking system. To reduce the waiting time, passengers can track the buses in their places and known about where their bus is located. If passengers are not known about the bus number they can also scan the QR code placed in all the bus stops. By scan the code they can get the information about the bus number and recently crossed bus stop of that bus. The bus tracking system requires installing RFID tags on all buses and RFID readers on bus stops for tracking.

AN AUTOMATED PASSENGER COUNTING SYSTEM

This paper uses the pressure pad under seats of the bus, is used to count total passenger are sitting in the seats by the pressure over the seats and it can viewed in display screen. The pressure pad connected to Arduino. When passengers are sitting on the seat, pressure pad becomes closed circuit and passes the voltage into the circuit. The voltage goes to the Arduino which converts the voltage into a digital signal like 0, 1. It means when a passenger is sitting on the seat, it passes the value as 1. It increments the count. Also, when there is no passenger, it passes the value as 0, that decrements the count provides the number of passengers in the bus.

SMART BUS MANAGEMENT SYSTEM USING IOT:

In this paper QR code is scanned to generate the tickets and the passengers receive ticket in the type of SMS to the registered number in their mobile applications. When user likes to go by bus, they has to scan the QR code in the bus by using their mobile phone. The user asks for profile registration, the user has to attach the bank details for amount transactions using their mobile with their private informations in order for secured transformation. Whenever a person decides to go on a bus, they have to select from and to location. By doing so, it will generate amount details for number of heads within the bus. After that, the users have to enter the number of tickets needed. Then in order to generate the actual ticket, the users have to scan the QR code. The money will be transferred from the bank of the passenger to the bank of the bus owner. And the details will be stored in the wallet. The user can also get SMS alert for ticket payment as a proof.

RFID BASED BUS TICKETING SYSTEM:

This paper presents an automated system for ticketing in the Public Transport System which is based on passenger identification. This is a user friendly system, which will automatically identify the passenger and deduct the passenger's fare according to the distance travelled. The RFID card and GPS are used to make the identification of passenger and transaction very precise. The cards being reusable, they are much more convenient compared to the paper based ticketing system. RFID cards are distributed among the public. The unique ID in the RFID cards are stored in a database in the internet along with personal data and creates accounts for each person. It is possible to identify the traveller, check his account and deduct the fare from their account. Creating database facilitates efficient filtering of anti-social elements and gives firm assurance to both passenger and PTS about the transaction. Fare calculation is done with the help of GPS module and internet. So a change in fare does not create any confusion as fare calculation is done by evaluating position by GPS module and rate through internet. System thus reduces human errors and efforts. Raspberry Pi is the control unit and programming is done using Python. GPS module is used for the purpose of distance measuring.

AN RFID BASED SYSTEM FOR BUS LOCATION TRACKING AND DISPLAY:

This paper presents a system that can track buses across a city by placing RFID tags in the buses and the readers in every alternative bus stop. Once the bus started at any location, it crosses the various bus terminals. The local server for the city receives the location information, and alerts the forthcoming bus stops in the route of the bus, and the bus number, route and also the expected time of arrival, which are then displayed at the stop to the passengers at their bus terminals. This system thus describes is a cost effective and easy to implement scheme for tracking buses in real time. The display about the bus details need to be updated every thirty seconds. So that it can gain the effectiveness of it.

MATERIALS:

The components are,

- ✓ Arduino
- ✓ LCD Display
- ✓ Wi-Fi Module
- ✓ Wi-Fi Router
- ✓ RFID Reader&Tags
- ✓ Coding language : EMBBEDED C
- ✓ Tool : Arduino IDE

METHOD:

The following are the modules of the project along with the way they are implemented and that is planned with respect to the proposed system, while overcoming existing system and also providing the support for the future enhancement system. There are totally three modules used in our project which is listed below. Each module has specific usage in the project and is description is given below followed by the list of modules.

- College Bus Tracking
- Checking whether the student paid the Fee or not
- Ensuring the number of students inside the Bus
- Finding the students who missed their busses

COLLEGE BUS TRACKING:

The system consists of Wi-Fi modules at some Access Points say at Bus terminals and the GPS in the buses. When a bus come to the bus terminal, the Wi-Fi module gets connected to the router which sends the address i.e. latitude and longitude of the bus terminals to the cloud then the data is retrieved from the cloud and displayed to the user in the mobile application, also gets notified when the bus is nearer to the bus terminal.

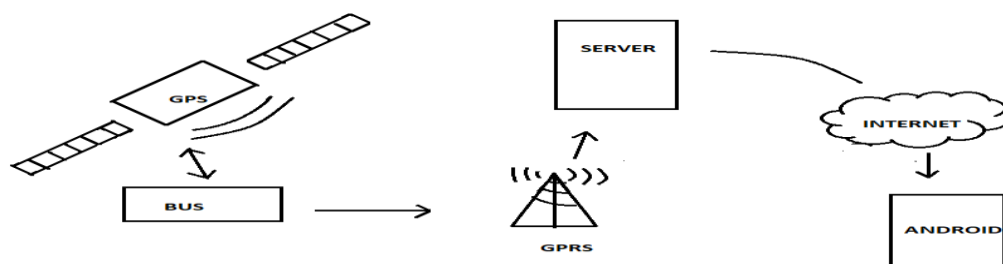


Figure 1. Bus Tracking

CHECKING WHETHER THE STUDENT PAID THE FEE OR NOT:

The student fee details can be checked by providing the RFID tags to individual students, the RFID reader is placed in every buses. By scanning the tags, they can enter into the buses. If they not paid their bus fee, the driver can get the intimation about the student and also the message is sent to the parent.

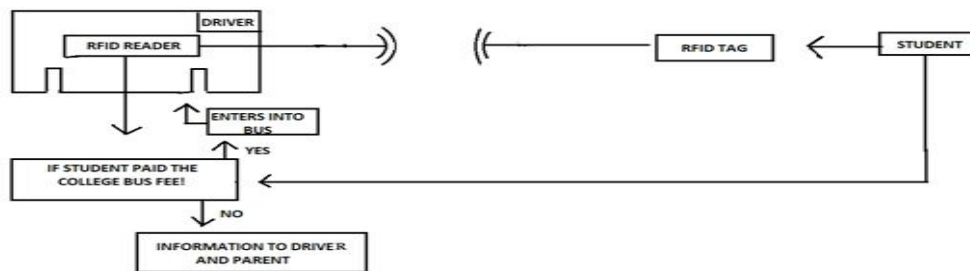


Figure 2. Finding The Bus Fee Is Paid Or Not

ENSURING THE NUMBER OF STUDENTS INSIDE THE BUS:

Every student in the college bus has single RFID tag with themselves. By counting the number of RFID tags present in the bus, the total number of students travelling in the bus can be identified.

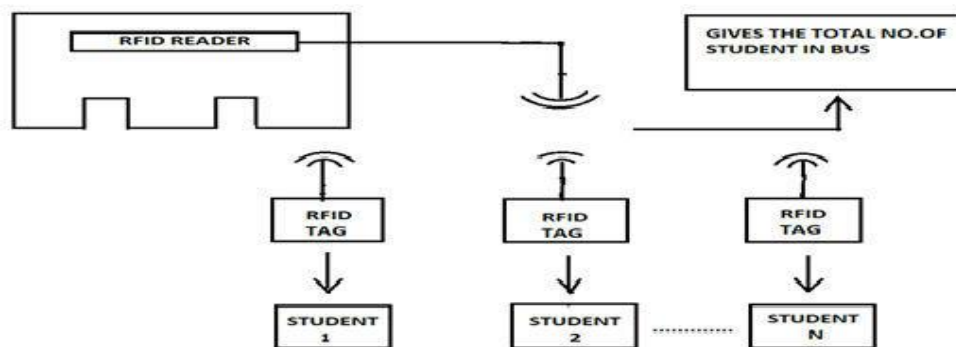


Figure 3. Counting Number Of Students In The Bus

FINDING THE STUDENTS WHO MISSED THE BUS:

The students who missed their busses at their bus stops can be identified by using the end switches placed at the buses. If the end switches are on, then the students who are not inside the bus are considered as the absentees (i.e.,) they are the students who missed the college bus.

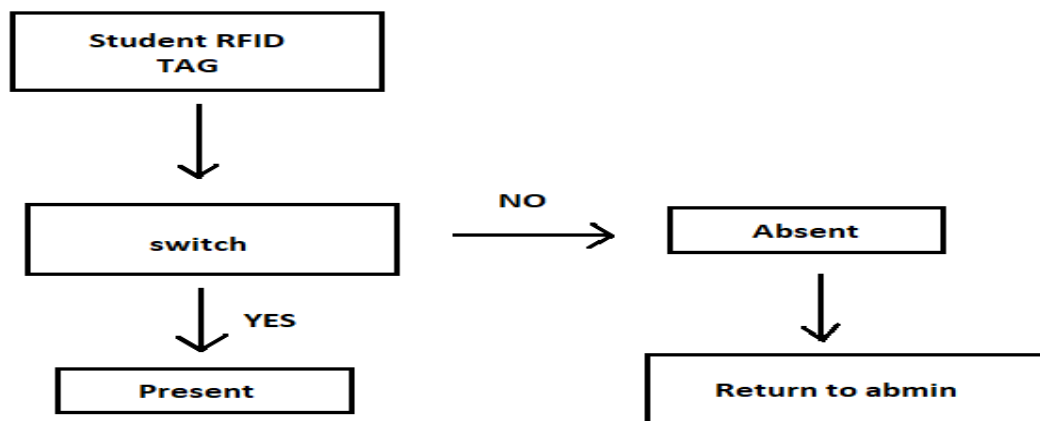


Figure 4. Finding The Student Who Missed The Bus

DISCUSSION:

The maintenance of college bus is essential for the college management since it includes the safety of the college students travelling in the college bus. The tracking of bus while reaching to college and returning from college is important to ensure the safety of the bus and the students. The bus tracking can be done by the Wi-Fi module and gets updated at every terminal. Then the location of the bus can be viewed by anyone within the management. The payment of the bus fee is also need to be taken care by the management. The student is whether paid the fee or not can be identified by the RFID tags present in their ID cards. After scanning is done, they can be checked for whether they paid the college fee or not. In case of not paid, the message can be sent to their parents and the intimation is also sent to the driver. To ensure the number of students travelling in the bus is also essential for the management to know about it. These can be identified by the number of RFID tags present within the college bus.

ARCHITECTURE DIAGRAM:

Implementation is the stage of the project when the theoretical design is turned out into a working system. Thus it can be considered to be the most critical in achieving a successful new system and in giving the user, confidence that the new system will work and be effective.

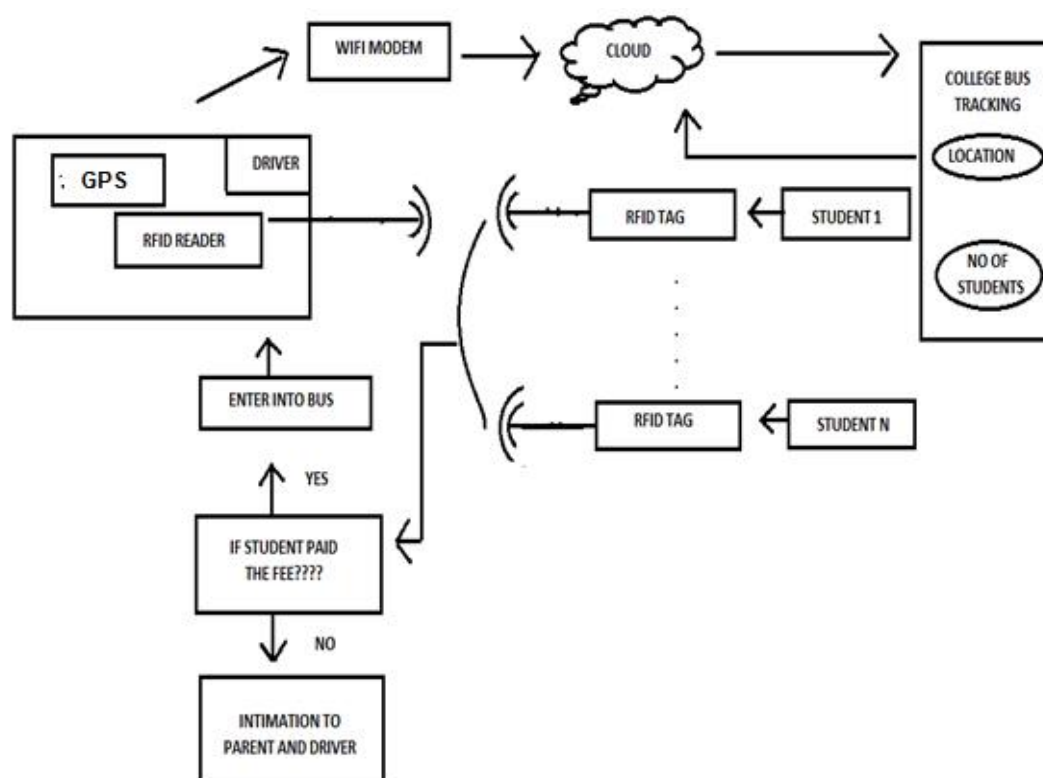


Figure 5. Architecture of Intelligent Bus Maintenance System

ANALYSIS:

The proposed system helps in tracking the college bus where it is available and also finding the number of students using the college bus. This helps in providing the safety to the college bus students and also helps the college management to know about the college bus details at any time, at anywhere. The student is whether paid their college fee or not can also be checked by our proposed system. This helps in finding out the unauthorized users of the college bus. In case of public transports it indicates low balanced cards.

RESULT:

The result of the proposed system includes the login page, store page and the result page. The results are as follows. It gives the clear elaboration of the application. It will be useful for the new user to understand for the future steps.

STORE PAGE

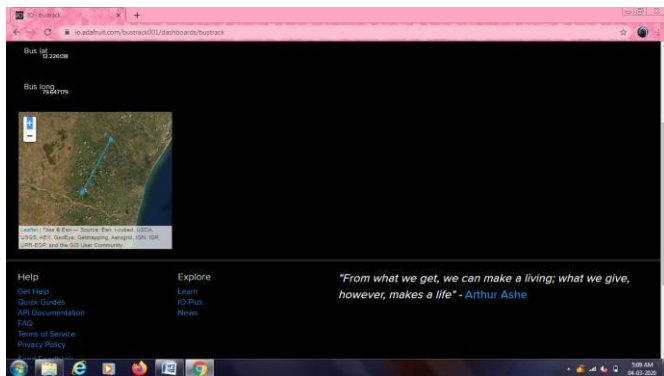


Figure 8.3 Getting The Location of The Bus From The Current Location



Figure 8.9 Incase of Unauthorized Use Of Bus

STUDENT FEE DETAILS

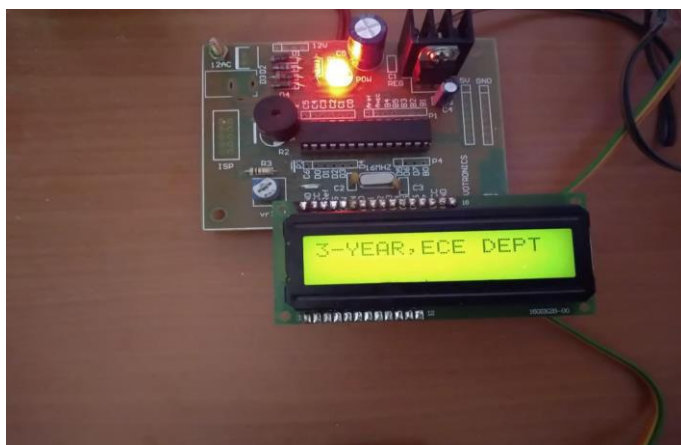


Figure 8.5 Displaying The Details Of The Student

RESULT PAGE

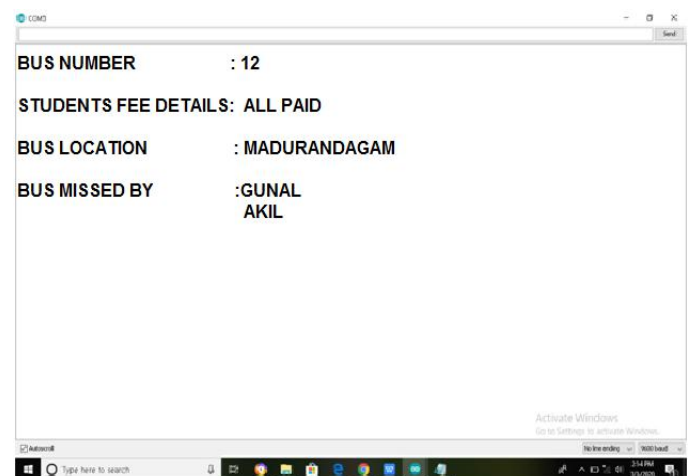


Figure 8.10 Result Page Of The Application



Figure 8.7 In Case Of Balance Exists Amount Is Debited



Figure 8.8 If Authorized Card Has No Balance



Fig 8.11 Number Of Students Within The Bus

CONCLUSION:

The proposed system is successfully designed, implemented and tested. The system helps the college management to track the location of all college buses at any point of time. All the information can be viewed in the webpage. It also includes the students fee details with the number of students present in it. This can be implemented in public transport too. The fairless ticketing can be achieved by our proposed method. Use of video camera to this system would take this system to the most level in the field of security with use of motion sensor the speed of the bus can be calculated, which helps to control over the speed of the bus which reduces the accident rate. Moreover, since the system is developed with open standards and open sources, it is easily extended with future technologies according to users need.

REFERENCES:

1. Godge, Priyanka, Kalyani Gore, Apurva Gore, Aishwarya Jadhav, and Anuradha Nawathe. "Smart bus management and tracking system." *International Journal of Latest Engineering Science* 2, no. 2 (2019): 20-25.
2. Khin, June Myint Mo, and Nyein Nyein Oo. "Real-Time Vehicle Tracking System Using Arduino, GPS, GSM and Web-Based Technologies." *International Journal of Science and Engineering Applications* 7, no. 11, 433-436 (2018).
3. Boshita, Takuya, Hidekazu Suzuki, and Yukimasa Matsumoto. "IoT-based bus location system using LoRaWAN." In *2018 21st International Conference on Intelligent Transportation Systems (ITSC)*, pp. 933-938. IEEE, 2018.
4. Sundaramoorthy, Revathy, Yamuna Ilango, and Ananth Kumar Tamilarasan. "SMART BUS PASSENGERS INFORMATION AND SAFETY MANAGEMENT SYSTEM." *International Journal of Pure and Applied Mathematics* 119, no. 14 (2018): 795-800.
5. Boshita, Takuya, Hidekazu Suzuki, and Yukimasa Matsumoto. "IoT-based bus location system using LoRaWAN." In *2018 21st International Conference on Intelligent Transportation Systems (ITSC)*, pp. 933-938. IEEE, 2018.
6. Ya'acob, Norsuzila, Aziean Mohd Azize, and Nik Muhammad Ridhwan Nik Zainal Alam. "Parking system using geographic information system (GIS)." In *2016 IEEE Conference on Systems, Process and Control (ICSPC)*, pp. 12-16. IEEE, 2016.
7. Kumar, Rahul, and Kunal Gupta. "ITMS (Intelligent Traffic Management System)." In *Proceedings of Fifth International Conference on Soft Computing for Problem Solving*, pp. 487-495. Springer, Singapore, 2016.
8. Matyakubov, Marks, and Onakhon Rustamova. "Development of Smart City Model: Smart Bus System." In *2019 International Conference on Information Science and Communications Technologies (ICISCT)*, pp. 1-5. IEEE, 2019.
9. Sharad, S., P. Bagavathi Sivakumar, and V. Anantha Narayanan. "The smart bus for a smart city—A real-time implementation." In *2016 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)*, pp. 1-6. IEEE, 2016.
10. Badawy, Emad, A. Elhakim, A. Abdulhameed, and I. Zuolkernan. "AN IOT BASED SCHOOL BUS TRACKING AND MONITORING SYSTEM." (2016): 5537-5546.
11. Wachira, Kelvin, and Joel Karthik. "Smart Bus Shelters: Enhancing Public Information Systems in Bus Shelters by Integrating Smart IoT solutions." (2016).
12. Kamaraj, A., K. Radha, M. Priyanka, and M. Punitha. "Intelligent transport system using integrated GPS optimized reader." In *2016 Second International Conference on Science Technology Engineering and Management (ICONSTEM)*, pp. 332-336. IEEE, 2016.
13. Jung, Moonho, and Peom Park. "A Study on Developing of Low Cost for Safety Management System of Manufacturing Site in Developing Country Industrial Site using Arduino." *DEStech Transactions on Engineering and Technology Research mcee* (2016).

Web References:

- <https://www.arduino.cc/en/Guide/ArduinoUnoWiFi>
- <https://create.arduino.cc/projecthub/ruchir1674/how-to-interface-arduino-mega-with-neo-6m-gps-module-1b7283>

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BANK TRANSACTION USING FACIAL IDENTIFICATION

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Abstract: In field, it's celebrated that facial dynamics profit the perception of identity. This paper proposes a very distinctive deep network framework to capture identity information from facial dynamics and their relations. among the projected technique, facial dynamics occurred from smile expression area unit analyzed and used for facial authentication. careful changes among the native regions of a face like wrinkles and dimples area unit encoded among the facial dynamic feature illustration. The latent relationships of the facial dynamic choices area unit learned by the facial dynamic relative network. among the facial dynamic relative network, the relation choices of the facial dynamic area unit encoded and conjointly the relative importance is encoded supported the relation choices. As a result, the projected technique has further attention on the very important relation choices in facial authentication. Through comprehensive and comparative experiments, the effectiveness of the projected technique has been verified in facial authentication.

Key Words: *identity, live face detection, 4 digit PIN, transaction, face dynamics, face authentication. Emerging technologies, Health, Requirements/Specifications, Ubiquitous computing*

INTRODUCTION:

Over the last decade, we have seen an increase in the use of technology in many business sectors to simplify and better engage customers. This is especially true in the banking and finance sector. Since the start of the digital revolution facial recognition has been gaining prominence over touch and type based interactions due to the convenience it offers without compromising on the security of transactions. Despite an increase in the use of EMV cards (Europay, MasterCard, Visa) coupled with password creation policies, there has been a surge in banking fraud cases. As a result of the billions that are lost by major banking institutions, there has been a call to switch to biometric facial recognition to curb this issue. It means that banking software will rely on face scans which it then compares with similar ones that were uploaded by the bank's personnel into their system so as to verify the customer's identity. The aim is to authenticate the identity and only allow a transaction to go through if the account owner's identity is positively identified. This customer ID authentication process is known as KYC (Know Your Customer).

LITERATURE REVIEW:

FACIAL- RECOGNITION PAYMENT: AN EXAMPLE OF CHINESE CONSUMERS:

The emergence and use of facial-recognition payment technology has brought new challenges. Although credit-card payment is quick and easy, it is easy to lose a card or forget the password. Because people use simple passwords and reuse them on different accounts and services, passwords can be shared and cracked. QR payment is inseparable from smart phones, smart phones may be lost, signals may be unstable, and batteries may be exhausted. However, facial-recognition technology, which detects and describes feature vectors without physical contact, directly contributes to overall efficiency, performance, and accuracy. Currently, studies of technical issues of facial-recognition technology and facial-recognition payment systems are very popular. There are many studies that emphasize the working principle of the facial-recognition system, the system's reliability, and the future development trend. However, for non-technical issues, such as from the perspective of consumers, research on the characteristics of facial-recognition payment and the factors affecting consumer's intent to use is rare. Therefore, the purpose of this study is to explore the factors influencing consumers' willingness to use facial-recognition payment systems. This study has selected security, visibility, and expected effort and social image as the feature variables of the facial-recognition payment system. Results in this paper shows that the safety, security, visibility and social image will affect consumers' intent to use the system. It can also

influence consumers' intent to use through perceived usefulness. The amount of effort expected not only has direct influence on intent to use but also influences the intent to use by the mediating factor of perceived usefulness. In this article, Openness characteristic (consumer's personality) has a moderating effect on the relationship between security, expected effort and usage intention.

Secure multifactor authentication payment system using NFC:

The latest trend of making financial transactions is done by the use of cards or internet banking. A person may have multiple bank accounts across several banks which makes it difficult for him/her to manage the transactions i.e. he/she either has to carry several cards or use a bunch of bank websites for accomplishing his/her transaction purposes. This situation demands the need of a simple, secure and hi-tech system for achieving the purposes of making transactions. We propose such a system that uses the latest technologies like NFC and multifactor authentication which can be used on any NFC enabled Smartphone. The multi factor authentication system uses a 4-digit PIN as the knowledge factor, an NFC enabled Smartphone, instead of cards, as the possession factor and the face of the user as the inherence factor for the purpose of authentication. The proposed system which can be implemented as cross-platform mobile application, not only allows the user to make secure transactions, but also allows him/her to make transactions from his/her multiple accounts.

Biometric Face Recognition Payment System:

Use of payment cards in various places such as shopping, restaurants, lodges and online payment for booking hotels, movie tickets, flight and train tickets etc are increasing day by day. So the problem is that a person has to carry payment cards along with him and keep the cards secure to use it all the time. This also lacked security. In the present work the biometric face recognition payments is used in all kinds of payments. Thus it avoids the need to memorize different passwords. Face recognition payment system is safe, secure and even easy to use. It is reliable and more efficient compared to other payment technologies. A general design of online payment system using face recognition is proposed. The methods adopted for face recognition are by finding the eigenfaces and Euclidean distance.

Facial Recognition in Banking – Current Applications:

Facial recognition software is making its way into the mainstream, with consumer applications such as the ability to unlock one's smartphone with their face. The banking sector has been at the forefront of enterprise adoption of AI since machine learning became the hot topic of the business world in the early years of the decade; as such, it makes sense that facial recognition technology would start to make its way into banking. There are a handful of companies offering facial recognition software to banks that at face value seem to have the requisite talent in their C-suite that we look for when vetting a company on their claims to leveraging AI. These companies offer software with applications ranging from physical security to the ability for customers to make withdrawals with their faces. Facial recognition is one of numerous ways banks can decrease friction in their customers' experience and increase efficiency and accessibility. Some experts think that this is how banks can succeed in the future as AI and other technologies make more and more services accessible without any down time.

Face Detection and Recognition for Bank Transaction ", International Journal of Emerging Technologies and Innovative Research:

There is a crucial need for improving security in banking region. With the birth of the Automatic Teller Machines, banking became a lot easier though with its own troubles of insecurity. Due to tremendous increase in the number of criminals and their activities, the ATM has become insecure. ATM systems today use no more than an access card and PIN for identity verification. An attempt is made for developing a system that integrates facial recognition technology into the identity verification process and use of RFID card for handling multiple accounts in same card with Raspberry pi controller. The development of such a system would serve to protect consumers and financial institutions alike from intruders and identity thieves. This paper proposes an automatic teller machine security model that would combine a RFID card, a PIN, and electronic facial recognition that will go as far as with holding the fraudsters' card. If this technology becomes widely used, faces would be protected as well as PINs. However, it obvious that manes biometric features cannot be replicated, this proposal will go a long way to solve the problem of Account safety making it possible for the actual account owner alone have access to his accounts. The combined biometric features approach is to serve the purpose both the identification and authentication.

Continuous User Identity Verification Using Biometric Traits for Secure Internet Services:

Nowadays, it becomes serious concern to provide more security to web services. So, secure user authentication is the fundamental task in security systems. Traditionally, most of the systems are based on pairs of username and password which verifies the identity of user only at login phase. Once the user is identified with username and password, no checks are performed further during working sessions. But emerging biometric solutions substitutes the username

and password with biometric data of user. In such approach still single shot verification is less efficient because the identity of user is permanent during whole session. Hence, a basic solution is to use very short period of timeouts for each session and periodically request the user to input his credentials over and over. But this is not a proper solution because it heavily affects the service usability and ultimately the satisfaction of users. This paper explores the system for continuous authentication of user using his credentials such as biometric traits. The use of continuous biometric authentication system acquires credentials without explicitly notifying the user or requiring user interaction that is, transparently which is necessary to guarantee better performance and service usability.

Skin color based Face detection Method:

Detection of skin color in color images is a very popular and useful technique for face detection. Color is an important feature of human faces. Using skin-color as a feature for tracking a face has several advantages. Color processing is much faster than processing other facial features. In the skin color detection process, each pixel was classified as skin or non-skin based on its color components. In situations where color description plays an integral role, the HSV color model is often preferred over the RGB model. The first step of face detection is to segment the color image into skin and non-skin region. Different color space has different ranges of pixels which represents skin region and non-skin region.

Face Detection system based on retinal connected neural network (RCNN):

It first applies a set of neural network-based filters to an image. It uses an arbitrator to combine the outputs. The filters examine each location in the image at several scales, looking for locations that might contain a face. The arbitrator then merges detections from individual filters and eliminates overlapping detections. This method produces good detection rates (77.9% and 90.3%) with an acceptable number of false positives. Depending on the application, the system can be made more or less conservative by varying the arbitration heuristics or thresholds used. We have also applied the same algorithm for the detection of car tires and human eyes.

Combining Skin Color based Classifiers and HAAR Feature using VJ Algorithm:

D. Gobinathan have presented a hybrid means for face recognition in shade images. The well-known HAAR feature-based encounter detector developed by Viola as well as Jones (VJ) that was designed for gray-scale pictures was along with a skin-color filtration system, which supplies complementary facts in shade images. The image was passed by way of a HAAR Feature based encounter detector, which ended up being adjusted in a way that it ended up being operating in a point in its ROC curve which has a low quantity of missed people but a top number involving false detections. Their recommended method features eliminated a number of these false detections. They have likewise used a color pay out algorithm in order to reduce the results of illumination. Their experimental results about the Bao shade face databases have showed that this proposed method was better than the unique VJ algorithm.

Face Detection and Recognition for Bank Transaction:

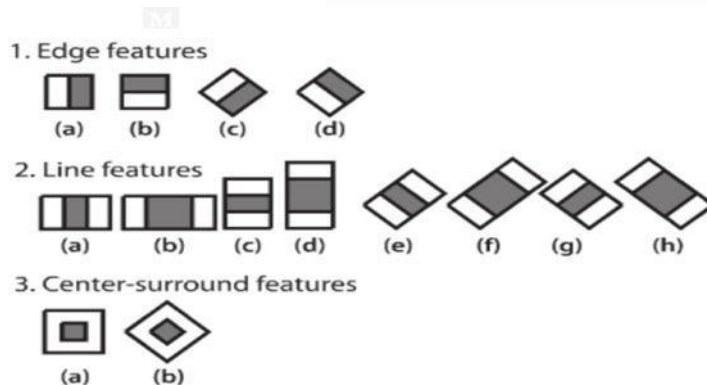
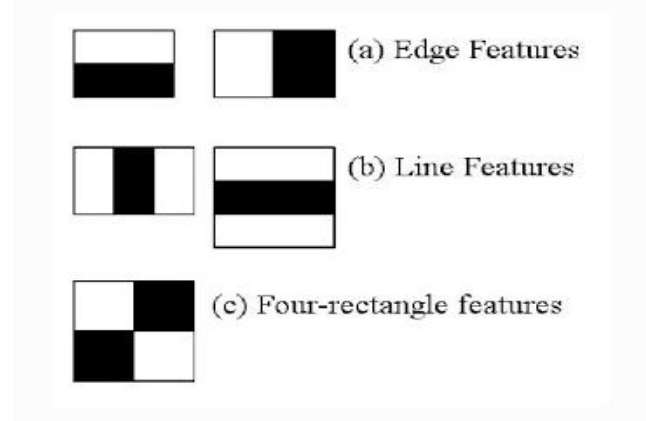
There is a crucial need for improving security in banking region. With the birth of the Automatic Teller Machines, banking became a lot easier though with its own troubles of insecurity. Due to tremendous increase in the number of criminals and their activities, the ATM has become insecure. ATM systems today use no more than an access card and PIN for identity verification. An attempt is made for developing a system that integrates facial recognition technology into the identity verification process and use of RFID card for handling multiple accounts in same card with Raspberry pi controller. The development of such a system would serve to protect consumers and financial institutions alike from intruders and identity thieves. This paper proposes an automatic teller machine security model that would combine a RFID card, a PIN, and electronic facial recognition that will go as far as with holding the fraudsters' card. If this technology becomes widely used, faces would be protected as well as PINs. However, it obvious that manes biometric features cannot be replicated, this proposal will go a long way to solve the problem of Account safety making it possible for the actual account owner alone have access to his accounts. The combined biometric features approach is to serve the purpose both the identification and authentication.

MATERIALS:

- Web camera
- Pentium 4
- Anaconda ide
- Keyboard
- Windows
- RAM 8GB

PROPOSED SYSTEM OVERVIEW:

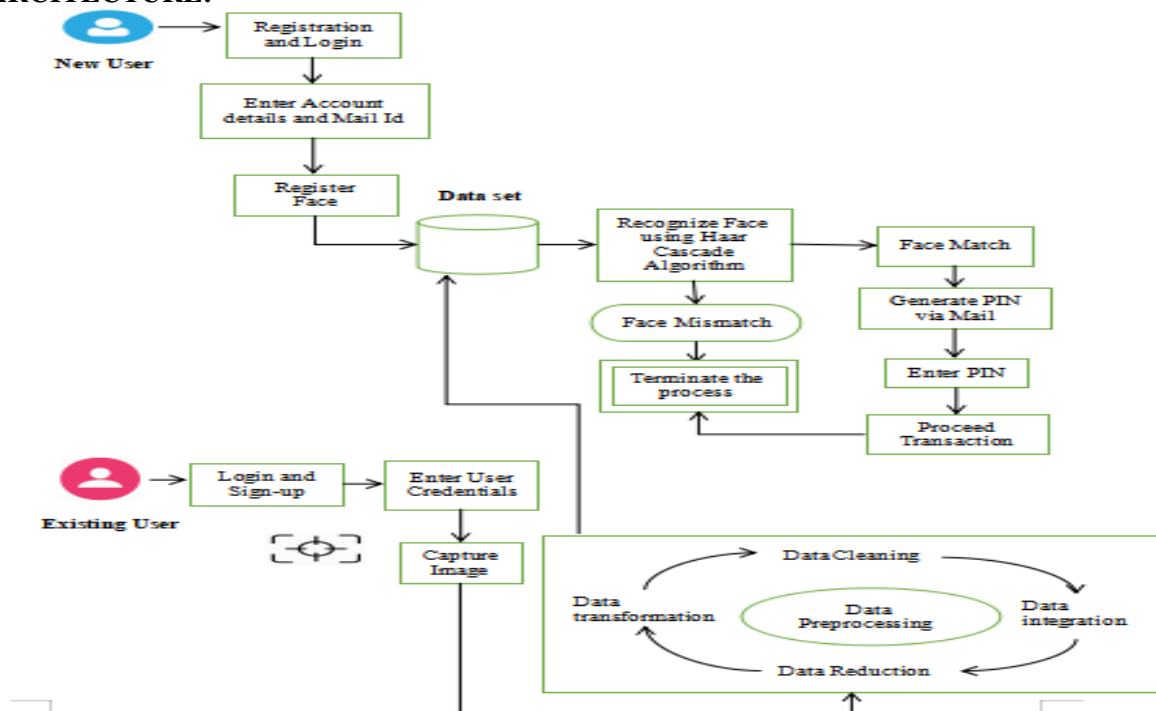
This uses machine learning techniques to get a high degree of accuracy from what is called “training data”. Haar Cascades use the Adaboost learning algorithm which selects a small number of important features from a large set to give an efficient result of classifiers. Initially, the algorithm needs a lot of positive images (images of faces) and negative images (images without faces) to train the classifier. Then we need to extract features from it. For this, haar features shown in below image are used. They are just like our convolutional kernel. Each feature is a single value obtained by subtracting sum of pixels under white rectangle from sum of pixels under black rectangle.



Face Detection determines the locations and sizes of human faces in arbitrary (digital) images.

In **Face Recognition**, the use of Face Detection comes first to determine and isolate a face before it can be recognized.

SYSTEM DESIGN: SYSTEM ARCHITECTURE:



SYSTEM REQUIREMENTS:

Hardware Specification

- ✓ PROCESSOR : PENTIUM IV RAM : 8 GB
- ✓ PROCESSOR : 2.4 GHZ
- ✓ MAIN MEMORY : 8GB RAM
- ✓ PROCESSING SPEED : 600 MHZ
- ✓ HARD DISK DRIVE : 1TB
- ✓ KEYBOARD : 104 KEYS

Software Specification:

- ✓ FRONT END : PYTHON
- ✓ IDE : ANACONDA
- ✓ OPERATING SYSTEM : WINDOWS 10

IMPLEMENTATION:

• LOGIN

The Login Module is a portal module that allows users to type a user name and face image to log in. You can add this module on any module tab to allow users to log in to the system.

• REGISTER

Registration module user enter their details for registration into the system.

• TRANSACTION

In this phase the transaction is proceed when the face is matched with the registered user otherwise the transaction is terminated.

RESULTS AND DISCUSSION:

In this study, we introduced a facial recognition system to provide a secured and reliable bank transaction. The introduction of the deep for facial authentication had proven to be effective in maximizing security level when performing banking transaction. It is expected that the security level of mobile banking to increase with the employment networks for face authentication.

REFERENCES:

1. Wen Kun Zhang ; Min Jung Kang , : Facial-Recognition Payment: An Example of Chinese Consumers, IEEE Access, Year: 2019
2. Anirudhan Adukkathayar ; Gokul S Krishnan ; Rajashree Chinchole,: Secure multifactor authentication payment system using NFC, 2015 10th International Conference on Computer Science & Education (ICCSE)\
3. Surekha. R. Gondkar Saurab. Dr. C. S. Mala : Biometric Face Recognition Payment System, International journal of Engineering Research & Technology NCESC - 2018 Conference Proceedings
4. Facial Recognition in Banking – Current Applications, Niccolo Mejia, 2019 Conference Proceedings
5. Sudarshan Dumbre ,Shamita Kulkarni, Devashree Deshpande ,P.V.Mulmule : Face Detection and Recognition for Bank Transaction ", International Journal of Emerging Technologies and Innovative Research , Journal of Emerging Technologies and Innovative Research 2018
6. Dr.SHAIK ADBUL MUZZER, 2GOSALA SUBHASIN: Continuous User Identity Verification Using Biometric Traits for Secure Internet Services,
7. Devendra Singh Raghuvanshi,Dheeraj Agrawal: Skin color based Face detection Method,
8. Rowley, Baluja, Kanade : Face Detection system based on retinal connected neural network (RCNN),
9. N.Gobinathan, Abinaya and Geetha. P: Combining Skin Color based Classifiers and HAAR Feature using VJ Algorithm,
10. Sudarshan Dumbre, Shamita Kulkarni, Devashree Deshpande, Prof P.V.Mulmule., Face Detection and Recognition for Bank Transaction.

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Secure Authentication Scheme for Bank Locer Access Using Multi-Fingerprinting

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Abstract: In this paper we use a biometric security which uses multiple fingerprints. Here 2 fingerprints are combined to obtain more privacy and security. A combined template which is made up of two different fingerprints is used. This Combined fingerprint is stored in central repository. Even though this data is accessed or stolen, it is difficult to recognize the combined fingerprint from the normal fingerprint template. Therefore a virtual fingerprint based on two different imprints of the same user to improve the performance of normal security systems.

Key Words: biometric, central repository.

INTRODUCTION:

OBJECTIVE

To generate minutiae based template from a two different fingerprint template.

PROJECT OBJECTIVE:

The main objective of this system is to prevent an attacker to compromise privacy of users or biometric data and not necessarily to the art by passing of the biometric authentication itself.

PROBLEM STATEMENT

Traditional encryption is not sufficient for fingerprint privacy protection because decryption is required before the fingerprint matching, which exposes the fingerprint to the attacker. Therefore, in recent years, significant efforts have been put into developing specific protection techniques

LITERATURE REVIEW:

GLOBAL AND LOCAL FEATURE-BASED TRANSFORMATIONS FOR FINGERPRINT DATA PROTECTION:

Knowledge and token-based authentication systems have been widely researched and implemented in various applications, from complex systems, such as e-voting to simple ones, such as computer account verification. These two authentication systems have high reliability and accuracy levels so that only when the information provided by the user is exactly the same as what has been stored in the database, the authentication is successful. This simplicity has made it easy for the users to authenticate themselves. Nevertheless, these two authentication systems have some drawbacks. Firstly, passwords (knowledge-based authentication) and ID-cards (token-based authentication) are easily shared or distributed between users; so, the system is not able to detect whether they are used by the legitimate users. This can result in breaking the non-repudiation property in the authentication process. Secondly, most users hold exactly the same passwords for various applications which make it easy for the adversary to compromise all applications since he/she only needs to break one password.

Moreover, dictionary words or the word password itself has been commonly used as a password which actually does not comply with the security standard, especially in terms of length and randomness. A vulnerable situation caused by the password-related issue. Where there were 34% of users who never changed their passwords at all and only about 46% of users who changed their passwords within six months. Therefore, in multiple applications, passwords can be the weakest point. On the other hand, the biometrics-based authentication system has advantages over the existing knowledge- and token-based authentication ones. The fact that biometrics employs the human physical or behavioral traits has become its strength since a legitimate user must present when the authentication process is performed. Also, biometrics is not easily shared or distributed. This makes it difficult for the users to repudiate. Furthermore, an advanced technology has been introduced to detect the authenticity of the biometrics, for

example, the liveness detection of face and fingerprint. In addition, the combination of biometrics and either passwords or ID-cards in multiple applications potentially increases security. Conceptually, the biometrics-based authentication system is similar to both knowledge and token-based ones. It needs to process the biometric data so that it is appropriate (in terms of size, format, etc) to be stored in the database. This biometric data, called biometric template, is to be compared (matched) with the biometric query which is presented by the user in the authentication process. Among existing biometric modalities, the fingerprint has been the most popular to be used in any authentication or identification system. Fingerprints as identification have a long history. They have been proposed to be a marker of identity by ancient people and have been researched scientifically since sixteenth century. In addition, fingerprints have relatively good characteristics; at least, based on them, users can be distinguished by using their unique fingerprint pattern which will not change over a long period of time (distinctiveness and permanence properties). It should be noted that in rare cases, the fingerprint pattern may change due to some reasons, for example, occupational and aging factors. It is also shown in that the possibility of different individuals being falsely matched is low. In fact, each biometric module has different characteristics. Fingerprints, in general, hold properties which are suitable for various aspects required by a biometrics-based authentication system. Other biometric modalities may be better in one aspect but worse in others. For example, the iris is the best in terms of potentiality for circumvention but it is the worst in terms of acceptability. The superiority of fingerprints has made them a potential candidate to be used either in single or in multiple authentication systems. In the latter, fingerprints are combined with the existing knowledge and token-based systems or other biometric modalities.

SECURE AND EFFICIENT PROTOCOLS FOR IRIS AND FINGERPRINT IDENTIFICATION:

Recent advances in biometric recognition make the use of biometric data more prevalent for authentication and other purposes. Today large-scale collections of biometric data include face, fingerprint, and iris images collected by the US Department of Homeland Security (DHS) from visitors through its US-VISIT program iris images collected by the United Arab Emirates (UAE) Ministry of Interior from all foreigners and also fingerprints and photographs from certain types of travelers and several others. While biometry serves as an excellent mechanism for authentication and identification of individuals, such data is undeniably extremely sensitive and must be well protected. Furthermore, once leaked biometric data cannot be revoked or replaced. For these reasons, biometric data cannot be easily shared between organizations or agencies. However, there could be legitimate reasons to carry out computations on biometric data belonging to different entities. For example, a non-government agency may need to know whether a biometric it possesses appears on the government watch-list. In this case the agency would like to maintain the privacy of the individual if no matches are found, and the government also does not want to release its database to third parties. The above requires carrying out computation over biometric data in a way that keeps the data private and reveals only the outcome of the computation. In particular, we study the problem of biometric identification, where a client C is in a possession of a biometric X and a server S possesses a biometric database D . The client would like to know whether X appears in the database D by comparing its biometric to the records in D . The computation amounts to comparing X to each $Y \in D$ in a privacy-preserving manner. This formulation is general enough to apply to a number of other scenarios, ranging from a single comparison of X and Y to the case where two parties need to compute the intersection of their respective databases. We assume that the result of comparing biometrics X and Y is a bit, and no additional information about X or Y should be Learned by the parties as a result of secure computation. With our secure protocols, the outcome can be made available to either party or both of them; for concreteness in our description, we have the client learn the outcome of each comparison. In this work that both the client's and the server's biometric images have been processed and have representations suitable for biometric matching, i.e., each raw biometric image has been processed by a feature extraction algorithm.

FINGERPRINT TEMPLATE PROTECTION: FROM THEORY TO PRACTICE:

The primary purpose of using a biometric system is to provide non-repudiable authentication. Authentication implies that (i) only legitimate or authorized users are able to access the physical or logical resources protected by the biometric system and (ii) impostors are prevented from accessing the protected resources. Non repudiation ensures that an individual who accesses a certain resource cannot later deny using it. From the perspective of the users, there are two main requirements that a biometric system must meet. Firstly, the legitimate users must have timely and reliable access to the protected resource/service. Secondly, the biometric system and the personal data stored in it must be used only for the intended functionality, which is to control access to a specific resource and not for other unintended purposes. However, attacks by adversaries may prevent the biometric system from satisfying the above functionalities and requirements. While a biometric system can be compromised in a number of ways, one of the potentially damaging attacks is the leakage of biometric template information. The leakage of this template information to unauthorized individuals constitutes a serious security and privacy threat due to the following two reasons:

- **Intrusion attack:** If an attacker can hack into a biometric database, he can easily obtain the stored biometric information of a user. This information can be used to gain unauthorized access to the system by either reverse engineering the template to create a physical spoof or replaying the stolen template. For example, it has been shown that fingerprint images can be reconstructed from minutiae templates, which may in turn be used to construct a spoof.
- **Function creep:** An adversary can exploit the biometric template information for unintended purposes (e.g., covertly track a user across different applications by cross-matching the templates from the associated databases), compromising user privacy. Due to these reasons, biometric templates (or the raw biometric images) should not be stored in plaintext form and fool-proof techniques are required to securely store the templates such that both the security of the application and the users' privacy are not compromised by adversary attacks. The fundamental challenge in designing a biometric template protection scheme is to overcome the large intra-user variability among multiple acquisitions of the same biometric trait

BIOMETRICS OF NEXT GENERATION: AN OVERVIEW:

Human identification leads to mutual trust that is essential for the proper functioning of society. Identifying fellow humans based on their voice, appearance, or gait for thousands of years. However, a systematic and scientific basis for human identification started in the 19th century when Alphonse Bertillon introduced the use of a number of anthropomorphic measurements to identify habitual criminals. The Bertillon system was short-lived: soon after its introduction, the distinctiveness of human fingerprints was established. Since the early 1900s, fingerprints have been an accepted method in forensic investigations to identify suspects and repeat criminals. Now, virtually all law enforcement agencies worldwide use Automatic Fingerprint Identification Systems (AFIS). With growing concerns about terrorist activities, security breaches, and financial fraud, other physiological and behavioral human characteristics have been used for person identification. These distinctive characteristics, or biometric traits, include features such as face, iris, palm print, and voice. Biometrics is now a mature technology that is widely used in a variety of applications ranging from border crossings (e.g., the US-VISIT program) to visiting Walt Disney Parks.

Biometric recognition is based on two fundamental premises about body traits: distinctiveness and permanence. The applicability and identification accuracy of a specific biometric trait essentially depends to what extent these two premises hold true for the population at hand. Fingerprints, face, and iris are amongst the most popular physiological characteristics used in commercial biometric systems, with fingerprint alone capturing over 50% of the civilian market share. Distinctiveness as well as the permanence of many of the behavioral characteristics proposed in the literature (such as signature, gait, and keystroke dynamics) is weak. As such, very few operational systems based on these traits have been deployed so far. The choice of a specific biometric modality typically depends on the nature and requirements of the intended identification application. As an example, voice biometric is appropriate in authentication applications involving mobile phones since a sensor for capturing voice (microphone) is already embedded in the phone. Fingerprint is the most popular biometric for accessing laptops, mobile phones and PDAs since low cost, small footprint fingerprint sweep sensors can be easily embedded in these devices. Some of the traits, for example, hand geometry, are more appropriate for verification applications (1:1 matching) whereas others like fingerprint, iris, and face have sufficient discriminating power to be applicable in large-scale identification applications (1:N matching). One of the unique applications of biometrics is in the negative identification, *i.e.*, the person is not the one who has already been registered/enrolled in the system. The negative identification is required to prevent multiple enrollments of the same person which is critical for large scale biometric applications, *e.g.* claiming social benefits from the government sponsored programs. Therefore, even in verification applications, identification capabilities for the negative identification are necessary.

PRIVACY LEAKAGE VS. PROTECTION MEASURES: THE GROWING DISCONNECT

Recently, multiple vectors of private information leakage via Online Social Networks (OSN) and the two decade long aggregation of data about users visiting popular Web sites have been reported. The problem of privacy has worsened significantly in spite of the various proposals and reports by researchers, government agencies, and privacy advocates. The ability of advertisers and third-party aggregators to collect a vast amount of increasingly personal information about users who visit various Web sites has been steadily growing. Numerous stories have expressed alarm about the situation with legislatures and privacy commissioners in different countries paying closer attention to the problem. The awareness about the steady erosion of privacy on the part of users is growing slowly. The potential economic impact as a result of loss of brand value has forced some companies to start paying closer attention to complaints from users and privacy advocates. The privacy landscape is worsening as there is a growing disconnect between steadily increasing leakage to and linkage by aggregators with existing and proposed protection measures. Beyond the egregious leakage of private information via OSNs and their more recent mobile counterparts, a key part of the Internet with tens of millions of users representing diverse demographics with accounts on popular non-OSN Web sites also suffer from private information leakage to prominent aggregators. Additionally, less well-

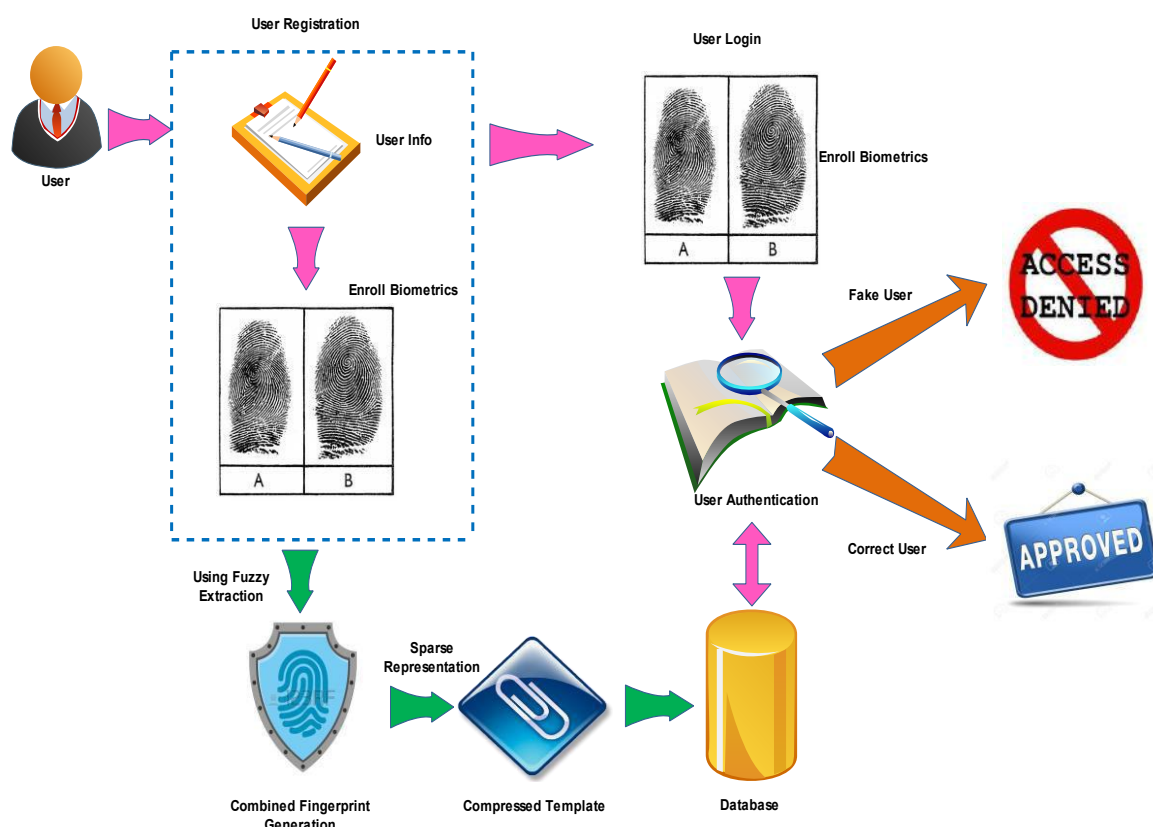
understood notions of linkage are typically not addressed by most of the proposed privacy solutions. One such privacy issue arises from the existence of globally unique ids such as an OSN id or reused email addresses that could be used to link together pieces of seemingly distinct information. Beyond the intrinsic identifying nature of these ids, they aid in linking together other information, such as cookies from a home and work computer. New proposals, such as the recent United States Federal Trade Commission's December fail to address several key issues.

Our earlier work focused on longitudinal data gathering by aggregators on the leakage of personal information via popular OSNs and the more recently mobile OSN. However, there has been no attention paid thus far to another segment of the Internet where sites encourage and allow users to create accounts so that they could have a richer interaction experience. Many popular Web sites allowed users to establish profiles long even before the advent of OSNs. There are significant demographics that are present in non-OSN Web sites that may not be on OSN sites and their private information is also of interest to aggregators. On many of these sites, users create profiles with varying amounts of personal information, but typically less than what they supply on OSN sites. Unlike OSNs, these Web sites already have content and do not depend on users to create content; users could however add comments or tags. Surprisingly, there is considerable overlap in the nature of personal information that users provide across these sites. The degree of sensitivity to different aspects of their personal information varies across users as is the potential for identifiability (ability to link a unit of personal information with a specific user).

PROPOSED SYSTEM OVERVIEW:

A novel system for protecting fingerprint privacy by combining two different fingerprints into a new identity. During the enrollment, the system captures two finger prints from two different fingers. A combined minutiae template generation algorithm to create a combined minutiae template from the two fingerprints. In such a template, the minutiae positions are extracted from one fingerprint, while the minutiae directions depend on the orientation of the other fingerprint and some coding strategies. The template will be stored in a database for the authentication which requires two query fingerprints. A two-stage fingerprint matching process is further proposed for matching the two query fingerprints against a combined minutiae template. By using the combined minutiae template, the complete minutiae feature of a single fingerprint will not be compromised when the database is stolen. In addition, the combined minutiae template share a similar topology to the original minutiae templates, it can be converted into a real-look alike combined fingerprint by using an existing fingerprint reconstruction approach. The combined fingerprint issues a new virtual identity for two different fingerprints, which can be matched using minutiae based fingerprint matching algorithms.

SYSTEM SOFTWARE DESIGN: SYSTEM ARCHITECTURE



LIST OF MODULES:

- User Enrollment
- Minutiae Template Generation
- Server Authentication
- Access User Information

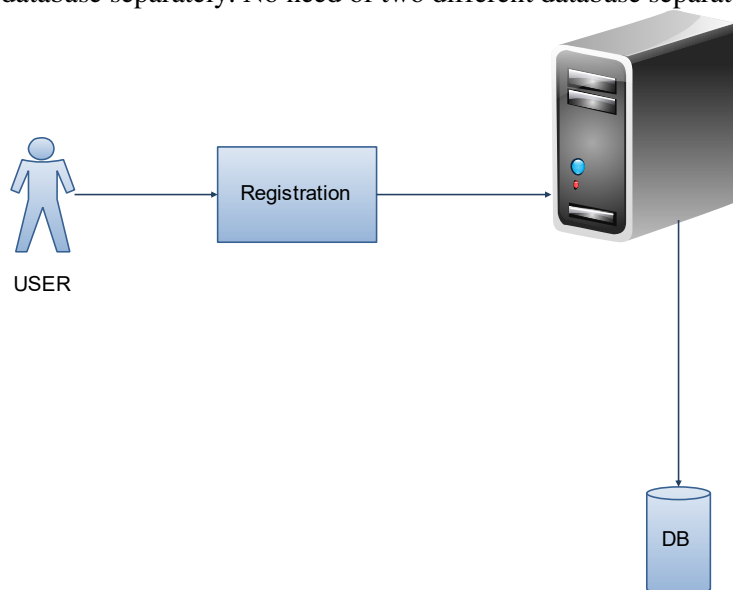
MODULE DESCRIPTION:

LIST OF MODULES

- User Enrollment
- Minutiae Template Generation
- Server Authentication
- Access User Information

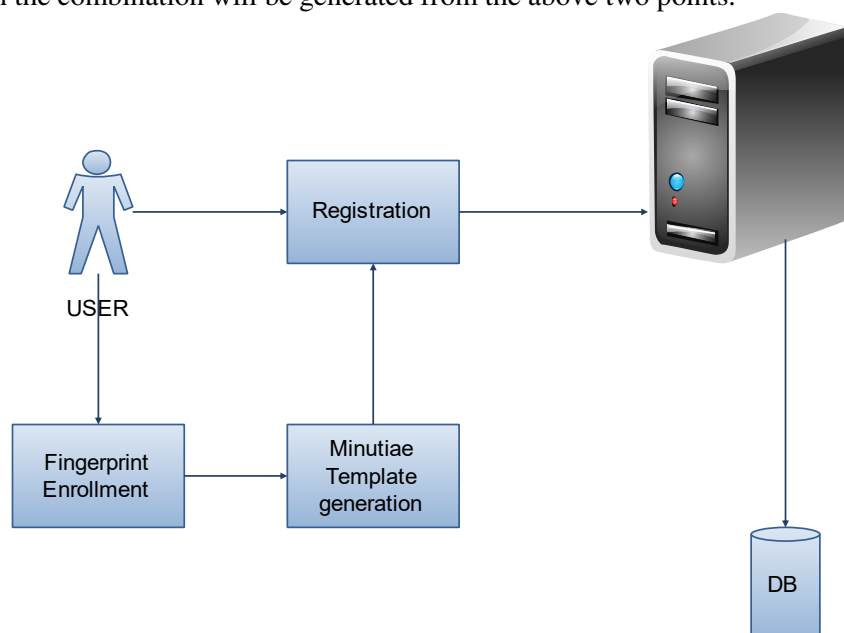
USER ENROLLMENT

This Module mainly used for user registration process and they need to provide information such as username, password, address, phone number, image, fingerprint info, Security question, answer, locker details and the server can maintain the details in their database separately. No need of two different database separately.



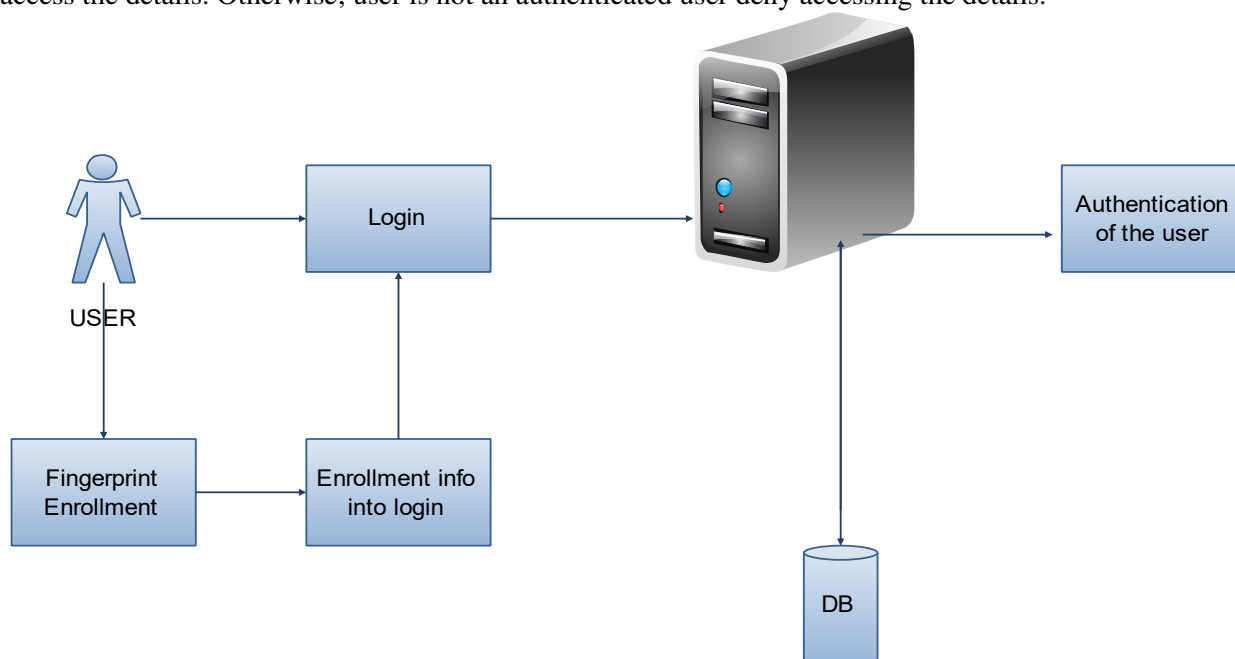
MINUTIAE TEMPLATE GENERATION:

The Minutiae Template is nothing but fingerprint info. User provides a two different fingers and the combination is generated from the two fingerprint info is referred to as a Minutiae Template. The Minutiae template is generated by using the two points they are reference points orientation extraction and the reference point and minutiae position extraction then the combination will be generated from the above two points.



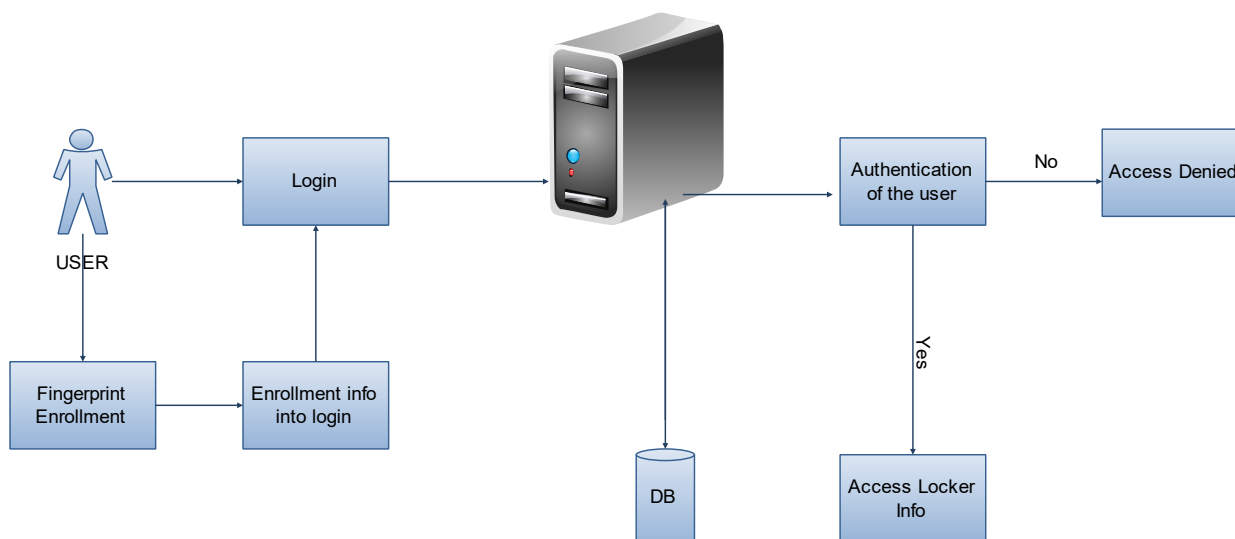
SERVER AUTHENTICATION:

This module mainly used to authenticate the user login info details provided by the user will be match with an existing database and especially fingerprint info. The Fingerprint enrollment process again the two points are extracted and then the matching the two templates with the database if it matches then the user is an authenticated person can access the details. Otherwise; user is not an authenticated user deny accessing the details.



ACCESS USER INFORMATION:

The user can access their information if they want to view the details and the updation they want to do their information means they provide their updation info to the server and in turn server can update the user information. The users access the details at anytime. This will provide a high enough security to the user details. The user data will be more and more secure unauthorized user can't able get the details.



CONCLUSION:

We introduce a novel system for fingerprint privacy protection by combining two fingerprints into a new identity. In the enrollment, the system captures two fingerprints from two different fingers. A combined minutiae template containing only a partial minutiae feature of each of the two finger prints will be generated and stored in a database. To make the combined minutiae template look real as an original minutiae template, three different coding strategies are introduced during the combined minutiae template generation process. In the authentication process, two query fingerprints from the same two fingers are required. A two-stage fingerprint matching process is proposed for matching the two query fingerprints against the enrolled template. Our combined minutiae template has a similar topology to an original minutiae template. Therefore, we are able to combine two different fingerprints into a new virtual identity by reconstructing a real-look alike combined fingerprint from the combined minutiae template. The

experimental results show that our system achieves a very low error rate with FRR at FAR . It is also difficult for an attacker to break other traditional systems by using the combined minutiae templates. Compared with the state-of-the-art technique, our technique can generate a better new virtual identity (i.e., the combined fingerprint) when the two different fingerprints are randomly chosen. The analysis shows that it is not easy for the attacker to recover the original minutiae templates from a combined minutiae template or a combined fingerprint.

REFERENCES:

1. S. Li and A. C. Kot, "A novel system for fingerprint privacy protection," in Proc. 7th Int. Conf. Inform. Assurance and Security (IAS), Dec. 5–8, 2017, pp. 262–266.
2. B. J. A. Teoh, C. L. D. Ngo, and A. Goh, "Biohashing: Two factor authentication featuring fingerprint data and tokenised random number," Pattern Recognit., vol. 37, no. 11, pp. 2245–2255, 2017.
3. A. Kong, K.-H. Cheung, D. Zhang, M. Kamel, and J. You, "An analysis of biohashing and its variants," Pattern Recognit., vol. 39, no. 7, pp. 1359–1368, 2016.
4. N. K. Ratha, S. Chikkerur, J. H. Connell, and R. M. Bolle, "Generating cancelable fingerprint templates," IEEE Trans. Pattern Anal. Mach. Intell., vol. 29, no. 4, pp. 561–72, Apr. 2017.
5. A. Nagar, K. Nandakumar, and A. K. Jain, "Biometric template transformation: A security analysis," in Proc. SPIE, Electron. Imaging, Media Forensics and Security, San Jose, Jan. 2016.
6. K. Nandakumar, A. K. Jain, and S. Pankanti, "Fingerprint-based fuzzy vault: Implementation and performance," IEEE Trans. Inf. Forensics Security, vol. 2, no. 4, pp. 744–57, Dec. 2015.
7. W. J. Scheirer and T. E. Boult, "Cracking fuzzy vaults and biometric encryption," in Proc. Biometrics Symp., Sep. 2014, pp. 34–39.
8. S. Li and A. C. Kot, "Privacy protection of fingerprint database," IEEE Signal Process. Lett., vol. 18, no. 2, pp. 115–118, Feb. 2015.
9. A. Ross and A. Othman, "Visual cryptography for biometric privacy," IEEE Trans. Inf. Forensics Security, vol. 6, no. 1, pp. 70–81, Mar. 2014.
10. B. Yanikoglu and A. Kholmatov, "Combining multiple biometrics to protect privacy," in Proc. ICPR- BCTP Workshop, Cambridge, U.K., Aug. 2013.

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Crypt-Dac Cryptographically Enforced Dynamic Access Control In The Cloud

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Abstract: Data owners will store their data in public cloud along with encryption and particular set of attributes to access control on the cloud data. While uploading the data into public cloud they will allocate some attribute set to their data. If any authorized cloud user wants to download their data they must enter that particular attribute set to perform additional actions on data owner's data. A cloud user wants to register their details under cloud organization to access the data owner's data. Users want to submit their details as attributes along with their designation. Based on the user details Semi-Trusted Authority generates decryption keys to get influence on owner's data. An user can perform a lot of operations over the cloud data. If the user wants to read the cloud data he needs to be entering some read related attributes, and if he wants to write the data he needs to be entering write related attributes. For each and every action user in an organization would be proved with their unique attribute set. These attributes would be shared by the admins to the authorized users in cloud organization Crypt-DAC enforces dynamic access control that provides efficiency, as it does not require expensive decryption, re-encryption and uploading/re-uploading of large data at the controller side, and security, as it immediately revokes access permissions.

Key Words: cryptography, revocation key, symmetric key.

INTRODUCTION:

Aim

The main aim of this project is to provide integrity of an organization data which is in public cloud.

Synopsis:

Data owners will store their data in public cloud along with encryption and particular set of attributes to access control on the cloud data. While uploading the data into public cloud they will assign some attribute set to their data. If any authorized cloud user wants to download their data they should enter that particular attribute set to perform further actions on data owner's data. A cloud user wants to register their details under cloud organization to access the data owner's data. Users want to submit their details as attributes along with their designation. Based on the user details Semi-Trusted Authority generates decryption keys to get control on owner's data. An user can perform a lot of operations over the cloud data. If the user wants to read the cloud data he needs to be entering some read related attributes, and if he wants to write the data he needs to be entering write related attributes. For each and every action user in an organization would be verified with their unique attribute set. These attributes would be shared by the admins to the authorized users in cloud organization Crypt-DAC enforces dynamic access control that provides efficiency, as it does not require expensive decryption, re-encryption and uploading/re-uploading of large data at the administrator side, and security, as it immediately revokes access permissions.

LITERATURE REVIEW:

- “Attribute-Based Encryption For Fine-Grained Access Control Of Encrypted Data”, Vipul Goyal Omkant Pandey Amit Sahai, 2006

Abstract: As more sensitive data is shared and stored by third-party sites on the Internet, there will be a need to encrypt data stored at these sites. One drawback of encrypting data is that it can be selectively shared only at a coarse-grained level (i.e., giving another party your private key). We develop a new cryptosystem for ne-

grained sharing of encrypted data that we call Key-Policy Attribute-Based Encryption (KP-ABE). In our cryptosystem, cipher texts are labeled with sets of attributes and private keys are associated with access structures that control which cipher texts a user is able to decrypt. We demonstrate the applicability of our construction to sharing of audit-log information and broadcast encryption. Our construction supports delegation of private keys which subsumes Hierarchical Identity-Based Encryption (H)

- **“Bounded Cipher Text Policy Attribute Based Encryption”, Vipul Goyal, Abhishek Jain, Omkant Pandey, 2009**

Abstract: In a cipher text policy attribute based encryption system, a user's private key is associated with a set of attributes (describing the user) and an encrypted cipher text will specify an access policy over attributes. A user will be able to decrypt if and only if his attributes satisfy the cipher text's policy. In this work, we present the first construction of a cipher text-policy attribute based encryption scheme having a security proof based on a number theoretic assumption and supporting advanced access structures. Previous CP-ABE systems could either support only very limited access structures or had a proof of security only in the generic group model. Our construction can support access structures which can be represented by a bounded size access tree with threshold gates as its nodes. The bound on the size of the access trees is chosen at the time of the system setup. Our security proof is based on the standard Decisional Bilinear Different Hellman assumption.

- **“ Cipher Text-Policy Attribute-Based Encryption”, John Bethencourt, Amit Sahai 2008**

Abstract: In several distributed systems a user should only be able to access data if a user possesses a certain set of credentials or attributes. Currently, the only method for storing the data and mediating access control. However, if any server storing the data is compromised, then the confidentiality of the data will be compromised. In this paper we present a system for realizing complex access control on encrypted data that we call Cipher text-Policy Attribute-Based Encryption. By using our techniques encrypted data can be kept confidential even if the storage server is entrusted; moreover, our methods are secure against collusion attacks. Previous Attribute-Based Encryption systems used attributes to describe the encrypted data and built policies into user's keys; while in our system attributes are used to describe a user's credentials, and a party encrypting data determines a policy for who can decrypt. Thus, our methods are conceptually closer to traditional access control methods such as Role-Based Access Control (RBAC). In addition, we provide an implementation of our system and give performance measurements.

- **“Cryptographically Enforced Data Access Control In Personal Health Record Systems”, Dr. Ragesh G. K.A, Dr. K. Baskaranb, 2016**

Abstract: Personal Health Record (PHR) systems play a vital role during digital transformation of healthcare. These systems provide many value-added features like viewing one's health related information, secure transmission and tracking of that information with the health service providers. A cloud assisted PHR system maximizes the possibility for PHR systems to interoperate with other systems in health information management environments. Each patient needs to encrypt his/her PHR data before uploading it in the cloud since the patients will lose their physical access to their health data stored in cloud servers. Moreover, to achieve fine-grained data access control on encrypted PHR data in an effective and scalable manner is a challenging task. Since there are multiple owners or patients are available in a PHR system and existing data access control schemes are mostly designed for the single-authority/owner scenarios, a novel patient-centric data access control scheme called Revocable Multi Authority Attribute Set Based Encryption (R- MA- ASBE) is proposed. The proposed scheme inherits flexibility, scalability and fine-grained patient centric data access control.

- **“ Design And Implementation Of Sec Pod, A Framework For Virtualization-Based Security Systems”, Xiaoguang Wang, Yong Qi, ,2017**

Abstract: The OS kernel is critical to the security of a computer system. Many systems have been proposed to improve its security. A fundamental weakness of those systems is that page tables, the data structures that control the memory protection, are not isolated from the vulnerable kernel, and thus subject to tampering. To address that, researchers have relied on virtualization for reliable kernel memory protection. Unfortunately, such memory protection requires monitoring every update to the guest's page tables. This fundamentally conflicts with the recent advances in the hardware virtualization support. In this paper, we present the design and implementation of Sec Pod, a practical and extensible framework for virtualization-based security systems that can provide both strong isolation and the compatibility with modern hardware. Sec Pod has two key techniques: paging delegation delegates and audits the kernel's paging operations to a secure space; execution trapping intercepts the (compromised) kernel's attempts to subvert Sec Pod by misusing privileged instructions. We have implemented a prototype of Sec Pod based on KVM. Our experiments show that Sec Pod is both effective and efficient.

- **“Dynamic And Efficient Key Management For Access Hierarchies”, Mikhail J. Atallah, Keith B. Frikken, And Marina Blanton, 2005**

Abstract: The problem of key management in an access hierarchy has elicited much interest in the literature. The hierarchy is modeled as a set of partially ordered classes (represented as a directed graph), and a user who obtains access (i.e., a key) to a certain class can also obtain access to all descendant classes of her class through key derivation. Our solution to the above problem has the following properties: (i) only hash functions are used for a node to derive a descendant's key from its own key; (ii) the space complexity of the public information is the same as that of storing the hierarchy; (iii) the private information at a class consists of a single key associated with that class; (iv) updates (revocations, additions, etc.) are handled locally in the hierarchy; (v) the scheme is provably secure against collusion; and (vi) key derivation by a node of its descendant's key is bounded by the number of bit operations linear in the length of the path between the nodes. Whereas many previous schemes had some of these properties, ours is the first that satisfies all of them. Moreover, for trees (and other “recursively decomposable” hierarchies), we are the first to achieve a worst- and average-case number of bit operations for key derivation that is exponentially better than the depth of a balanced hierarchy (double-exponentially better if the hierarchy is unbalanced, i.e., “tall and skinny”); this is achieved with only a constant increase in the space for the hierarchy. We also show how with simple modifications our scheme can handle extensions proposed by Crampton of the standard hierarchies to “limited depth” and reverse inheritance

- **“Hiding The Policy In Cryptographic Access Control”, Sascha M'Uller And Stefan Katzenbeisser, 2011**

Abstract: Recently, cryptographic access control has received a lot of attention, mainly due to the availability of efficient Attribute-Based Encryption (ABE) schemes. ABE allows to get rid of a trusted reference monitor by enforcing access rules in a cryptographic way. However, ABE has a privacy problem: The access policies are sent in clear along with the cipher texts. Further generalizing the idea of policy-hiding in cryptographic access control, we introduce policy anonymity where similar to the well-understood concept of k-anonymity the attacker can only see a large set of possible policies that might have been used to encrypt, but is not able to identify the one that was actually used. We show that using a concept from graph theory we can extend a known ABE construction to achieve the desired privacy property.

Keywords: access control, privacy, tree majors, abe, anonymity, hidden policies

- **“New Publicly Verifiable Databases With Efficient Updates”, Xiaofeng Chen, Jin Li, Xinyi Huang, 2014**

Abstract: The notion of verifiable database (VDB) enables a resource-constrained client to securely outsource a very large database to a un trusted server so that it could later retrieve a database record and update it by assigning a new value. Also, any attempt by the server to tamper with the data will be detected by the client. Very recently, Catalano and Fiore proposed an elegant framework to build efficient VDB that supports public verifiability from a new primitive named vector commitment. In this paper, we point out Catalano-Fiore's VDB framework from vector commitment is vulnerable to the so-called forward automatic update (FAU) attack. Besides, we propose a new VDB framework from vector commitment based on the idea of commitment binding. The construction is not only public verifiable but also secure under the FAU attack. Furthermore, we prove that our construction can achieve the desired security properties.

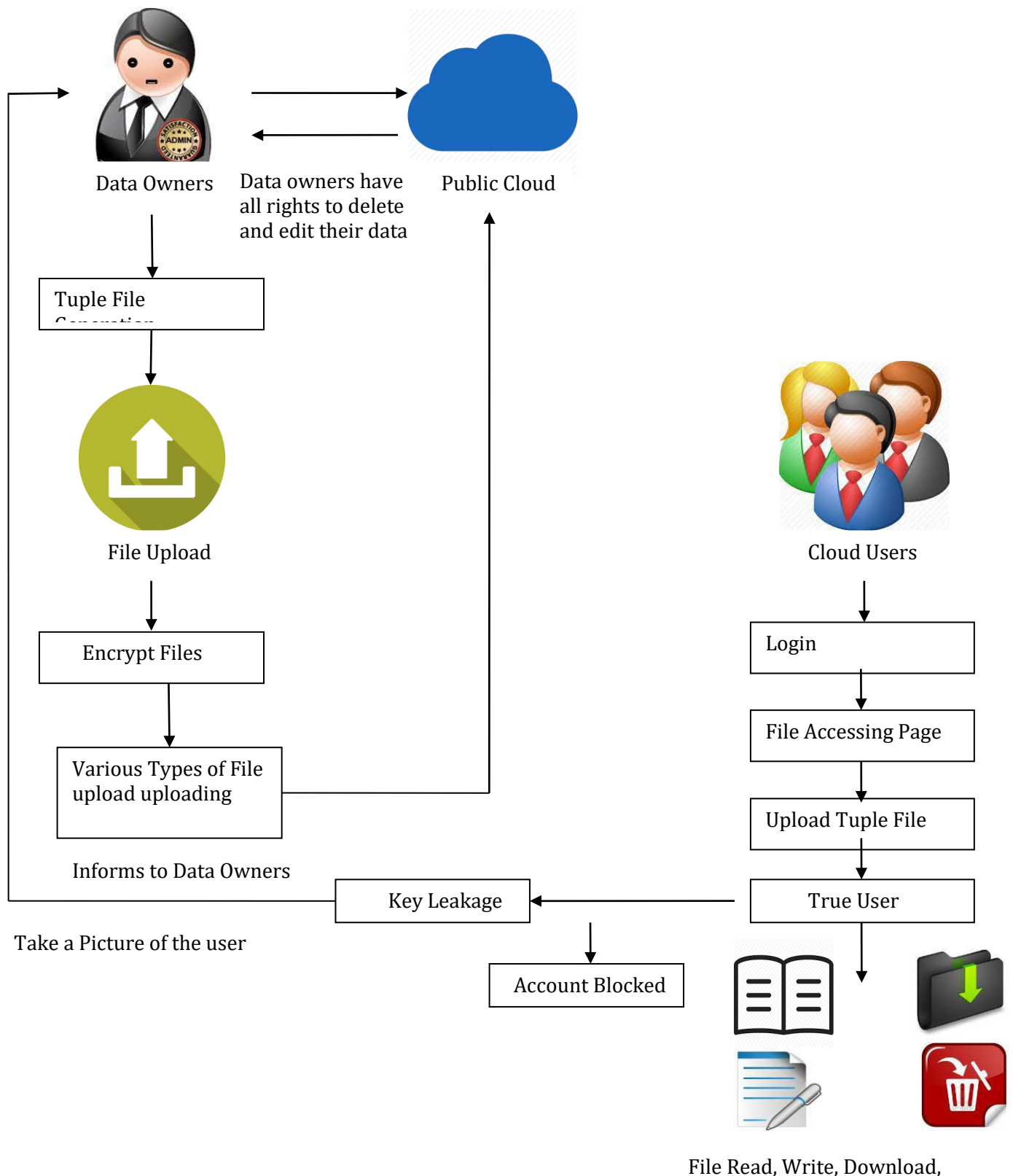
- **“Attribute Based Encryption With Non-Monotonic Access Structures”, Rafail Ostrovsky Amit Sahai Brent Waters, 2007**

Abstract: We construct an Attribute-Based Encryption (ABE) scheme that allows a user's private key to be expressed in terms of any access formula over attributes. Previous ABE schemes were limited to expressing only monotonic access structures. We provide a proof of security for our scheme based on the Decisional Bilinear Diffie Hellman (BDH) assumption. Furthermore, the performance of our new scheme compares favorably with existing, less-expressive schemes.

PROPOSED SYSTEM OVERVIEW:

To overcome these problems, we present Crypt-DAC, a cryptographically enforced dynamic access control system on un-trusted cloud. To overcome the onion encryption we propose Tuple for security purpose. Every time user should upload the tuple file while accessing the cloud files. If the tuple verification is success you can access the files otherwise admin sent you a warning message three times and then admin will block you at the same time camera will capture your face and sent to admin.

SYSTEM SOFTWARE DESIGN: SYSTEM ARCHITECTURE



LIST OF MODULES:

- Role Creation
- Admin File Upload
- Tuple Generation
- User File Acces

ROLE CREATION:

The roles will be created for employee and the cloud authority. The roles will be created based on their designation. The employee and the cloud authority will get added based on their designation and roles.

ADMIN FILE UPLOAD:

The admin will upload the file which is of two types. They are public and private files. The admin will add the news. If the file is public, it does not contain any access permission. If the file is private, then the tuples will get generated.

TUPLE GENERATION:

Here file permission keys are issued to the employees in the organization based on their experience and position to their registered. Senior Employees have all the permission to access the files (read, write, delete, & download). Freshers or trainee only having the permission to read the files. Some Employees have the permission to read and write. And some employees have all the permissions except deleting the data. If any Senior Employee leaks or shares their secret permission keys to their junior employees they will request to download or delete the Data Owners Data. Tuples are the encrypted PDF files which will be generated while the employee logs in. These tuples will get generated based on the roles of employee and the cloud authority.

USER FILE ACCESS:

Authorized DUs are able to access (e.g. read, write, download, delete and decrypt) the outsourced data. While entering the password for re-encryption system, it will generate attribute set for their role in background validate that the user has all rights to access the data. If the attributes set is not matched to the Data Owners policy files they will be claimed as guilty. If we ask them we will find who leaked the key to the junior employees. If any employee does an illegal access of files without any permission, they will be warned for 3 times. If they continues the access, they will get captured by the camera and send as a notification to the admin.

CONCLUSION:

Thus to provide integrity of an organization data which is in public cloud is achieved successfully. we propose to avoid the expensive re encryption of file data at the administrator side. The crypt-dac achieves orders of magnitude higher efficiency in access revocation while ensuring the same security properties

REFERENCES:

1. J. Bethencourt, A. Sahai, and B. Waters, Ciphertext-policy attribute based encryption, in IEEE S&P, 2007.
2. X. Wang, Y. Qi, and Z. Wang, Design and Implementation of SecPod: A Framework for Virtualization-based Security Systems, IEEE Transactions on Dependable and Secure Computing, vol. 16, no. 1, 2019.
3. J. Ren, Y. Qi, Y. Dai, X. Wang, and Y. Shi, AppSec: A Safe Execution Environment for Security Sensitive Applications, in ACM VEE, 2015.
4. V. Goyal, A. Jain, O. Pandey, and A. Sahai, Bounded ciphertext policy attribute based encryption, in ICALP, 2008.
5. V. Goyal, O. Pandey, A. Sahai, and B. Waters, Attribute-based encryption for fine-grained access control of encrypted data, in ACM CCS, 2006.
6. J. Katz, A. Sahai, and B. Waters, Predicate encryption supporting disjunctions, polynomial equations, and inner products, in EUROCRYPT, 2008.
7. S. Muller and S. Katzenbeisser, Hiding the policy in cryptographic access control, in STM, 2011.
8. R. Ostrovsky, A. Sahai, and B. Waters, Attribute-based encryption with non-monotonic access structures, in ACM CCS, 2007.
9. A. Sahai, and B. Waters, Fuzzy identity-based encryption, in EUROCRYPT, 2005.
10. T. Ring, Cloud computing hit by celebgate, <http://www.scmagazineuk.com/cloud-computing-hit-by-celebgate/article/370815/>, 2015.
11. X. Jin, R. Krishnan, and R. S. Sandhu, A unified attribute-based access control model covering DAC, MAC and RBAC, in DDBSec, 2012.
12. W. C. Garrison III, A. Shull, S. Myers, and, A. J. Lee, On the Practicality of Cryptographically Enforcing Dynamic Access Control Policies in the Cloud, in IEEE S&P, 2016.
13. R. S. Sandhu, Rationale for the RBAC96 family of access control models, in ACM Workshop on RBAC, 1995.
14. T. Jiang, X. Chen, Q. Wu, J. Ma, W. Susilo, and W. Lou, Secure and Efficient Cloud Data Deduplication With Randomized Tag, IEEE Transactions on Information Forensics and Security, vol. 12, no. 3, 2017.
15. M. Kallahalla, E. Riedel, R. Swaminathan, Q. Wang, K. Fu, Plutus: Scalable Secure File Sharing on Untrusted Storage, in USENIX FAST, 2003.
16. J. Wang, X. Chen, X. Huang, I. You, and Y. Xiang, Verifiable Auditing for Outsourced Database in Cloud Computing, IEEE Transactions on Computers, vol. 64, no. 11, 2015.
17. J. Wang, X. Chen, J. Li, J. Zhao, and J. Shen, Towards achieving flexible and verifiable search for outsourced database in cloud computing, Future Generation Computer Systems, vol. 67, 2017.
18. X. Chen, J. Li, X. Huang, J. Ma, and W. Lou, New Publicly Verifiable Databases with Efficient Updates, IEEE Transactions on Dependable and Secure Computing, vol. 12, no. 5, 2015.
19. T. Jiang, X. Chen, and J. Ma, Public Integrity Auditing for Shared Dynamic Cloud Data with Group User Revocation, IEEE Transactions on Computers, vol. 65, no. 8, 2016.
20. D. Boneh and M. Franklin, Identity-based encryption from the Weil pairing, SIAM Journal on Computing, vol. 32, no. 3, 2003.

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Decentralized Access Control with Anonymous Authentication of Data Stored in Clouds

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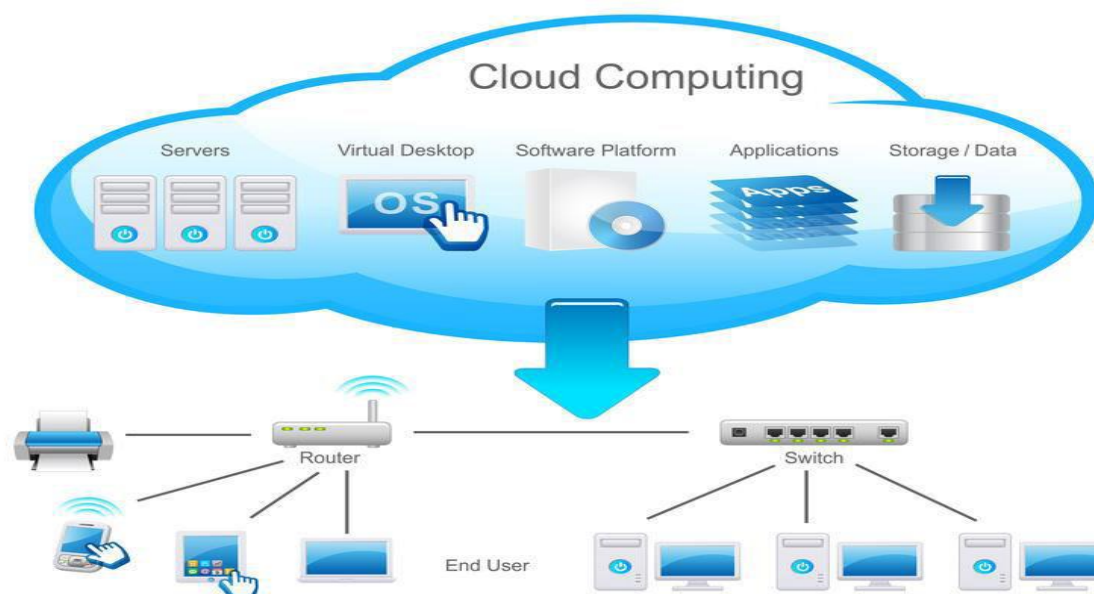
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Abstract: Blockchain is another innovation for information sharing between untrusted peers. In any case, it doesn't function admirably with enormous exchanges. Additionally, there are high boundaries between heterogeneous blockchain frameworks. Right now, proposed a creative part based structure for trading data across discretionary blockchain framework considered intelligent different blockchain design. In our engineering, a unique system with multi-chain is made for between blockchain correspondence. We propose the between blockchain association model for steering the executives and messages moving. Furthermore, our proposed conventions give exchanges atomicity and consistency in intersection chain scene. At last, our trial results dependent on a system of private various blockchain frameworks show that throughput is expanded by various chains equal running

INTRODUCTION:

Cloud computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing storage, memory, processing and bandwidth. Cloud computing is a comprehensive solution that delivers IT as a service.



The flexibility of cloud computing is a function of the allocation of resources on demand. Before cloud computing, websites and server-based applications were executed on a specific system. Cloud computing is broken down into three segments application, storage and connectivity.

2. LITERATURE REVIEW:

2.1 CIPHERTEXT-POLICY ATTRIBUTE-BASED ENCRYPTION

In several distributed systems a user should only be able to access data if a user possesses a certain set of credentials or attributes. Currently, the only method for enforcing such policies is to employ a trusted server to store the data and mediate access control. However, if any server storing the data is compromised, then the confidentiality of the data will be compromised. In this paper we present a system for realizing complex access control on encrypted data that we call Ciphertext-Policy Attribute-Based Encryption. By using our techniques encrypted data can be kept confidential even if the storage server is untrusted; moreover, our methods are secure against collusion attacks. Previous Attribute-Based Encryption systems used attributes to describe the encrypted data and built policies into user's keys; while in our system attributes are used to describe a user's credentials, and a party encrypting data determines a policy for who can decrypt. Thus, our methods are conceptually closer to traditional access control methods such as Role-Based Access Control (RBAC). In addition, we provide an implementation of our system and give performance measurements.

2.2 MULTI-AUTHORITY ATTRIBUTE BASED ENCRYPTION

In an identity based encryption scheme, each user is identified by a unique identity string. An attribute based encryption scheme (ABE), in contrast, is a scheme in which each user is identified by a set of attributes, and some function of those attributes is used to determine decryption ability for each ciphertext. Sahai and Waters introduced a single authority attribute encryption scheme and left open the question of whether a scheme could be constructed in which multiple authorities were allowed to distribute attributes [SW05]. We answer this question in the affirmative.

Our scheme allows any polynomial number of independent authorities to monitor attributes and distribute secret keys. An encryptor can choose, for each authority, a number dk and a set of attributes; he can then encrypt a message such that a user can only decrypt if he has at least dk of the given attributes from each authority k . Our scheme can tolerate an arbitrary number of corrupt authorities.

2.3 SECURING PERSONAL HEALTH RECORDS IN CLOUD COMPUTING: PATIENT -CENTRIC AND FINE-GRAINED DATA ACCESS CONTROL IN MULTI-OWNER SETTINGS:

Online personal health record (PHR) enables patients to manage their own medical records in a centralized way, which greatly facilitates the storage, access and sharing of personal health data. With the emergence of cloud computing, it is attractive for the PHR service providers to shift their PHR applications and storage into the cloud, in order to enjoy the elastic resources and reduce the operational cost. However, by storing PHRs in the cloud, the patients lose physical control to their personal health data, which makes it necessary for each patient to encrypt her PHR data before uploading to the cloud servers. Under encryption, it is challenging to achieve fine-grained access control to PHR data in a scalable and efficient way. For each patient, the PHR data should be encrypted so that it is scalable with the number of users having access. Also, since there are multiple owners (patients) in a PHR system and every owner would encrypt her PHR files using a different set of cryptographic keys, it is important to reduce the key distribution complexity in such multi-owner settings. Existing cryptographic enforced access control schemes are mostly designed for the single-owner scenarios. In this paper, we propose a novel framework for access control to PHRs within cloud computing environment. To enable fine-grained and scalable access control for PHRs, we leverage attribute based encryption (ABE)

New techniques to encrypt each patients' PHR data. To reduce the key distribution complexity, divide the system into multiple security domains, where each domain manages only a subset of the users. In this way, each patient has full control over her own privacy, and the key management complexity is reduced dramatically. Our proposed scheme is also flexible, in that it supports efficient and on-demand revocation of user access rights, and break-glass access under emergency scenarios.

2.4 ATTRIBUTE-BASED ENCRYPTION FOR FINE-GRAINED ACCESS CONTROL OF ENCRYPTED DATA

As more sensitive data is shared and stored by third-party sites on the Internet, there will be a need to encrypt data stored at these sites. One drawback of encrypting data is that it can be selectively shared only at a coarse-grained level (i.e., giving another party your private key). Develop a new cryptosystem for fine-grained sharing of encrypted data that we call Key-Policy Attribute-Based Encryption (KP-ABE). In our cryptosystem, cipher texts are labeled with sets of attributes and private keys are associated with access structures that control which cipher texts a user is able to decrypt. We demonstrate the applicability of our construction to sharing of audit-log information and broadcast encryption. Our construction supports delegation of private keys which subsumes Hierarchical Identity-Based Encryption (HIBE).

2.5 TOWARDS SECURE AND DEPENDABLE STORAGE SERVICES IN CLOUD COMPUTING

Cloud storage enables users to remotely store their data and enjoy the on-demand high quality cloud applications without the burden of local hardware and software management. Though the benefits are clear, such a service is also

relinquishing users' physical possession of their outsourced data, which inevitably poses new security risks towards the correctness of the data in cloud.

In order to address this new problem and further achieve a secure and dependable cloud storage service, we propose in this paper a flexible distributed storage integrity auditing mechanism, utilizing the homomorphic token and distributed erasure-coded data. The proposed design allows users to audit the cloud storage with very lightweight communication and computation cost. The auditing result not only ensures strong cloud storage correctness guarantee, but also simultaneously achieves fast data error localization, i.e., the identification of misbehaving server. Considering the cloud data are dynamic in nature, the proposed design further supports secure and efficient dynamic operations on outsourced data, including block modification, deletion, and append. Analysis shows the proposed scheme is highly efficient and resilient against Byzantine failure, malicious data modification attack, and even server colluding attacks.

3. PROPOSED SYSTEM OVERVIEW:

Propose our privacy preserving authenticated access control scheme. According to our scheme a user can create a file and store it securely in the cloud. This scheme consists of use of the two protocols ABE and ABS, as discussed in Sections 3.4 and 3.5, respectively. We will first discuss our scheme in details and then provide a concrete example to demonstrate how it works.

We refer to the system Architecture. There are three users, a creator, a reader, and writer. Creator Alice receives a token τ from the trustee, who is assumed to be honest. A trustee can be someone like the federal government who manages social insurance numbers etc. On presenting her id (like health/social insurance number), the trustee gives her a token. There are multiple KDCs, which can be scattered. For example, these can be servers in different parts of the world. A creator on presenting the token to one or more KDCs receives keys for encryption/decryption and signing. In the system Architecture, SKs are secret keys given for decryption, K_x are keys for signing. The message MSG is encrypted under the access policy X. The access policy decides who can access the data stored in the cloud. The creator decides on a claim policy Y, to prove her authenticity and signs the message under this claim. The ciphertext C with signature is c , and is sent to the cloud. The cloud verifies the signature and stores the ciphertext C. When a reader wants to read, the cloud sends C. If the user has attributes matching with access policy, it can decrypt and get back original message. Write proceeds in the same way as file creation. By designating the verification process to the cloud, it relieves the individual users from time consuming verifications. When a reader wants to read some data stored in the cloud, it tries to decrypt it using the secret keys it receives from the KDCs. If it has enough attributes matching with the access policy, then it decrypts the information stored in the cloud.

The main contributions of this paper are the following:

1. Distributed access control of data stored in cloud so that only authorized users with valid attributes can access them.
2. Authentication of users who store and modify their data on the cloud.
3. The identity of the user is protected from the cloud during authentication.
4. The architecture is decentralized, meaning that there can be several KDCs for key management.
5. The access control and authentication are both collusion resistant, meaning that no two users can collude and access data or authenticate themselves, if they are individually not authorized.
6. Revoked users cannot access data after they have been revoked.
7. The proposed scheme is resilient to replay attacks. A writer whose attributes and keys have been revoked cannot write back stale information.
8. The protocol supports multiple read and write on the data stored in the cloud.
9. The costs are comparable to the existing centralized approaches, and the expensive operations are mostly done by the cloud.

4. SOFTWARE DESCRIPTION:

4.1 NET FRAMEWORK OVERVIEW

Microsoft's new software development platform, .NET Framework, is the first Microsoft development environment designed from the ground up for Internet development. Although .NET is not meant to be used exclusively for Internet development, its innovations were driven by the limitations of current Internet development tools and technology.

The basis of this new development platform consists of three primary components or layers: the common language runtime, the .NET Framework base classes, and the user and program interfaces, as demonstrated in Figure 4.1

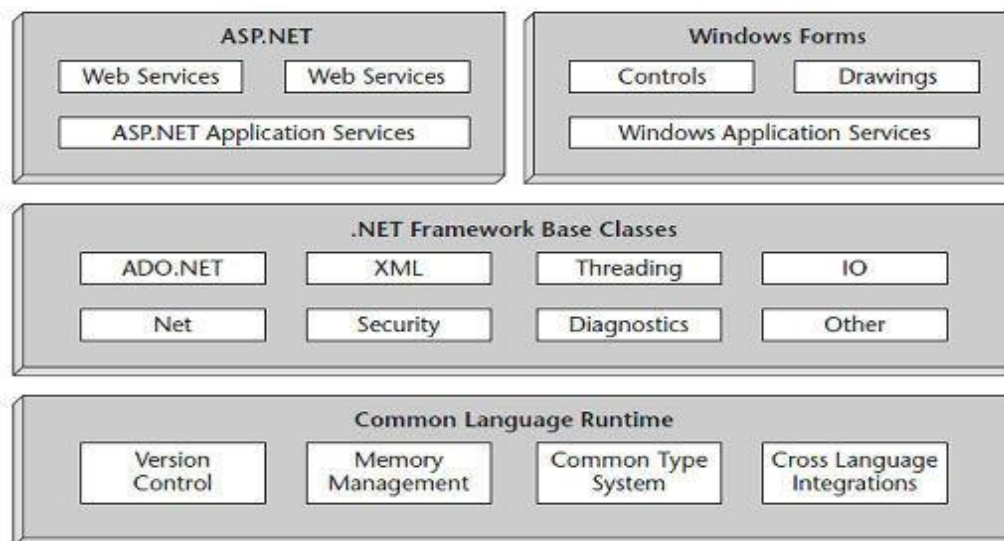


FIG 1.6 COMPONENTS OF .NET FRAMEWORK

The foundation of the .NET Framework is the common language runtime. Its principal purpose is to load, execute, and manage code that has been compiled to Microsoft's new intermediate byte code format called Intermediate Language (IL).

Several languages, notably Microsoft's Visual Basic .NET and C# .NET (pronounced "C sharp"), have compilers supporting this format, and many more are currently in development. It is important to note that the IL code is not interpreted. The common language runtime uses just in time compilers to compile the IL code to native binary code before execution.

The .NET Framework software developer's kit (SDK) not only provides several runtime hosts but also supports the development of third party runtime hosts. For example, ASP.NET hosts the runtime to provide a scalable, server side environment for managed code. ASP.NET works directly with the runtime to enable .asp pages and Web services.

The final layer of the .NET Framework consists of the user and program Interfaces. The two components of this layer are ASP.NET Application Services and Windows Application Services. The cornerstone of the ASP.NET Application Services is, of course, ASP.NET, which in turn supports the new Web services and Web Forms technologies that are discussed later. The Windows Application Services component supports traditional Windows programming applications through Windows Forms.

4.2 NET FRAMEWORK CLASS LIBRARY

The .NET Framework class library is a collection of reusable classes, or types, that tightly integrate with the common language runtime. .NET applications benefit from using and extending or inheriting the functionality from the classes and types available in the class library. The class library is very hierarchical and well organized, as shown in Figure 4.2. It starts with the most generic classes and continues to build down to classes with very specific and precise functionality. Although this library is extensive, its organization makes it easy to learn and use. In an age of ever growing technology it is refreshing to see a new technology and a new architecture that promise a reduced learning curve.

This model also makes it easy for third party components to be integrated easily with the existing class library. As expected in an object oriented class library, the .NET Framework classes enable developers to accomplish rapidly a wide range of common programming tasks, including things such as string management, file access, and database connectivity. Also, several classes facilitate highly specialized and custom development environments. These classes make the application development environment very flexible. The following types of applications are readily supported through the .NET Framework:

ASP.NET applications

Console applications

Scripted applications

Windows applications (Windows Forms)

Web services

For example, the Windows Forms classes are used to create Windows graphical user interface (GUI) applications, which often are referred to as standalone applications. This is facilitated through a series of reusable graphical interface classes. Alternatively, in developing a Web based application, the HTML and Web Forms classes facilitate its rapid development. Either way the underlying framework provides the flexibility for feature rich applications regardless of the choice of application environment.

4.3 WINDOWS AZURE SDK INTRODUCING WINDOWS AZURE

Windows Azure is Microsoft's application platform for the public cloud. You can use this platform in many different ways. For instance, you can use Windows Azure to build a web application that runs and stores its data in Windows Azure datacenters. You can use Windows Azure just to store data, with the applications that use this data running on-premises (that is, outside the public cloud). You can use Windows Azure to create virtual machines for development and test or to run SharePoint and other applications. You can use Windows Azure to build massively scalable applications with lots and lots of users. Because the platform offers a wide range of services, all of these things-and more-are possible.

To do any of them, though, you need to understand the basics. Even if you don't know anything about cloud computing, this article will walk you through the fundamentals of Windows Azure. The goal is to give you a foundation for understanding and using this cloud platform.

THE COMPONENTS OF WINDOWS AZURE

To understand what Windows Azure offers, it's useful to group its services into distinct categories. Figure 1 shows one way to do this.

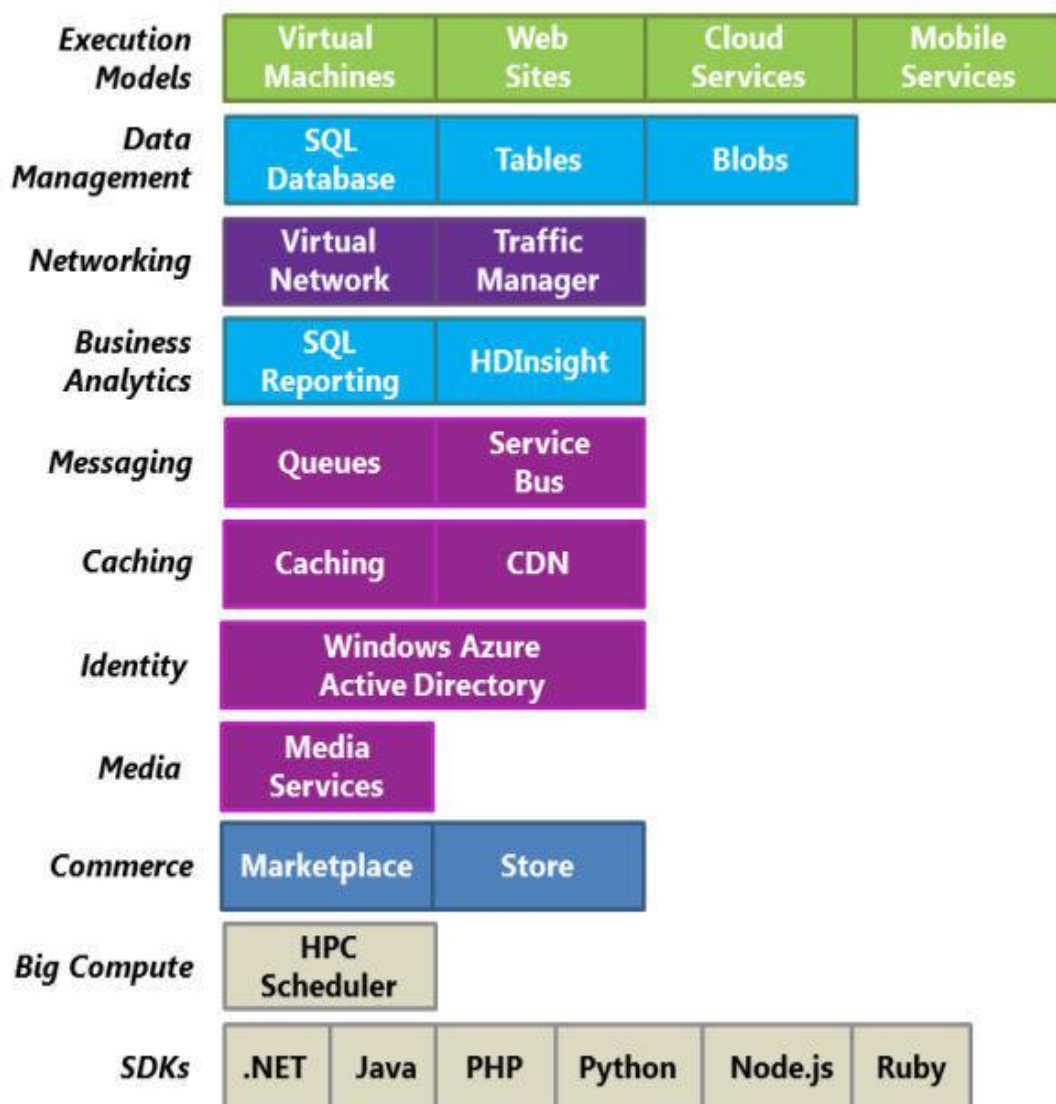


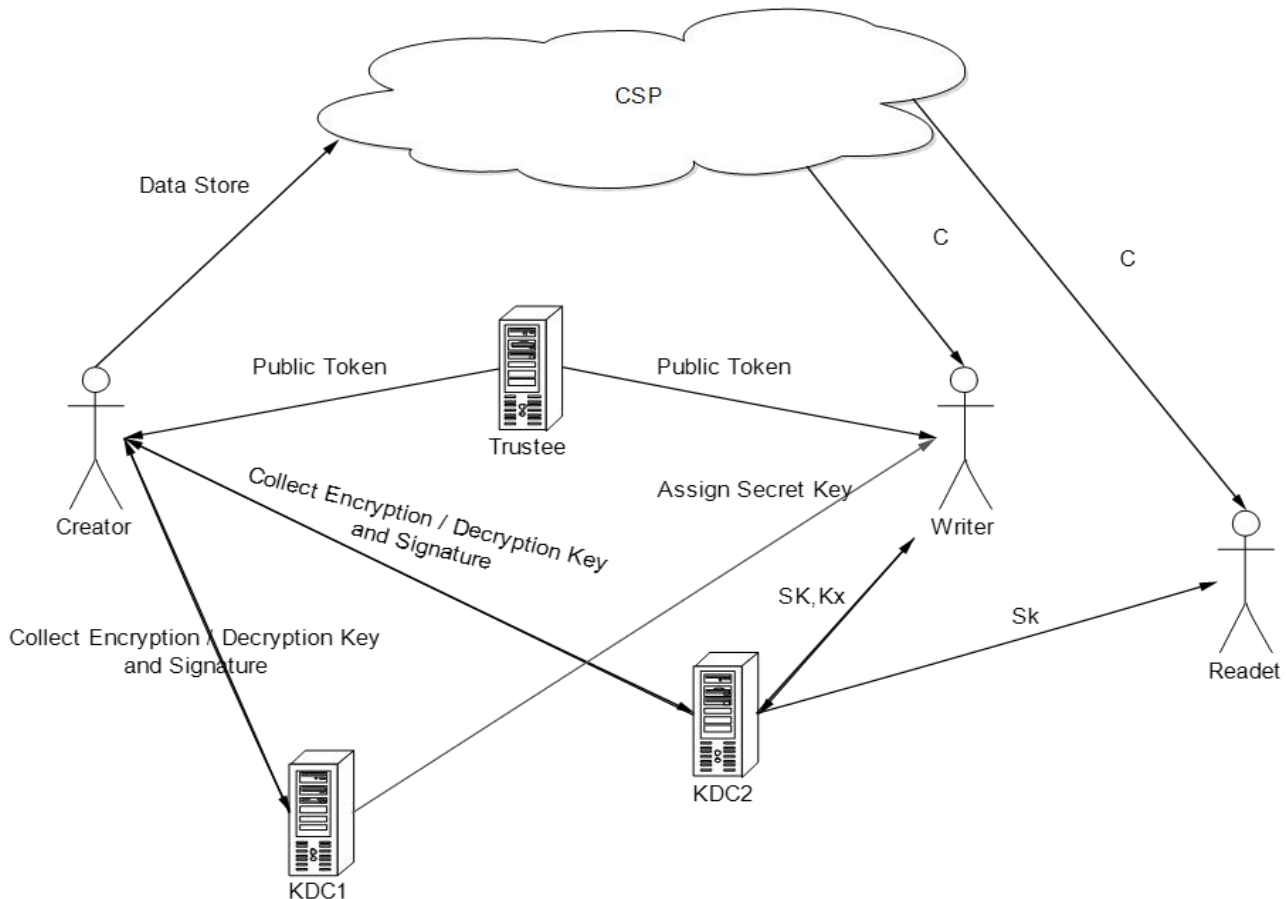
Fig 1.9: WINDOWS AZURE DATA MODEL.

To get started with Windows Azure, you need to know at least the basics about each of its components. You can also use the What Is Windows Azure Poster for a quick, visual way to get an overview. The colors of the boxes in Figure 1 correspond to their grouping on the poster. The rest of this article walks through the technologies shown in the figure, describing what each one offers and when you might use it.

5. SYSTEM DESIGN:

5.1 SYSTEM ARCHITECHURE

There are three users, a creator, a reader, and writer. Creator Alice receives a token _ from the trustee, who is assumed to be honest. A trustee can be someone like the federal government who manages social insurance numbers etc. On presenting her id (like health/social insurance number), the trustee gives her a token. There are multiple KDCs (here 2), which can be scattered. For example, these can be servers in different parts of the world. A creator on presenting the token to one or more KDCs receives keys for encryption/decryption.



5.2 MODULES

- Creator Module
- Data Dynamic Module
- Read Only Module
- Key Distributed Centre Module
- User Revocation Module
- Cloud Storage Module

5.3 ALGORITHM

- Attribute-Based Encryption
- Attribute-Based Signature Scheme

CONCLUSION:

Presented a decentralized access control technique with anonymous authentication, which provides user revocation and prevents replay attacks. The cloud does not know the identity of the user who stores information, but only verifies the user's credentials. Key distribution is done in a decentralized way. This project implements in **windows azure cloud** (Microsoft Cloud) storage and access through the real time web **URL** based application.

FUTURE ENHANCEMENT:

- Will improve the knowledge to hide the attribute and the Access policies in Decentralized Data Access in secure Cloud.
- Proposed a revocable multi-authority scheme that can support efficient attribute revocation. Construct an effective data access control scheme for multi-authority cloud storage systems and also proved that scheme was provable secure in the random model. The revocable multi-authority is a promising technique, which can be applied in any remote storage systems.

REFERENCES:

1. E. Bertino and R. Sandhu, "Database Security-Concepts, Approaches, and Challenges," IEEE Trans. Dependable and Secure Computing, vol. 2, no. 1, pp. 2-19, Jan.-Mar. 2005.
2. P. Samarati, "Protecting Respondents' Identities in Microdata Release," IEEE Trans. Knowledge and Data Eng., vol. 13, no. 6, pp. 1010-1027, Nov. 2001.
3. B. Fung, K. Wang, R. Chen, and P. Yu, "Privacy-Preserving Data Publishing: A Survey of Recent Developments," ACM Computing Surveys, vol. 42, no. 4, article 14, 2010.
4. A. Machanavajjhala, D. Kifer, J. Gehrke, and M. Venkitasubramanian, "L-Diversity: Privacy Beyond k-anonymity," ACM Trans. Knowledge Discovery from Data, vol. 1, no. 1, article 3, 2007.
5. K. LeFevre, D. DeWitt, and R. Ramakrishnan, "Workload-Aware Anonymization Techniques for Large-Scale Datasets," ACM Trans. Database Systems, vol. 33, no. 3, pp. 1-47, 2008.

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Diabetic Retinopathy Detection Using Machine Learning Based On Support Vector Machine

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Abstract: Diabetic retinopathy is a diabetes complication that have impact on eyes. It's generates damage to the blood vessels of the light-sensitive tissue at the back of the eye (retina). At first, diabetic retinopathy may generate no symptoms or only mild vision problems. Eventually, it can cause blindness. The number of doctors compared to the number of patients in India is quite low which assists to detained diagnosis of various diseases. But retarded diagnosis of Diabetic Retinopathy leads to irreversible damage to eyes, further leading to complete permanent blindness. This disease can be treated but the damage is not completely convertible. To avoid this situation, we planned to automate the process of diagnosis by using machine learning. The increase in diabetes cases limits the capability of current manual testing. New algorithms for assisted diagnosis are becoming very essential health consequences such as blindness, So we use support vector machine (SVM) algorithm for classification of the extracted histogram. A histogram binning scheme for features representation is suggested.

Key Words: Retinopathy, Diagnosis, Histogram, Light sensitive tissues.

INTRODUCTION:

In recent times, Whole world have been faced with an increase in age and society related diseases like diabetes. According to recent survey, 4% of the country population has been diagnosed of diabetes disease alone and it have been recognize and accepted as one of the main cause of blindness in the country if not properly treated and managed. Early detection and diagnosis have been identified as one of the way to achieve a reduction in the percentage of visual impairment caused by diabetes with routine medical check which the use of special facilities for detection and monitoring of the disease. The effect of this on the medical personnel need. not be over emphasized, it has lead to increase work load on the personnel and the facilities, increase in diabetes screening activities just to mention a few. A lot of approaches have been suggested and identified as means of reducing the stress caused by this constant check up and screening related activities among which is the use medical digital image signal processing for diagnosis of diabetes related disease like diabetic retinopathy using images of the retina. Diabetes is a disorder of metabolism. The energy required by the body is obtained from glucose which is produced as a result of food digestion. Digested food enters the body stream with the aid of a hormone called insulin which is produced by the pancreas, an organ that lies near the stomach. During eating, the pancreas automatically produces the correct amount of insulin needed for allowing glucose absorption from the blood into the cells. In individuals with diabetes, the pancreas either produces too little or no insulin or the cells do not react properly to the insulin that is produced. The level of glucose in the blood, overflows into the urine and then passes out of the body. Therefore, the body loses its main source of fuel even though the blood contains large amounts of glucose.

Basically there are three types of diabetes, Type 1 Diabetes, is caused as a result of auto immune problem. The immune system of the body destroys the insulin producing beta cells in the pancreas leading to no or less production of the required insulin by the pancreas. Type 2 Diabetes is a result of malfunctioning of the beta cell itself. This malfunction includes non production of insulin or a situation known as insulin resistance. In insulin resistance, the muscles, fat and other cells do not respond to the insulin produced. Type 3 is known as gestational diabetes and only occurs during pregnancy. During this stage, the body resist the effect of insulin produced. The effect of diabetes on the eye is called Diabetic Retinopathy (DR). It is known to damage the small blood vessel of the retina and this

might lead to loss of vision. The disease is classified into three stages viz: Background Diabetic Retinopathy (BDR), Proliferate Diabetic Retinopathy (PDR) and Severe Diabetic Retinopathy (SDR). In BDR phase, the arteries in the retina become weakened and leak, forming small, dot like haemorrhages. These leaking vessels often lead to swelling or edema in the retina and decreased vision. In the PDR phase, circulation problems cause areas of the retina to become oxygen-deprived. New fragile, vessels develop as the circulatory system attempts to maintain adequate oxygen levels within the retina. Blood may leak into the retina and vitreous, causing spots or floaters, along with decreased vision. In the SDR phase of the disease, there is continued abnormal vessel growth and scar tissue, which may cause serious problems such as retinal detachment and glaucoma and gradual loss of vision.

This research work is one of the method of applying digital image processing to the field of medical diagnosis in order to lessen the time and stress undergone by the ophthalmologist and other members of the team in the screening, diagnosis and treatment of diabetic retinopathy. This work determine the presence of BDR and PDR or otherwise in a patient by applying techniques of digital image processing on fundus images taken by the use of medical image camera by a medical personnel in the hospital.

LITERATURE REVIEW:

Diabetic Retinopathy Detection by Extracting Area and Number of Microaneurysm from Colour Fundus Image

Authors: Shailesh Kumar ; Basant Kumar, 2018 5th International Conference on Signal Processing and Integrated Networks (SPIN)

This paper presents an improved diabetic retinopathy detection scheme by extracting accurate area and a number of microaneurysm from color fundus images. Regular screening of eye is crucial for detection and dealing with diabetic retinopathy. Diabetic retinopathy (DR) is an eye disease which occurs due to damage of retina as a result of long illness of diabetic mellitus. Microaneurysms (MA) are tiny red spots on retina, shaped by inflating out of fragile part of the blood vessels. The recognition of MA at primary stage is very crucial and it is the first step in inhibiting DR. A variety of methods have been proposed for detection and diagnosis of DR. In this paper, there are two features namely; number and area of MA have been determined. Initially, pre-processing techniques like green channel extraction, histogram equalization and morphological process have been used. For detection of microaneurysms, principal component analysis (PCA), contrast limited adaptive histogram equalization (CLAHE), morphological process, averaging filtering have been used. Classification of DR has been done by linear Support vector machine (SVM). The sensitivity and specificity of DR detection system are observed as 96% and 92% respectively.

Exudate detection for diabetic retinopathy with convolutional neural networks

Authors: Shuang Yu ; Di Xiao ; Yogesha Kanagasigam, 2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)

Exudate detection is an essential task for computer-aid diagnosis of diabetic retinopathy (DR), so as to monitor the progress of DR. In this paper, deep convolutional neural network (CNN) is adopted to achieve pixel-wise exudate identification. The CNN model is first trained with expert labeled exudates image patches and then saved as off-line classifier. In order to achieve pixel-level accuracy meanwhile reduce computational time, potential exudate candidate points are first extracted with morphological ultimate opening algorithm. Then the local region (64×64) surrounding the candidate points are forwarded to the trained CNN model for classification/identification. A pixel-wise accuracy of 91.92%, sensitivity of 88.85% and specificity of 96% is achieved with the proposed CNN architecture on the test database.

Automatic diabetic retinopathy detection and classification system

Authors: Z. A. Omar ; M. Hanafi ; S. Mashohor ; N. F. M. Mahfudz ; M. Muna'im, 2017 7th IEEE International Conference on System Engineering and Technology (ICSET)

Diabetic Retinopathy (DR) is an eye disease due to diabetes, which is the most ordinary cause of blindness among adults of working age in Malaysia. To date, DR is still screened manually by ophthalmologist using fundus images due to insufficiently reliable existing automated DR detection systems. However, the manual screening process is the weakest link as it is a complicated and time-consuming process. Hence, this paper proposed an algorithm that consists of DR detection method with the aim to improve the accuracy of the existing systems. The methods used to detect DR features, namely exudates, hemorrhages and blood vessels can be categorized into several stages which are image pre-processing, vessel and hemorrhages detection, optic disc removal and exudate detection. However, the detection for blood vessel and hemorrhages was performed simultaneously due to similar intensity characteristics. The proposed algorithm was trained and tested using 49 and 89 fundus images, respectively. The images used in training were obtained from Hospital Serdang, Malaysia while images used in the testing were

obtained from DIARETDB1 database. All of the images were categorized into four DR stages, namely mild Non-Proliferative Diabetic Retinopathy (NPDR), moderate NPDR, severe NPDR and Proliferative Diabetic Retinopathy (PDR). The images were captured under various illumination conditions. In the testing, the result shows that the percentage of detection for blood vessel and hemorrhages, and exudates are 98% and 100%, respectively.

Diagnosis of Diabetic Retinopathy by Using Image Processing and Convolutional Neural Network

Authors: Ömer Deperlihoğlu ; Utku Köse, 2018 2nd International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT)

Diabetic retinopathy is a serious eye disease that originates from diabetes mellitus and is the most common cause of blindness in the developed countries. This study describes the use of image processing and deep learning to diagnose diabetic retinopathy from retinal fundus images. For retinal fundus images enhancement approach, a practical method which contains HSV, V transform algorithm and histogram equalization technics was used. Finally, Gaussian low-pass filter was applied to the retinal fundus image. After the image processing, the classification was made using the Convolutional Neural Network. The performance of the proposed method was assessed using 400 retinal fundus images in the Kaggle Diabetic Retinopathy Detection database. In experiments, classification work has been done for each stage of the image processing. The classification study performed after image processing. Twenty experiments were done for every stage and average values were found. In this experiment, the accuracy was 97%, the sensitivity was 96.67%, the specificity was 93.33%, the precision was 97.78%, the recall was 93.33%, and the Fscore was 93.33%. The obtained results show that the proposed method is very efficient and successful to diagnose diabetic retinopathy from retinal fundus images.

Automatic Diabetic Retinopathy Detection Using Digital Image Processing

Authors: Kranthi Kumar Palavalasa; Bhavani Sambaturu, 2018 International Conference on Communication and Signal Processing (ICCS)

Diabetic retinopathy (DR) is one of the most common reasons for blindness in the working-age population of world. Diabetic Retinopathy is an eye disease, which occurs with long-standing untreated diabetes. Progression to vision impairment can be slowed down or stopped if DR is detected on time; In detection or screening of DR, automatic methods can play an important role. In this paper, we proposed a novel method to detect hard exudates with high accuracy with respect to lesion level. In the present method we initially detected the possible candidate exudate lesions by using the back ground subtraction methodology. Following the subsequent steps, in the last stage of algorithm we removed the false exudate lesion detections using the de-correlation stretch based method. We tested our algorithm on publicly available DiaretDB database, which contains the ground truth for all images. We achieved high performance results such as sensitivity of 0.87 and F-Score of 0.78 and Positive Predict Value (PPV) of 0.76 for hard exudate lesion level detection, compared to the existing state of art techniques.

Deep Neural Network for Diabetic Retinopathy Detection

Authors: Mamta Arora; Mrinal Pandey, 2019 International Conference on Machine Learning, Big Data, Cloud and Parallel Computing (COMITCon)

Diabetic retinopathy damages the retina of the patient. It is most frequent in the patients who have had diabetes for longer than 10 years. This problem is occurring in millions of people worldwide but medical practitioners and the tools required for detection of diabetic retinopathy is scare for serving the mass population. The work already was done to serve this problem using the application of machine learning but the efficiency of machine learning algorithm depends on the quality of feature extraction which requires domain knowledge. The work presented in this paper overcome the problem by using deep learning algorithm which automatically identifies the pattern and classifies the retina images into one of the five class based.

Automated detection of diabetic retinopathy using SVM

Authors: Enrique V. Carrera ; Andrés González ; Ricardo Carrera, 2017 IEEE XXIV International Conference on Electronics, Electrical Engineering and Computing (INTERCON)

Diabetic retinopathy is a common eye disease in diabetic patients and is the main cause of blindness in the population. Early detection of diabetic retinopathy protects patients from losing their vision. Thus, this paper proposes a computer-assisted diagnosis based on the digital processing of retinal images in order to help people detecting diabetic retinopathy in advance. The main goal is to automatically classify the grade of non-proliferative diabetic retinopathy at any retinal image. For that, an initial image processing stage isolates blood vessels, microaneurysms and hard exudates in order to extract features that can be used by a support vector machine to figure out the retinopathy grade of each retinal image. This proposal has been tested on a database of 400 retinal images labeled according to a 4-grade scale of non-proliferative diabetic retinopathy. As a result, we obtained a maximum sensitivity of 95% and a

predictive capacity of 94%. Robustness with respect to changes in the parameters of the algorithm has also been evaluated.

Diabetic Retinopathy Grade Classification based on Fractal Analysis and Random Forest

Authors: Farrikh Alzami ; Abdussalam ; Rama Arya Megantara ; Ahmad Zainul Fanani ; Purwanto, 2019 International Seminar on Application for Technology of Information and Communication (iSemantic)

Glaucoma which part of Diabetic Retinopathy is the disease which distorted the optical nerve system and resulted loss in vision. Fractal dimension is one of feature extraction that can be used in retinopathy fields due to the fractal dimension able to characterize the retinal vasculature. In this paper, we presented a research based on fractal dimension which not only distinguish the healthy subjects and diabetic retinopathy patients, but also severe level of diabetic retinopathy patients. By using MESSIDOR dataset and Random Forest as Classifier, we obtained the results that fractal dimensions are able to distinguish the healthy subjects and diabetic retinopathy patients, but it did not obtain satisfactory results for classifying the severity of diabetic retinopathy patients (grade level). Thus, future directions which need to be explore is the other features such as univariate, multivariate and other statistical features. It also needs to pay attention to red lesion detection to gain more information about diabetic retinopathy grade level.

A Deep Learning Method for the detection of Diabetic Retinopathy

Authors: Navoneel Chakrabarty, 2018 5th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON)

Many Diabetic patients suffer from a medical condition in the retina of the eye known as Diabetic Retinopathy. The main cause of Diabetic Retinopathy is high blood sugar levels over a long period of time in the retina known as Diabetes Mellitus. The primary goal is to automatically classify patients having diabetic retinopathy and not having the same, given any High-Resolution Fundus Image of the Retina. For that an initial image processing has been done on the images which includes mainly, conversion of coloured (RGB) images into perfect greyscale and resizing it. Then, a Deep Learning Approach is applied in which the processed image is fed into a Convolutional Neural Network to predict whether the patient is diabetic or not. This methodology is applied on a dataset of 30 High Resolution Fundus Images of the retina. The results, so obtained are a 100 % predictive accuracy and a Sensitivity of 100 % also. Such an Automated System can easily classify images of the retina among Diabetic and Healthy patients, reducing the number of reviews of doctors.

Mobile phone based diabetic retinopathy detection system using ANN-DWT

Authors: Nikita Kashyap ; Dharmendra Kumar Singh ; Girish Kumar Singh, 2017 4th IEEE Uttar Pradesh Section International Conference on Electrical, Computer and Electronics (UPCON)

Diabetic retinopathy (DR) is a common retinal disease that occurs when fluid flow from blood vessels to retina. The eye examination and early detection of DR is the best solution to control the growth of this disease. In this paper we present a low price and compact mobile phone based result finding system for early detection of diabetic retinopathy using artificial neural network (ANN) Algorithm. The mobile phone will take the retina images with the help of condensing lens then implement detection program of ANN to make decision for the initial screening of DR. The work done is measured by examine an existing database of retina. We aim at achieving the effective and low cost examination system which is ideal for underdeveloped regions and make it available to one and all.

PROPOSED SYSTEM OVERVIEW:

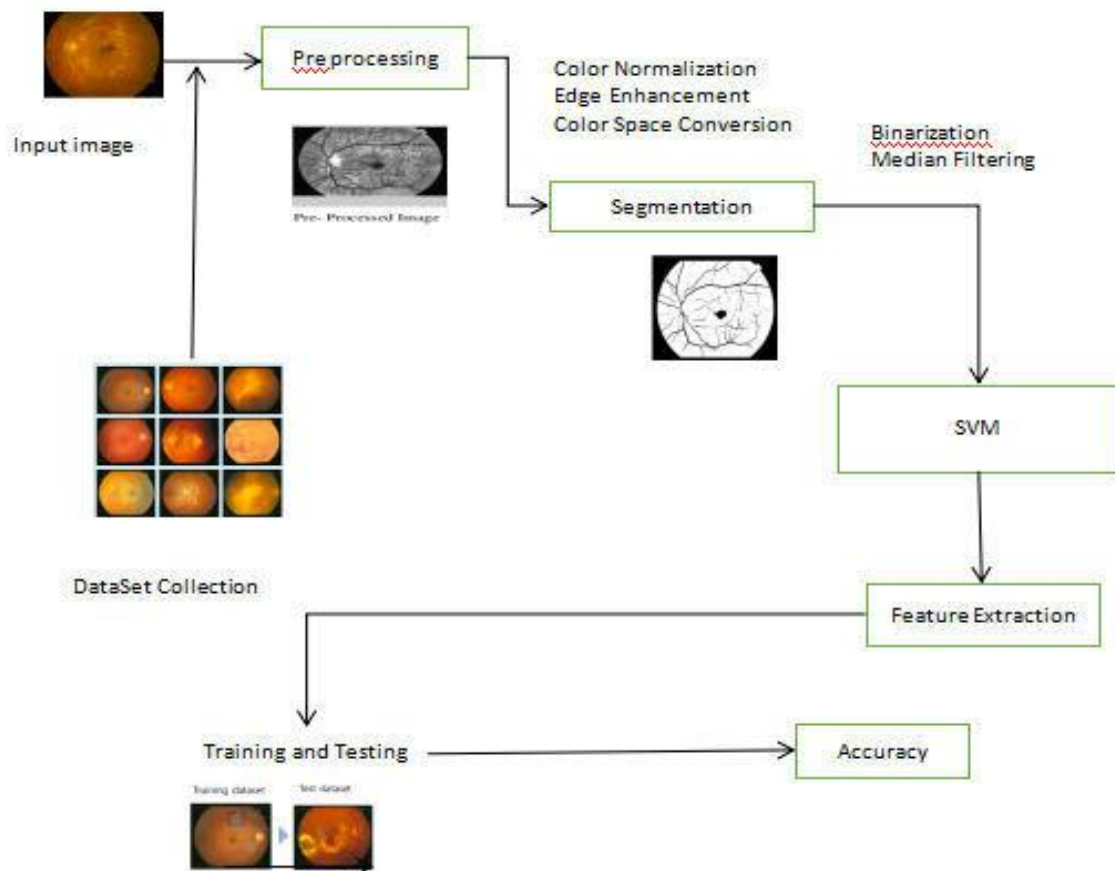
We proposed in this paper, an automated approach for classification of the disease diabetic retinopathy using fundus images is presented. In this paper, an automatic assessment system of diabetic retinopathy using Support Vector Machine has been discussed with various preprocessing techniques including post filtration followed by the extraction of several features such as color, shape, intensity, entropy, energy, texture etc. Classification of abnormalities from normal fundus retinal images can be performed with various classifiers. From observation, Support vector Machine is the best classifier for extracting and classifying the abnormalities in retina like microaneurysms, hard exudates, soft exudates, neovascularization, and macular edema in an effective manner.

We show that they outperform LBP extracted features. Support Vector Machines (SVM) are used for the classification of the extracted histogram. A histogram binning scheme for features representation is proposed. In the result of diabetic retinopathy automatic detection using Support Vector Machines (SVM) algorithm and it has an accuracy of 97.608 %. All the techniques used for the classification were good in performance, but SVM is more efficient than CNN and DNN from the obtained results. Thus, this work has given a successful Diabetic Retinopathy Diagnosing method which helps to diagnose the disease in early stage which mutually reduces the manual work.

Support vector machine classifier achieves a greater accuracy in detection of diabetic retinopathy which makes the diagnosis and screening of retinal images for the ophthalmologists in an easier way

SYSTEM SOFTWARE DESIGN:

✓ SYSTEM ARCHITECTURE



RESULTS AND PERFORMANCE ANALYSIS

✓ PRE-PROCESSING

In detecting abnormalities associated with fundus image, the images have to be Pre-Processed in order to correct the problems of uneven illumination problem, insufficient contrast between exudates and image background pixels and presence of noise in the input fundus image.

✓ SEGMENTATION

The main objective of segmentation is to group the image into regions with same property or characteristics. It plays a major role in image analysis system by facilitating the description of anatomical structures and other regions of interest.

✓ EDGE ENHANCEMENT

Edge enhancement is an image processing filter that enhances the edge contrast of an image to improve its apparent sharpness. Most digital cameras also perform some edge enhancement.

✓ COLOR SPACE CONVERSION

Color space conversion is the translation of the representation of a color from one basis to another. This typically occurs in the context of converting an image that is represented in one color space to another color space, the goal being to make the translated image look as similar as possible to the original.

✓ SEGMENTATION

The main objective of segmentation is to group the image into regions with same property or characteristics. It plays a major role in image analysis system by facilitating the description of anatomical structures and other regions of interest.

✓ BINARIZATION

Binarization is the process of transforming data features of any entity into vectors of binary numbers.

CONCLUSION:

Diabetic retinopathy is a common eye disease in diabetic patients and is the main cause of blindness in the population. Early detection of diabetic retinopathy protects patients from losing their vision. Thus, this paper proposes

the machine learning algorithms like SVM classifier and KNN is used and SVM classifier which gives at the yield the level of diabetic retinopathy. Early diagnosis and treatment has been shown to prevent visual loss and blindness.

FUTURE ENHANCEMENT:

In Future Hybrid methodology ought to be utilized in order to get higher end in terms of accuracy and potency for DR detection.

REFERENCES:

1. Diabetic Retinopathy Detection by Extracting Area and Number of Microaneurysm from Colour Fundus Image, Shailesh Kumar ; Basant Kumar, 2018 5th International Conference on Signal Processing and Integrated Networks (SPIN)
2. Exudate detection for diabetic retinopathy with convolutional neural network, Shuang Yu ; Di Xiao ; Yogesan Kanagasingam, 2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)
3. Automatic diabetic retinopathy detection and classification system, Z. A. Omar ; M. Hanafi ; S. Mashohor ; N. F. M. Mahfudz ; M. Muna'im, 2017 7th IEEE International Conference on System Engineering and Technology (ICSET)
4. Diagnosis of Diabetic Retinopathy by Using Image Processing and Convolutional Neural Network, Ömer Deperlioğlu ; Utku Köse, 2018 2nd International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT)
5. Automatic Diabetic Retinopathy Detection Using Digital Image Processing, Kranthi Kumar Palavalasa ; Bhavani Sambaturu, 2018 International Conference on Communication and Signal Processing (ICCSP)
6. Deep Neural Network for Diabetic Retinopathy Detection, Mamta Arora ; Mrinal Pandey, 2019 International Conference on Machine Learning, Big Data, Cloud and Parallel Computing (COMITCon)
7. Automated detection of diabetic retinopathy using SVM, Enrique V. Carrera ; Andrés González ; Ricardo Carrera, 2017 IEEE XXIV International Conference on Electronics, Electrical Engineering and Computing (INTERCON)
8. Diabetic Retinopathy Grade Classification based on Fractal Analysis and Random Forest, Farrikh Alzami ; Abdussalam ; Rama Arya Megantara ; Ahmad Zainul Fanani ; Purwanto, 2019 International Seminar on Application for Technology of Information and Communication (iSemantic)
9. A Deep Learning Method for the detection of Diabetic Retinopathy Navoneel Chakrabarty, 2018 5th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON)
10. Mobile phone based diabetic retinopathy detection system using ANN-DWT, Nikita Kashyap ; Dharmendra Kumar Singh ; Girish Kumar Singh, 2017 4th IEEE Uttar Pradesh Section International Conference on Electrical, Computer and Electronics (UPCON)

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Distributed Network System Under Eavesdropping For Security Analysis

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Abstract: Eavesdropping attacks are easy to launch, it plays a significant role in the performance of wireless sensor networks. Although the statement of a node can be proved through cryptographic authentication, standard security approaches are not always preferable because of their overhead requirements. The challenging tasks in Wireless Sensor Network are spotting of eavesdropping attackers, evaluation of number of attackers, localization of multiple adversaries and rejecting them. The clustering approach is used to detect the eavesdropping attackers and localize them. This approach fails to predict the attackers accurately. To overcome this problem, this project proposes Intrusion Detection System to detect the eavesdropping attackers. The cluster head act, as IDS to monitor the behavior of nodes in their cluster such as packet transmission which helps to identify the misbehaving nodes in wireless sensor network. The simulation result clearly shows that the proposed scheme detects the eavesdropping attackers in Wireless Sensor Network efficiently and robustly. In this, the clusters are formed dynamically and periodically. The Identity based digital signature protocol relies on the hardness of the Diffie- Hellman problem to provide security and also, identity based online-offline signature protocol introduced in order to avoid the security overhead in the identity-based signature, identity based online-offline signature reduces the computational overhead of the protocol using discrete logarithm problem. This paper includes the feasibility of the protocol with respect to security requirements and security analysis over several attacks and assign with orphan node problem. The calculations and simulations are provided to accompany the efficiency of the proposed protocol. The results show that, the proposed protocol have better performance than the existing secure protocols for cluster-based wireless sensor networks, in terms of security overhead and energy consumption.

Key Words: Intrusion Detection System, Diffie- Hellman problem, Wireless Sensor Network, cluster.

INTRODUCTION:

Wireless sensor network is a network of simple sensing devices; which are capable of sensing some changes of incidents/parameters and communicating with other devices, over a specific geographic area for some specific purposes like target tracking, surveillance, environmental monitoring etc. Wireless networks are usually deployed in an unattended manner and are controlled remotely by the network operator. The unattended nature of wireless networks can be exploited by attackers. Specifically, an attacker can capture and compromise wireless nodes and launch a variety of attacks by leveraging compromised nodes. eavesdropping is a situation in which one person or program successfully masquerades as another by falsifying data and thereby gaining an illegitimate advantage. In a large-scale network, multiple adversaries may masquerade as the same identity and collaborate to launch malicious attacks such as Network Resource Utilization attack and Denial-of-Service attack quickly. Among various types of attacks, eavesdropping attacks are easy to launch that degrades the network performance highly. eavesdropping is when an attacker pretends to be someone else in order to gain access to restricted resources or steal information. Therefore, it is important to

- Detect the presence of eavesdropping attacks,
- Determine the number of attackers, and
- Localize multiple adversaries and eliminate them.

Wireless networks are widely used in the real world as they provide simple and easy solutions to communications. However, they are vulnerable to various kinds of attacks due to the open medium and mobility.

Adversaries can launch attacks on such networks using low cost devices with less effort. Among the attacks launched by them, identity-based attacks are easier to launch and such attacks cause problems to wireless networks. Masquerade with another device is possible with MAC address change in 802.11 networks. The protocols like WEP, WPA and WPA 2 are used to protect wireless networks. The security methodologies of these protocols also cause problems and they are vulnerable to eavesdropping attacks. Other attacks possible include traffic injection attacks DoS attacks and rogue access point attacks. In this context, it is essential to have mechanisms to detect the eavesdropping attacks, find out the number of attackers involved and localize those attackers or adversaries and get rid of them. Traditionally cryptographic schemes were used to secure communications in networks. However, they cause heavy overhead on the network. Key distribution mechanisms are costly and the security mechanisms used for conventional networks do not work directly with wireless networks. For this reason, it is important to understand the feasibility of traditional cryptographic solutions with respect to their computational and infrastructural overhead. Node compromises another serious problem with cryptographic methods. To overcome these issues, a solution based on the received signal strength and spatial correlation. When a physical property which is associated with each node is used for security, it is not easy to falsify it. This approach does not depend on cryptographic primitives. With respect to eavesdropping attacks, it is essential that identifying the number of attacks and their location.

LITERATURE REVIEW:

LITERATURE SURVEY

1. Analysis of Different Routing Techniques for Opportunistic Data Transfer

Author: Sheela Rani Arasu, and Immanuel JohnrajaJebadurai, International Journal of Computer Applications (0975 - 8887), volume 62 - No.5, January 2013

Opportunistic networks are mobile networks that rely on the store-carry-and-forward paradigm, using contacts between nodes to opportunistically transfer data. For this reason, traditional routing mechanisms are no longer suitable. To increase the success of successful message delivery, different probability-based techniques were previously studied by various authors. Here we address the question of how much of the forwarding probability of an ON has to be increased, in order for the network to achieve a given desired hit rate. We propose an approach based on percolation theory, which explains the influence of forwarding probability in a network's performance, and we try to prove that such a phenomenon is indeed present in ONs. We demonstrate, through extensive experiments, that the transition phase can be indeed observed in ONs when the forwarding probability is varied from 0 to 0.1. After the transition phase, little benefit is obtained in terms of reachability (exponential relationship) when the forwarding probability is increased. In contrast, the delivery cost increases much faster than the reachability after the transition phase. Consequently, increasing the forwarding probability only impacts on metrics like the delivery cost and latency since high reachability can be assumed in opportunistic networks.

2. The Design and Performance Evaluation of a Proactive Multipath Routing Protocol for Mobile Ad Hoc Networks

Author: Ali AbdallaEtorban, at Heriot - Watt University in the School of Mathematical and Computer sciences, May 2012

Network coding has been studied to enhance reliability and robustness of communications in lossy environments such as high mobile tactical situations. Previous network coding research has exploited on-demand multipath routing, multicasting, or broadcasting to leverage spatial redundancy and improve communication performance. However, one should not ignore proactive routing protocols such as link state protocol OSPF, since the latter is the prevailing protocol used in tactical field communications. This paper proposes a new routing and network coding strategy based on a link state protocol. This strategy extends the shortest path generated by the link state algorithm to multipath routing; thus provides the spatial redundancy required for efficient network coding. The strategy is simple. It can be applied to any link state routing protocol and it greatly improves packet delivery performance in disruptive environments. This paper provides protocol design, implementation and performance evaluation of this strategy, followed by extensive validation via simulation.

3. Power aware qos multipath routing protocol for disaster recovery network

Author: S. Santhi, Dr. G. SudhaSadasivam International Journal of Wireless & Mobile Networks (IJWMN) Vol. 3, No. 6, December 2011.

Mobile ad-hoc networks (MANETs) have gained great importance in today's commercial communication markets. These networks consist of several nodes that can communicate with each other without any fixed infrastructure. The nodes in these networks are highly dynamic and they are also battery powered. Hence energy efficiency is one of the important factor that has to be considered in MANETs. In this paper, we have designed an energy efficient multipath routing protocol using adjustable sleeping window (EMRAS) by implementing two algorithms - power and delay aware multipath routing protocol (PDMRP) and slow start exponential and liner algorithm (STELA) using cross layer design. STELA algorithm helps to improve the energy efficiency of the network by adjusting the sleeping window when there are no network activities. When there is any network activity, PDMRP helps to select the path which is energy efficient and also shortest. Simulation results show that EMRAS protocol has

improved the overall residual energy and reduced the total energy consumption without degrading the QoS parameters.

4. Performance Analysis of An Energy Aware Multipath Routing Algorithm for Mobile Ad Hoc Networks

Author: S. Harous, M. Alidubai, Q. Nasir University of Sharjah

A Mobile Ad Hoc Network (MANET) is a dynamic wireless network that can be formed without the need for any pre-existing infrastructure in which each node can act as a router. Wireless mobile ad hoc stations have limited battery capacity, hence, ad hoc routing protocols ought to be energy conservative. Energy aware routing protocols are consistently cited as efficient solutions for ad hoc and sensor networks routing and data management. However, there is not a consistent approach to define the energy related cost metrics that are used to guide the routing protocol performance. In this paper, we provide an analysis and critical review of energy entropy metrics, it present an Energy Entropy on EECA (EE-EECA) multipath routing protocol. The key idea of the protocol is to find the minimal node residual energy of each route in the process of selecting path by descending node residual energy

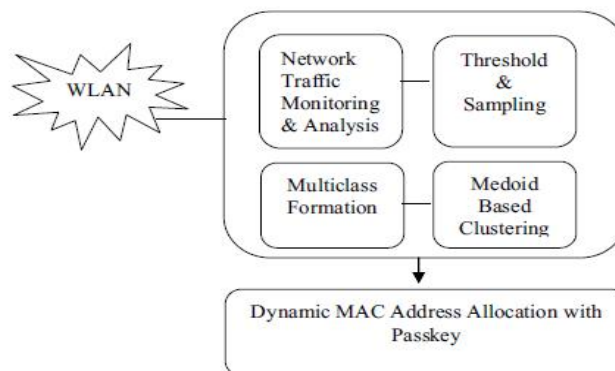
5. Manet Load Balancing Parallel Routing Protocol

Author: A. Ali, Taher T. Hamza and Shadia Sarhan IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 4, No 1, July 2012.

Routing protocol in ad hoc networks essentially needs a routing mechanism to establish a path from source to destination. The protocols differ in techniques used to discover path and recover in case of failure. Traditional routing protocol such as AODV, DSR, DSDV, OLSR, and AOMDV have been found to perform efficiently in the networks without consideration of battery power or network life time. This paper analyzes the traditional routing protocols to find a better candidate on which further applied energy efficient techniques to optimize the energy consumption. The performance of protocols adjudge energy consumption versus various parameters such as data insertion rate, mobility, network density, the degree of nodes, number of connections in the networks. The performance analysis implemented in NS-2 simulator and finds the reactive routing protocols AODV & AOMDV perform as compared to proactive routing protocols DSDV & OLSR.

PROPOSED SYSTEM OVERVIEW:

Preventive Method: The existing method for prevention available is dynamic allocation of MAC address. It is In order to prevent a eavesdropping attack, a novel scheme Dynamic MAC address assignment has been adopted.



Based on this approach the eavesdropping attack has been prevented. Moreover, dynamic MAC address has been assigned to the victim node based on the threshold value to prevent the attack. In addition, the node has been authenticated using passkey. A special DAM (Dynamic Allocation MAC) table has been designed for maintaining both passkey value of node and Dynamic MAC address logger. Each MAC address has been used for one session and periodically updated in the DAM table. Whenever a node requests for authentication through their MAC address, it has been checking verify from the register table. If the authentication success then MAC address of node would be changed dynamically with the help of DAM table.

In our proposed system we will be using the same method for detecting the attackers i.e.

- RSS-a physical property closely correlated with locations in the physical space and
- Kmeans algorithm for formation of the clusters.

Further the attackers have been detected using the GADE mechanism. After the attackers have been detected, we will be using the IDOL method for localizing these attackers. The major difference is that we use a dummy node or an intermediate node between the server and the other users. Before the user's request is received by the server it has to pass through this dummy node or the intermediate node. This intermediate node serves 2 purposes

- a) Ignore the data requests by the attackers
- b) Reduce the traffic on the server

SYSTEM REQUIREMENTS:

HARDWARE REQUIREMENTS:

The hardware requirements of this project serve as a tool for capturing the gestures of the user to be used for authentication by the system. The following are the hardware specifications:

- System : Pentium IV 2.4 GHz.
- Hard Disk : 40 GB.
- Floppy Drive : 44 Mb.
- Monitor : 15 VGA Color.
- Ram : 512 Mb.

SOFTWARE REQUIREMENTS:

The software based requirements of this project are pertinent to the tools used for the processing of the live input feed. The tools required are:

- Tools: Network Simulator-2
- Os: Ubuntu
- Languages: TCL (Tool Command Language)

ARCHITECTURE DIAGRAM:

A system architecture or systems architecture is the conceptual model that defines structure, behavior, and more views of a system. An architecture description is formal description and representation of a system, organized in a way that supports reasoning about the structures of the system. A system architecture can comprise system components, the externally visible properties of those components, the relationships (e.g. the behavior) between them. It can provide a plan from which products can be procured, and systems developed, that will work together to implement the overall system

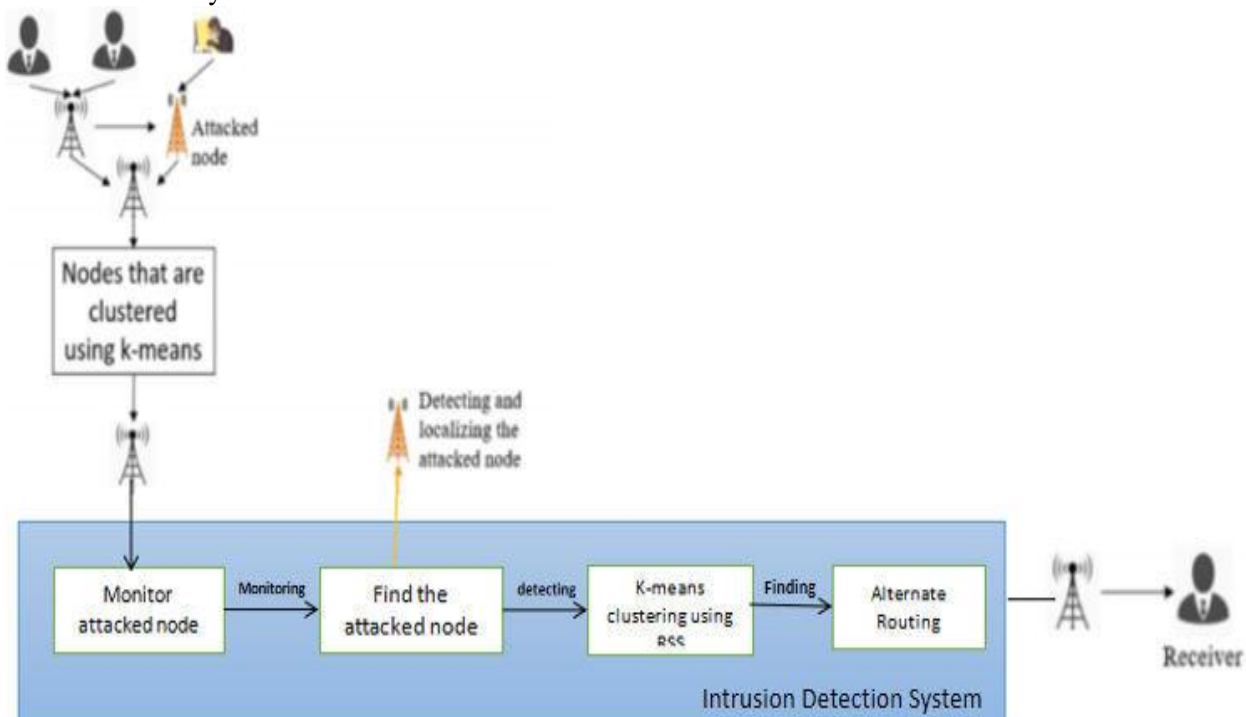


Figure 1. MODULE DESCRIPTION:

MODULES:

- Traffic Reducing System
- Testing attack detection and its localization by K-MEANS APPROACH USING RECEIVED SIGNAL STRENGTH (RSS)
- Preventing eavesdropping Attack

Traffic Reducing System:

As seen from Figure, there would be multiple data requests from the trusted as well as the attacker nodes to the Server. Hence there would be huge traffic which would slow down the performance as the server would have to process all the requests from all the users.

PRESENT SYSTEM:

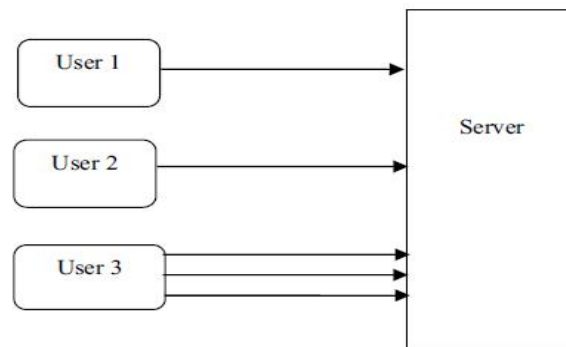


Figure 2 Present system

As seen from figure 6.2.1.1, in the present system the server is receiving request from User 1 and User 2 but receiving multiple requests from User 3 as well which thus creates traffic. In order to reduce the traffic as well as avoid the attack, we propose a method which uses an intermediate node. As seen in Figure, the intermediate node would lie between the server and the users and would act as a proxy i.e. the users will assume that they are sending requests directly to the server but in reality, the request is being sent to the intermediate node.

REDUCING TRAFFIC

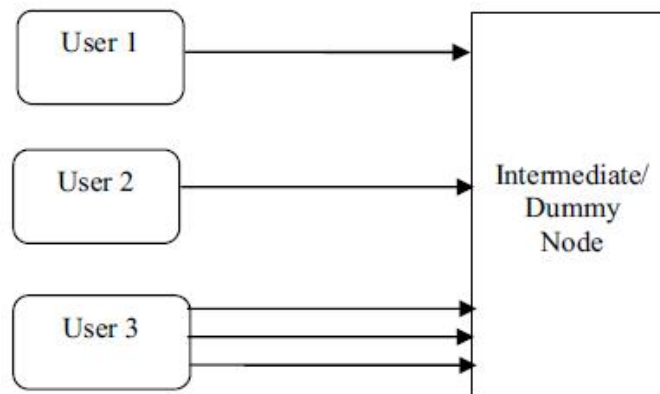


Figure 3. Reducing system.

Testing attack detection and its localization by K-MEANS APPROACH USING RECEIVED SIGNAL STRENGTH (RSS):

Received signal strength is measured across a set of access point to carry out the eavesdropping detection and localization. The Received Signal Strength (RSS) is a measurement that is hard to falsify randomly and it is highly associated to the transmitter's location. RSS is the signal strength of a received frame measured at the receiver's antenna. Many commercial 802.11 networks present per-frame RSS measurements. RSS is interrelated to the transmission power, the distance between the transmitter and the receiver, and the radio location because of multi-path and inclusion effects. Further, the attacker is from its victim, the more possibility in the variation of RSS pattern extensively and the easier to detect the eavesdropping attacks. In GADE method, K-Means Method is used to perform clustering analysis in RSS. The RSS-based spatial correlation is inherited from wireless nodes for eavesdropping attack detection. The RSS readings from a wireless node may fluctuate and cluster together. The RSS readings over time from the same physical location that belong to the same cluster points in the n-dimensional signal space, while the RSS readings from different locations over time form different clusters in signal space. Under the eavesdropping attack, the victim and the attacker use the same ID to transmit data packets, and the RSS readings are measured for each individual node (i.e., eavesdropping node or victim node). Thus eavesdropping detection is formulated as a statistical significance testing problem, where the null hypothesis is μ_0 : normal (no eavesdropping attack).

Preventing eavesdropping Attack:

Consider that there is a MAC eavesdropping attack. In order to prevent it we have to first detect it; which is done by using GADE and RSS whereas IDOL is used for localizing it. As seen in figure, our proposed method for preventing describes that once the attack is detected, the intermediate node may accept the data requests from the attacker, but not forward it further to the server, thus suppressing the attacker to have data access from the server along with making the server independent from serving such requests.

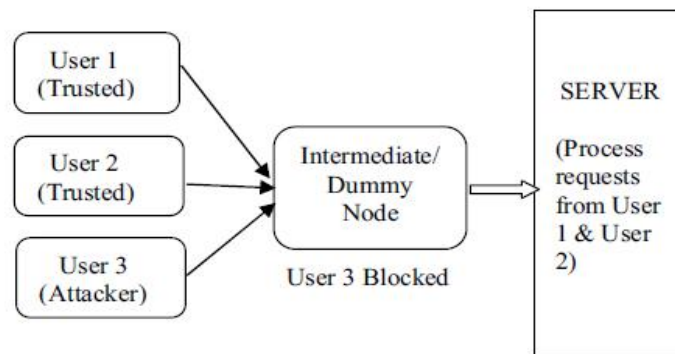
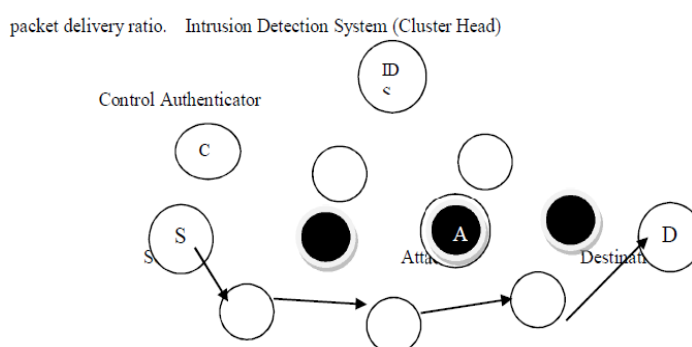


Figure 4. Preventing attackers

Intrusion Detection and Preventing System:

Intrusion detection is a set of actions that determine and report unauthorized activities in wireless sensor network. It detects the violation of confidentiality, integrity and availability. In case of wireless sensor network, the communication among the sensors is done using wireless transceivers. The threats that damage the security in WSN can be detected by the Intrusion detection and prevention systems (IDPSs). IDPS had an ability to identify the network intrusions and misuse by gathering and analyzing data. The wireless IDPS can monitor and analyze user and system activities, recognize patterns of known attacks, identify abnormal network activity, and detect policy violations in WSN. Thus, it is desirable to monitor the attacks and report the same to a source node to avoid losing an important event. Fig, shows that the group of nodes forms a cluster and a cluster head act as an Intrusion Detection and Prevention System (IDPS). The Control Authenticator (CA) distributes the public key and private (secrete) key to each node in the cluster. The IDPS monitor the activities of all the nodes in the cluster. The source node S starts to send the packets to their destination node D. Based on the public key the IDPS monitor each and every activity of the nodes in the cluster such as transmission power and energy level. At the time of packet sending the sender node check the receivers secrete key of the receiver. If there is any change in the transmission power or the secret is not matched then IDPS consider it as an attacker. Before the packet is dropped by the attacker the IDPS send the alarm message to the source node and also all the nodes in the network. The source node gets the information from the IDPS and takes the re-routing to reach the destination using the AOMDV routing protocol. Basically, the major security challenges in wireless sensor networks are (i) The size of sensor (ii) consequent the processing power, (iii) memory and (iv) type of tasks expected from the sensors.



CONCLUSION:

In this paper, the eavesdropping attack detection and localization scheme such as K-Means and Intrusion Detection System (IDS) are analyzed in Wireless Sensor Network using NS2 simulator. The K-Means approach with Received Signal Strength (RSS) is performed to detect the eavesdropping attackers in wireless sensor network. The Intrusion Detection System (IDS) with AOMDV is proposed to detect the eavesdropping attack. The simulation results showed that the performance of the IDS with AOMDV is better for efficient data transmission from sender to receiver by updating the next shortest path. when the packets are received by the attackers, its route will be diverted towards the Dummy node thus stopping their communication with the sender as the dummy node will receive the requests from attackers but will discard it i.e. receive the requests but not processing it further and thus preventing the data from being stolen.

FUTURE ENHANCEMENT:

In the future, a reliable and energy-efficient trust mechanism can be designed for identifying the attackers in WSNs to facilitate high result than the other.

REFERENCES:

1. Jie Yang, Yingying (Jennifer) Chen, Senior Member, IEEE, Wade Trappe and Jerry Cheng. (2013). Detection and Localization of Multiple eavesdropping Attackers in Wireless Networks. *IEEE*. 24 (1), p44-58.
2. M. Bohge and W. Trappe, "An Authentication Framework for Hierarchical Ad Hoc Sensor Networks," Proc. ACM Workshop Wireless Security (WiSe), pp. 79-87, 2003.
3. A. Wool, "Lightweight Key Management for IEEE 802.11 Wireless Lans With Key Refresh and Host Revocation," ACM/Springer Wireless Networks, vol. 11, no. 6, pp. 677-686, 2005.
4. B. Wu, J. Wu, E. Fernandez, and S. Magliveras, "Secure and Efficient Key Management in Mobile Ad Hoc Networks," Proc. IEEE Int'l Parallel and Distributed Processing Symp. (IPDPS), 2005.
5. L. Xiao, L.J. Greenstein, N.B. Mandayam, and W. Trappe, "Fingerprints in the Ether: Using the Physical Layer for Wireless Authentication," Proc. IEEE Int'l Conf. Comm. (ICC), pp. 4646- 4651, June 2007.
6. V. Brik, S. Banerjee, M. Gruteser, and S. Oh, "Wireless Device Identification with Radiometric Signatures," Proc. 14th ACM Int'l Conf. Mobile Computing and Networking, pp. 116-127, 2008.
7. Q. Li and W. Trappe, "Relationship-Based Detection of eavesdropping Related Anomalous Traffic in Ad Hoc Networks," Proc. Ann. IEEE Comm. Soc. on IEEE and Sensor and Ad Hoc Comm. And Networks (SECON), 2006.
8. F. Guo and T. Chiueh, "Sequence Number-Based MAC Address Spoof Detection," Proc. Eighth Int'l Conf. Recent Advances in Intrusion Detection, pp. 309-329, 2006.
9. L. Sang and A. Arora, "Spatial Signatures for Lightweight Security in Wireless Sensor Networks," Proc. IEEE INFOCOM, pp. 2137-2145, 2008.
10. Y. Sheng, K. Tan, G. Chen, D. Kotz, and A. Campbell, "Detecting 802.11 MAC Layer eavesdropping Using Received Signal Strength," Proc. IEEE INFOCOM, Apr. 2008.

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SMART AMBULANCE WITH AUTOMATIC TRAFFIC CONTROL USING IOT

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Abstract: With a large population and large amount of vehicles there is also a big trouble of car accidents or road accidents and with these overcrowded roads there is a problem of delay in first aid service. To overcome this delay, the paper describes a solution that is “Intelligent ambulance with automatic traffic control” which includes the accident detecting, alerting and tracking mechanism. Here we also have a patient monitoring system. In health monitoring system, the patient vital health parameters such as heart rate and body temperature can be measure. These parameters are sent to PC in ambulance via serial communication and this data will be sent to the hospital server. The proposed system consists of traffic control system an RF transmitter on the ambulance will communicate with RF receiver mounted on the signal post.

Key Words: Vibration sensor, IR sensors, GSM module, GPS module, Accident Detection and Prevention.

INTRODUCTION:

The development of a transportation system has been the generative power for human beings to have the highest civilization above creatures in the earth. Automobile has a great importance in our daily life. We utilize it to go to our work place, keep in touch with our friends and family and deliver our goods. But it can also bring disaster to us and even can kill us through accidents. Speed is one of the most important and basic risk factors in driving. It not only affects the severity of a crash, but also increases risk of being involved in a crash. Despite many efforts taken by different governmental and non-governmental organizations all around the world by various programs to aware against careless driving, yet accidents are taking place every now and then. However, many lives could have been saved if the emergency service could get the crash information in time. As such, efficient automatic accident detection with an automatic notification to the emergency service with the accident location is a prime need to save the precious human life. This seminar proposes to utilize the capability of a GPS receiver to monitor the speed of a vehicle and detect an accident basing on the monitored speed and send the location and time of the accident from the GPS data processed by a microcontroller by using the GSM network to the Alert Service Centre.

EXISTING SYSTEM:

Several Literature paper have been studied and analysed for the System Design. Several pitfalls in the existing works have been identified. In one of the paper, the authors have interfaced to Arduino Uno board. The IR sensor and crashing switch is responsible for detecting the accidents and sends the command to the microcontroller. GSM and GPS are the devices that sends SMS and location to the users.

PROPOSED SYSTEM:

The proposed system consists traffic control system an RF transmitter on the ambulance will communicate with the RF receiver mounted on the signal post. If there is any possibility for meet two ambulances at same point in the traffic signal the user should initiate at serious state of that patient via RF channel, that frequency received by RF receiver mounted on the signal post and it will give priority to which way to open. An algorithm is used to control the traffic signals automatically based on the key pressed by the driver from keyboard in the ambulance. The information reading the current as well as future location of ambulance is sent from the ambulance itself. This information is used to optimally control the traffic.

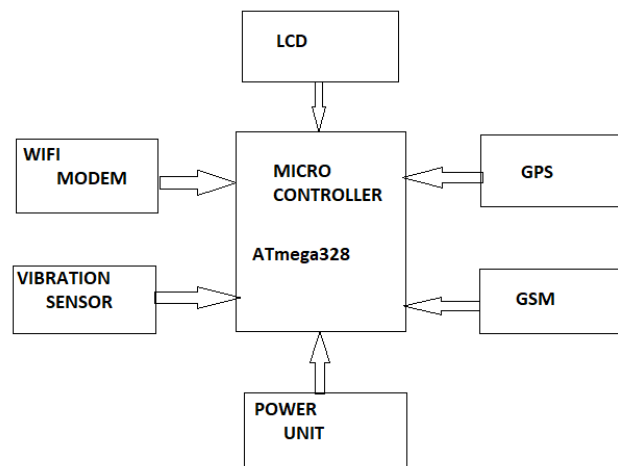


Figure.1 shows the block diagram of the existing system.

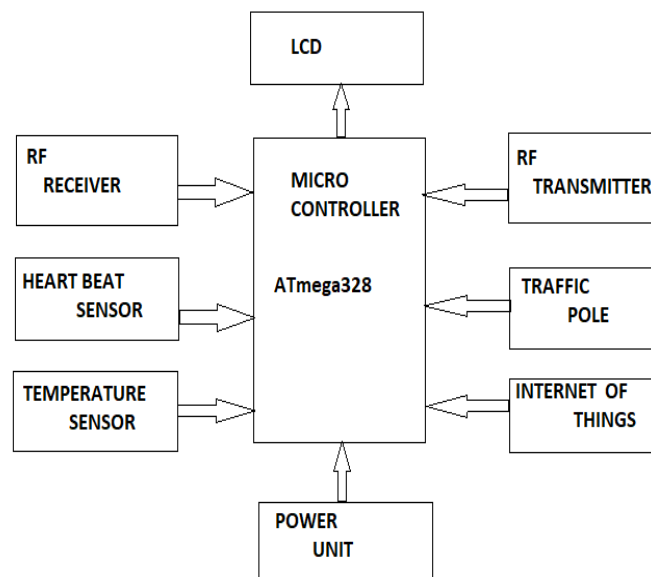


Figure 2. Shows the block diagram of proposed system.

WORKING:

When a person met with an accident ,the vibration sensor will reach above are equal to 1023HZ. An SMS will be automatically sent to the server with the help of GSM. And also we can live track the accident spot with the help of GPS using track me application. And then the ambulance will reach the accident spot. We can measure the patient heartbeat and temperature using heart beat sensor and temperature sensor. We have attached the transmitter in ambulance and the receiver is nothing but a traffic pole. When there is a possibility of met with two ambulances at the same traffic pole the priority will be given to the ambulance which has very low frequency (i.e distance) from the transmitter to the receiver using Radio frequency signal.

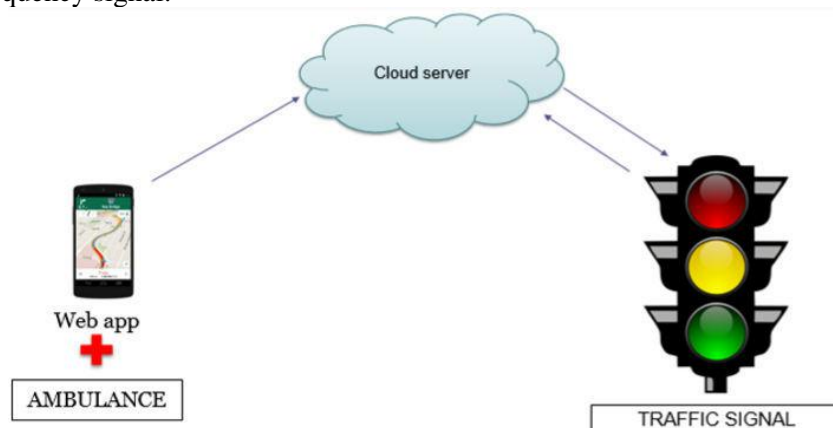


Figure.2 shows the block diagram of smart ambulance system.

LITERATURE REVIEW:

Some of the previous important literatures which have been studied are discussed below. Ashish Kushwaha et al. in [1] have proposed GPS And GSM Based Accident Alarm System. The purpose of this work is to find the vehicle accident location by means of sending a message using a system which is placed inside the vehicle system. Author has used assembly programming for better accuracy along with GPS and GSM. In this project, whenever a vehicle meets with an accident immediately vibration sensor will detect the signal and send it to the microcontroller. Microcontroller sends the alert message through the GSM to an authorized mobile no. An alternate condition can be allowed by pressing a switch, in order to interrupt the flow of sending the message in case of no casualty.

Hu Jian-ming, Li Jie, Li Guang-Hui et al. in [2] proposed an stolen vehicle recovery system. The system ensured increased safety and credibility. It used C8051F120 microcontroller and a vibration sensor. The vehicle owner gets the message regarding the vehicle location at specific intervals through GSM.

C. Prabha et al. in [3] have presented Automatic Vehicle Accident Detection and Messaging System Using GSM and GPS. In this paper an accelerometer can be used in a car alarm application so that dangerous driving can be detected. This paper is useful in detecting the accident precisely by means of both vibration sensor and Micro electro Mechanical system (MEMS) or accelerometer. In this project GPS is used for tracking the position of the vehicle, GSM, ARM controller is used for saving the mobile number in the EEPROM and sending the message to it when an accident has occurred.

T. Krishna Kishore et al. in [4] emphasised on a system that is cost effective and also inculcates the modern internet facility for networking purposes. Linux operating system has been used along with General Packet Radio Service(GPRS).Advancements include more exact identification of the vehicle location at all times, data transfer facilitation, and freedom from software monitoring.

Nirav Thakor et al. in [5] have presented Automatic Vehicle Accident Detection System Based on ARM &GPS. The system detects the vehicle accident with the help of vibration sensor or MEMS sensor. GPS module captured the location of vehicle accident and a message is transmitted with the help of GSM modem. which contains the co-ordinates values. One more facility is also provided which can be very handy during the critical times. If a person requires help due to other reasons like having symptoms of heart attack.in such a situation all he has to do is to press a single switch provided in the system. By pressing this switch a message is transmitted by the GSM module to the help centre which contains the location of car provided by GPS with the information of the user.

In this framework, we work on accident detection technics by referring following papers, in [6] author proposed solution to detect accident by accelerometer. Which used raspberry pi to keep track of the accelerometer readings. In [7] GPS and GSM framework used for accident detection and send quick message to the relatives. Another work of dispatching emergency services to appropriate location is done by using Analytic Hierarchy Process (AHP) in [8]. Where the author proposed all this system fully automated using different sensor on every stage in [9]. In [10] author design system which used sensor which forming an IoT network and cloud server to store all information. In [11] framework includes a microcontroller-based low-cost Accident Detection Unit (ADU) that contains GPS and GSM modem.In [12] used low cost RF modules, a microcontroller, LCD module and accelerometer for accident detection and reporting system. Where other gives importance to victim condition by using victim analysis in [13]. In another studies HMM and Machine learning framework used for riding pattern recognition and naturalistic riding study [14]. Another framework which monitors the vehicle through an On Board Diagnostics interface [15]. In this paper we studies all above paper and basic idea to detect accident by system which available to every two-wheeler easily and reduce delay in providing emergency services to victim. So here we came up with new idea which implement fully automated system for all process.

COMPONENTS:

Microcontroller:

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB to serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards

GPS module:

Global positioning system (GPS) is a world-wide radio-navigation system formed from the constellation of 24 satellites and their ground stations. GPS works by providing the information on exact location, velocity and time. A GPS tracking system uses the Global Navigation Satellite System (GNSS) network. This network in corporate a range

of satellites that use microwave signals that are transmitted to GPS device to give information on location, time and direction which are processed by a receiver. It transmits precise signals, allowing GPS receivers to calculate and display accurate location, speed, and time information to the user.

GSM module:

GSM (Global System for Mobile Communications, originally Group Special Mobile) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation digital cellular networks used by mobile devices such as tablets, first deployed in Finland in December 1991. As of 2014, it has become the global standard for mobile communications – with over 90% market share, operating in over 193 countries and territories. "GSM" is a trademark owned by the GSM Association.

Temperature Sensor:

Temperature sensor is a thermocouple or a resistance temperature detector (RTD) that gathers the temperature from a specific source and alters the collected information into understandable type for an apparatus or an observer. Temperature sensors are used in several applications namely HV system and AC system environmental controls, medical devices, food processing units, chemical handling, controlling systems, automotive under the hood monitoring and etc.

LCD display:

LCDs are used in a wide range of applications including computer monitors, televisions, instrument panels, aircraft cockpit displays, and signage. They are common in consumer devices such as DVD players, gaming devices, clocks, watches, calculators, and telephones, and have replaced cathode ray tube (CRT) displays in nearly all applications. They are available in a wider range of screen sizes than CRT and plasma displays, and since they do not use phosphors, they do not suffer image burn-in. LCDs are, however, susceptible to image persistence.

ANALYSIS:

We can monitored the heart beat and temperature of the patient using temperature sensor in the ambulance via (Thing view free application).



Figure 4. Shows the output of heart beat and temperature of the patient.

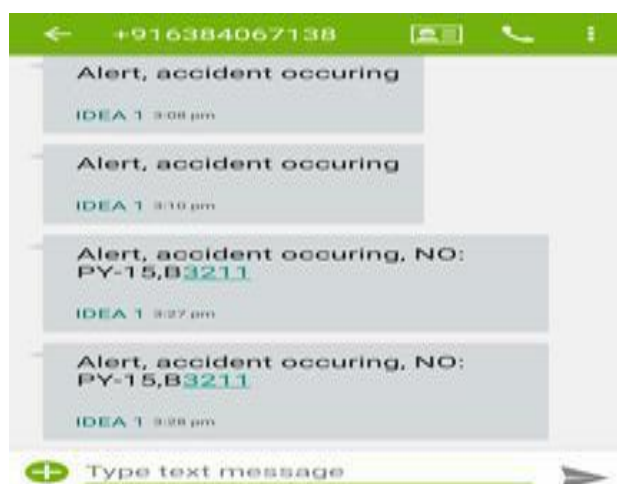


Figure 5 shows the message sent by GSM when a person met with an accident.

FINDINGS:

We have created a application to track the current location of the accident spot (i.e adafruit.io) using Internet Of Things(IOT).

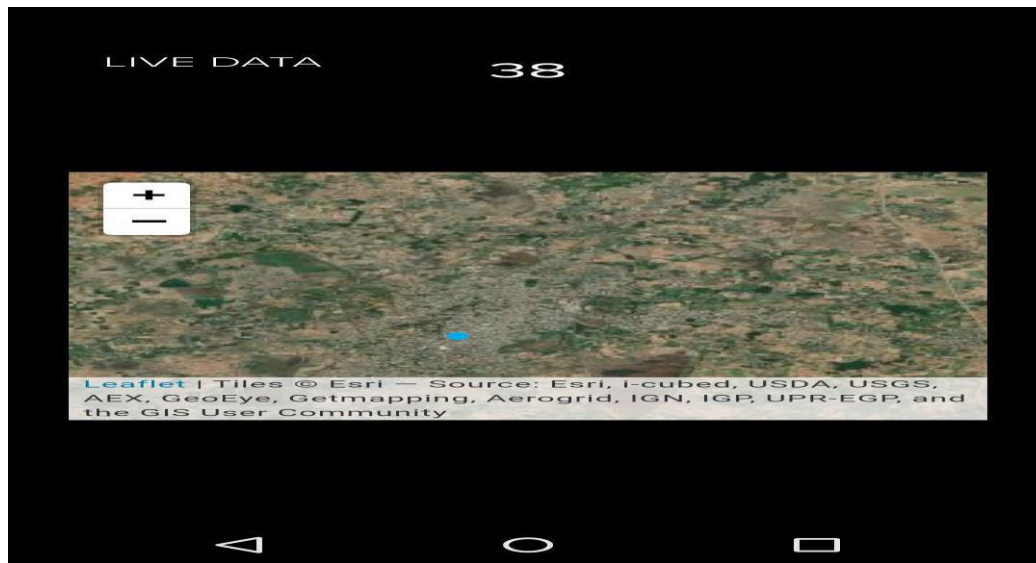


Figure 6. Live tracking of the accident spot

In this fig. 6 the blue dot denotes the current location of the accident spot and it can be viewed by the driver of the ambulance.

CONCLUSION:

This system is fully automated thus, the dead due to road accidents can be reduced by the detection of accidents in time. The location of accident can be detected with the help of GPS. The time taken by the ambulance to reach the hospital can be decreased by the intimation of the location of accident to the hospital.

REFERENCES:

1. K.Sangeetha, P.Archana, M.Ramya, Automatic Ambulance Rescue with Intelligent Traffic Light System, IOSR Journal of Engineering (IOSRJEN) Vol. 04, Issue 02.
2. K.Athavan, S.Jagadeeshwaran, Automatic ambulance rescue system, International Journal of Advanced Technology & Engineering Research (IJATER), Volume 2, Issue 2, May 2012.
3. Francisco J. Martinez, Chai-Keong Toh, Emergency services in future intelligent transportation systems based on vehicular communication networks, IEEE intelligent transportation systems Magazine, summer 2010.
4. Mr.S.Iyyappan, Mr.V.Nandagopal, Automatic accident detection and ambulance rescue with intelligent traffic light system, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 2, Issue 4, April 2013.
5. Anurag D, Srideep Ghosh, GPS based Vehicular Collision Warning System using IEEE 802.15.4 MAC/PHY Standard, July 2000.
6. United States Patent: "Vehicular electronic system with crash sensors and occupant protection systems". (Patent No.: US 7,580,782 B2)
7. Alumona T.L, Idigo V.E, Azubuike A.N, Technical Report on Data Acquisition of Patient's Health Status using GSM and WSN, SSRG International Journal of Electronics and Communication Engineering (SSRG-IJECE) Vol.1, issue 7, Sep 2014.
8. Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. Mc Kinlay, The 8051 Microcontroller & Embedded System, (Pearson Education Inc. 2 nd Edition, 2008)

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Plant Diseases Detection and Automated Fertilizing Using Arduino Controller

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Abstract: India is an agricultural country. Majority of Indian population belongs to the agricultural community. Farmers have a wide range of options for selecting various suitable crops and to find the suitable type of pesticides for plants. Diseases in plants leads to the significant reduction in the quality and quantity of agricultural products. The protection of plants and crops in the farming fields is extremely important, because they are the basis of survival for humans every day. Such plants are often subjected to various threats like viral, bacterial and fungal diseases. They can cause degradation and even the death of the plants, by gradually deteriorating them when they are healthy, thus decreasing the crop yield, and also makes them unfit for consumption of humans. In order to sort out this issue and lend a helping hand to the farmers, this paper introduces a system which will detect whether a plant is affected by a disease or not, with a greater accuracy, by processing the appropriate plant images and suggest the remedy automatically.

Key Words: pesticides, deteriorating, viral, bacterial, fungal.

INTRODUCTION:

Farming being a major occupation in India (66.5% rural population), crop protection from plant diseases has become a serious concern. Environmental and climatic factors play a substantial role in the onset of a particular disease. Pathogens (already present in soil, air, water and crop debris) are dormant until they acknowledge suitable environmental conditions. Thus, any crop in the fields is vulnerable and requires constant monitoring, exercised by the farmers to an extent, for noticing visual symptoms of a disease. Once the visual symptoms appear, samples are collected and examined via the traditional approach. Traditional methods for diagnosis encompass various immunology techniques, requiring laboratory set-up and skilled technicians. While this is an accurate method, it has its limitations in applicability, it being an expensive, labor intensive and most importantly, a time consuming approach. Apart from laboratory experiments, the diagnostician also has to check for biological and chemical aspects, symptom distribution and variability, specificity of the host etc. to determine the causal factors. In place of these elaborate procedures, we require an accurate as well as fast, user friendly and cost effective methodology with minimum human intervention, for constant monitoring. Given the restricted access to resources and limited expertise in plant pathology, there is a dire need for automated processes. Automated identification of plant diseases has been studied extensively over time and captured interest of several researchers. Advanced computational technologies such as Machine Learning, Artificial Neural Networks (ANN), Convolutional Neural Networks (CNN), have led to the advent of various non-destructive algorithms and techniques.

LITERATURE REVIEW:

[1]Carino, Kenmore and Dyck “Current Methods Used by the Crop Technicians in Sampling Insect Pests in the Paddy Fields” [2014].

Describes, there are several sampling techniques and devices for pest management decision making; the light trap, that involves varying size sample which is good for comparing seasonal and yearly catches of insects, but catches are subject to changes in insect behavior and do not catch none flying insects, the sweep net (catching insect using fishnet), is a fast method, very economical, and good for sampling arthropods staying in canopy of rice, but it has

human error due to variability and poor catch of arthropods at the base of the plant; tapping the rice, this is a sampling method that utilize a collecting pan with soap solution or oil with water to collect arthropods at the base and stem of the rice. After tapping, arthropods are identified and counted immediately in the field, the visual counting and data recording can be done on field but also subject to human error and very costly in labor, sticky trap is also economical, it measures insect movement and colonization but does not catch non flying insect; yellow pan trap is also economical; it measures insect migration, easy sorting and counting of samples, but the attraction is due to color stimulus and does not catch none flying insects.

[2] Phinyomark, Limsakul, Phukpattaranont, Alsmadin, Omar, Noa and Almarashdeh “Feature Extraction and Image Processing”.

Describes Image processing is the analysis and manipulation of graphical images from sources such as photographs and videos. There are three main steps in image processing; first is the conversion of captured images into binary values that a computer can process; second, is the image enhancement and data compression; and the third is the output step that consists of the display or printing of the processed image. Image processing is used in such applications as satellite weather mapping, machine vision, and computer-based pattern recognition.. for Electromyography signal used white gaussian noise to represent interference. Two novel mean and median frequencies were presented for robust feature extraction.

[3] Samantha, Ghosh, Do, Harp, Norris and Al-Saqer “Real Life Application of Image Processing in the Field of Agricultural Research”.

Several attempts have been made to build automatic insect identification systems based on image analysis. The study conducted by Samantha and Ghosh is concentrated to eight major insect pests based on the records of tea gardens of North Bengal Districts of India. The authors apply correlation based feature selection for the feature extraction and reduction, and incremental back propagation neural network as the neural network algorithm used for classifications. Do, Harp and Norris designed a computerized pattern recognition system for non-specialist in recognizing arachids and other arthropods to make the specimen identification easier and accurate. The researchers promote early insect pest detection in greenhouse crops in order to reduce pesticide use. The target application of this system is the detection of pests on plant organs such as leaves. The goal of their work is to define an innovative decision support system for in situ early pest detection based on video analysis and scene interpretation from multi-camera data. In this research, they used apriori algorithm to detect white flies and aphids, and follow a generic approach to design a system that can easily adapt different categories of bioaggressors. Al-Saqer developed a neural network-based identification system for pecan weevils. They used image descriptors as input in the neural network to recognize the pecan weevil. The authors collected different images of pecan weevil and other insects found in the paddy fields. After collecting the images they converted them into binary and resized to 114×134 pixels. To process the data, they used different image processing techniques such as Regional Properties and Zernike Moments.

[4] Preetha Rajan, Radhakrishnan. B, Dr. L. Padma Suresh “ Detection and classification of pests from crop images using Support Vector Machine” [ICETT] 2016.

Describes, Agriculture is the mother of all culture. Economy and prosperity of a country depends on agriculture production. Agriculture provides food as well as raw material for industry. Agriculture production is inversely affected by pest infestation and plant diseases. Early pest identification and disease detection will help to minimize the loss of production. Naked eye observation is a common using method to identify the pest. But it is time consuming process. In this paper we proposed an automatic pest identification system using image processing techniques. Color feature is used to train the SVM to classify the pest pixels and leaf pixels. Morphological operations are used to remove the unwanted elements in the classified image.

[5] Sushma R. Huddar, Swarna Gowri, Keerthana.K, Vasanthi S. and Sudhir Rao Rupanagudi “Novel Algorithm for Segmentation and Automatic Identification of Pests on Plants using Image Processing” [2015].

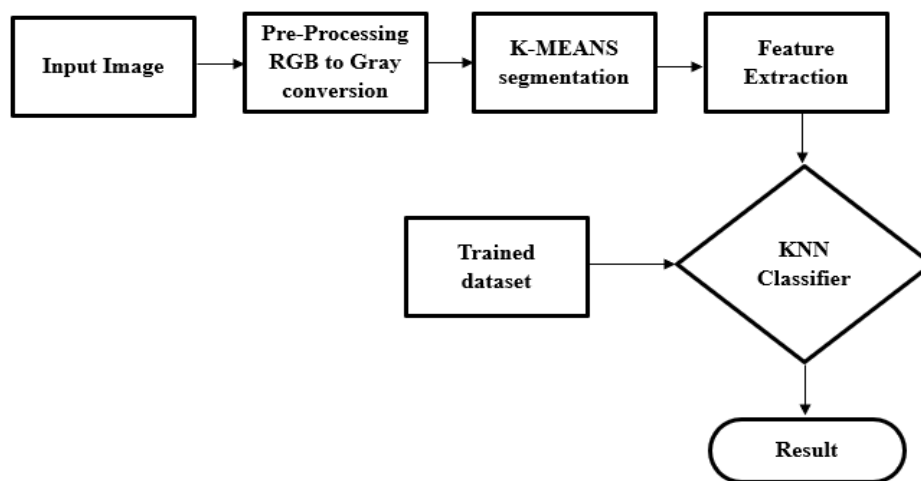
Presents Enormous agricultural yield is lost every year, due to rapid infestation by pests and insects. A lot of research is being carried out worldwide to identify scientific methodologies for early detection/identification of these bioaggressors. In the recent past, several approaches based on automation and image processing have come to light to address this issue. Most of the algorithms concentrate on pest identification and detection, limited to a greenhouse environment. Also, they involve several complex calculations to achieve the same. In this paper, we propose a novel and unique algorithm to segregate and detect pests using image processing. The proposed methodology involves reduced computational complexity and aims at pest detection not only in a greenhouse environment but also in a farm environment as well. The whitefly, a bio-aggressor which poses a threat to a multitude of crops, was chosen as the pest of interest in this paper. The algorithm was tested for several whiteflies affecting different leaves and an accuracy of 96% of whitefly detection was achieved. The algorithm was developed and implemented using MATLAB programming language on MATLAB 7.1 build 2011a.

[6] Lingwang Gao, Chunrong Yan, Zuorui Shen “Designing and Algorithm Implementing of the Expert System Platform for Assistant Identification of Agricultural Pests Based on a Dendriform Hierarchical Structure” [2009]

Presents Being numerous, the insect and disease pests were organized within classifications described as a dendriform hierarchical (tree-shape) structure. The data of the structure were managed by database management system (DBMS), tables were designed to store the information about the species/category and related characteristics. The characteristics were related to the species/category to construct a junction/x-ref table as the knowledge base of the expert system for insect and disease pest identification, including sets of identification characteristics for all species/category in the table. Relational calculus was employed to estimate the potential species/category of the insect and disease pests in relation to inclusion of the set of characters selected by users and the sets of identification characteristics in the knowledge base of the system. The system can be used as an open and flexible platform for professional users involved in plant protection to establish new expert application systems that provide pest identification services.

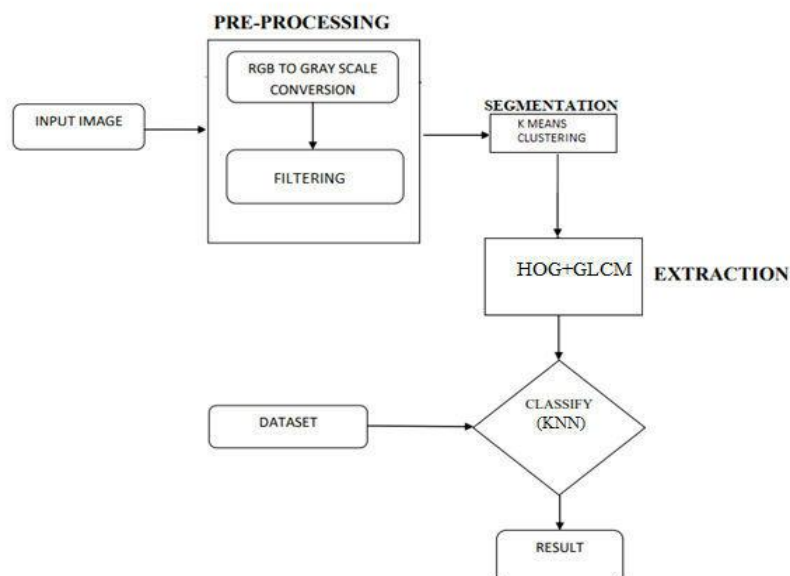
PROPOSED SYSTEM OVERVIEW:

Affected crops is identified through image processing. Depending upon the severity the classification was done KNN is used for classification disease. The proposed system consist of three main steps namely feature extraction, segmentation and classification. The k-mean clustering is applied to segment input images. GLCM algorithm is used to extract the textural features. The SVM classifier is replaced with the KNN classifier in the proposed work to classify data efficiently.



SYSTEM SOFTWARE DESIGN: SYSTEM ARCHITECTURE

In this system Architecture diagram, flow of the total leafimage process will be explained.



CONCLUSION:

In this project, we present a survey on detection and prediction models for tomato plant diseases, based on Image processing and automatic fertilizer spraying. The main objective of this paper was to identify the computational and biological aspects of disease identification, and the research work so far, as a preface. Those diseases predicted using efficient image processing algorithms. Affected crops is identified through image processing. Depending upon the severity the classification was done KNN is used for classification disease. The proposed system consist of three main steps namely feature extraction, segmentation and classification. The k-mean clustering is applied to segment input images. GLCM algorithm is used to extract the textural features. The SVM classifier is replaced with the KNN classifier in the proposed work to classify data efficiently.

REFERENCES:

1. Shan-e-Ahmed Raza, Gillian Prince, John P. Clarkson, Nasir M. Rajpoot, "Automatic Detection of Diseased Tomato Plants Using Thermal and Stereo Visible Light Images", PLOS ONE, DOI:10.1371/journal.pone.0123262, PP 1-20, April 10, 2015.
2. Dawei Li, Lihong Xu, Chengxiang Tan, Erik D. Goodman, Daichang Fu and LongjiaoXin, "Digitization and Visualization of Greenhouse Tomato Plants in Indoor Environments", Sensors, 15, PP 4019-4051; doi:10.3390/s150204019, 2015
3. H.R. Xu, Y.B. Ying, X.P. Fu, S.P. Zhu, "Near-infrared Spectroscopy in detecting Leaf Miner Damage on Tomato Leaf", Biosystems Engineering 96 (4), 447–454, doi:10.1016/j.biosystemseng.2007.01.008, 2007.
4. Minghua Zhang, Zhihao Qin, Xue Liu, Susan L. Ustin, "Detection of stress in tomatoes induced by late blight disease in California, USA, using hyperspectral remote sensing", International Journal of Applied Earth Observation and Geoinformation, 4, PP 295–310, 2003.
5. Minghua Zhang, Zhihao Qin, Xue Liu, "Remote Sensed Spectral Imagery to Detect Late Blight in Field Tomatoes", Precision Agriculture, 6, 489– 508, Springer Science+Business Media, Inc. Manufactured in The Netherlands, 2005.
6. X. Wang , M. Zhang , J. Zhu, S. Geng, "Spectral prediction of Phytophthora infestans infection on tomatoes using artificial neural network (ANN)", International Journal of Remote Sensing, Vol. 29, No. 6, PP 1693– 1706, 2008.
7. Huirong Xu, Shengpan Zhu, Yibin Ying, Huanyu Jiang, "Application of multispectral reflectance for early detection of tomato disease", Proceedings Volume 6381, Optics for Natural Resources, Agriculture, and Foods; 63810R, doi: 10.1117/12.685531, 2006.
8. Federico Hahn, "Actual Pathogen Detection: Sensors and Algorithms - a Review", Algorithms, 2, 301-338; doi:10.3390/a2010301, 2009.
9. Reza Ghaffari, Fu Zhang, Daciana Iliescu, Evor Hines, Mark Leeson, Richard Napier and John Clarkson, "Early Detection of Diseases in Tomato Crops: An Electronic Nose and Intelligent Systems Approach", Proceedings of the International Joint Conference on Neural Networks, PP 1 - 6. 10.1109/IJCNN.2010.5596535, August 2010.
10. Sudhir Rao Rupanagudi, Ranjani B. S., Prathik Nagaraj, Varsha G Bhat, Thippeswamy G, "A Novel Cloud Computing based Smart Farming System for Early Detection of Borer Insects in Tomatoes", 2015 IEEE International Conference on Communication, Information & Computing Technology (ICCICT), Jan. 16-17, Mumbai, India, 2015.
11. Yiannis Ampatzidis, Luigi De Bellis and Andrea Luvisi , "iPathology: Robotic Applications and Management of Plants and Plant Diseases", Sustainability, 9, 1010; doi:10.3390/su9061010, 2017.
12. Yuanshen Zhao, Liang Gong, Yixiang Huang and Chengliang Liu, "Robust Tomato Recognition for Robotic Harvesting Using Feature Images Fusion", Sensors, 16, 173; doi:10.3390/s16020173, 2016.
13. G. Rangaswami, A. Mahadevan, "Diseases of Crop Plants in India", PHI Learning Pvt. Ltd, Fourth

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Dangerous Selfie: Effective Accident Avoidance with Multi Zone Implementation

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Abstract: In the **EXISTING SYSTEM**, more than 1,500 reported accidents in US in 2010 associated with pedestrians using smart phones, and this number is expected to double in 2015. In the **PROPOSED SYSTEM**, Mobile phone's angle of rotation is analyzed, Overall mobile usage is analyzed. Our system will stop / Alert the user of no using the mobile phone during walking. In the **MODIFICATION**, apart from proposed system we also analyze other major possibilities of getting accident. Major accident is occurring because of taking Selfie in High Altitudes like Hill Areas, Our Android Application stops initiating the camera if user's Altitude is high from the Ground Level. Usage of Mobiles during riding Bikes will also be a dangerous, so camera is not initiated if Environmental Air decibels are very high. Camera is not initiated in Railway Station Zones because of High Voltage Current. In Cinema Theatres usage of camera is avoided when surrounding Audio Decibels are really high During walking if Vehicle Horn is captured immediately Camera is initiated and background Vehicle photo is captured & shown to the user to get alerted along with Headphone Alert, so that accidents can be avoided.

Key Words: Aititude, Camera, Selfie, Vehicle, Gps

INTRODUCTION:

HUMAN situation recognition systems have attracted much attention due to their applications in healthcare, intelligent control, smart houses, etc. The situation understanding can be achieved by using the information of locations and motions of the subjects. Generally, situation recognition is different from motion recognition. The latter focuses on the individual's motions, while situation recognition is more concerned about the scenario context such as the size of the group locations and postures of human subjects, and so on. The identification of such information does not require very accurate motion capture, since our interest is to extract the intrinsic patterns of the motion signals instead of analyzing each action's snapshot images. In situation understanding, the targets can be measured at a distance despite the subject's cosmetic conditions. The system can use low-resolution sensory data for accurate context identification, and it can be nonintrusive, since the subject may be unaware of the deployed sensors nearby.

LITERATURE REVIEW:

A Bayesian Computer Vision System for Modeling Human Interactions

Author: Nuria M. Oliver, Barbara Rosario, and Alex P. Pentland, Senior Member, IEEE

Abstract: We describe a real-time computer vision and machine learning system for modeling and recognizing human behaviors in a visual surveillance task [1]. The system is particularly concerned with detecting when interactions between people occur and classifying the type of interaction. Examples of interesting interaction behaviors include following another person, altering one's path to meet another, and so forth. Our system combines top-down with bottom-up information in a closed feedback loop, with both components employing a statistical Bayesian approach [2]. We propose and compare two different state-based learning architectures, namely, HMMs and CHMMs for modeling behaviors and interactions. The CHMM model is shown to work much more efficiently and accurately. Finally, to deal with the problem of limited training data, a synthetic "Alife-style" training system is used to develop flexible prior models for recognizing human interactions. We demonstrate the ability to use these a priori models to accurately classify real human behaviors and interactions with no additional tuning or training.

Detecting Human Behavior Models From Multimodal Observation in a Smart Home

Author: Oliver Brdiczka, Matthieu Langet, Jérôme Maisonnasse, and James L. Crowley

Abstract: This paper addresses learning and recognition of human behavior models from multimodal observation in a smart home environment. The proposed approach is part of a framework for acquiring a high-level contextual model for human behavior in an augmented environment. A 3-D video tracking system creates and tracks entities (persons) in the scene. Further, a speech activity detector analyzes audio streams coming from head set microphones and determines for each entity, whether the entity speaks or not. An ambient sound detector detects noises in the environment. An individual role detector derives basic activity like “walking” or “interacting with table” from the extracted entity properties of the 3-D tracker. From the derived multimodal observations, different situations like “aperitif” or “presentation” are learned and detected using statistical models (HMMs). The objective of the proposed general framework is two-fold: the automatic offline analysis of human behavior recordings and the online detection of learned human behavior models. To evaluate the proposed approach, several multimodal recordings showing different situations have been conducted. The obtained results, in particular for offline analysis, are very good, showing that multimodality as well as multiperson observation generation are beneficial for situation recognition.

Cross-Camera Knowledge Transfer for Multiview People Counting

Author: Nick C. Tang, Yen-Yu Lin, *Member, IEEE*, Ming-Fang Weng, and Hong-Yuan Mark Liao, *Fellow, IEEE*

Abstract: We present a novel two-pass framework for counting the number of people in an environment, where multiple cameras provide different views of the subjects. By exploiting the complementary information captured by the cameras, we can transfer knowledge between the cameras to address the difficulties of people counting and improve the performance. The contribution of this paper is threefold. First, normalizing the perspective of visual features and estimating the size of a crowd are highly correlated tasks. Hence, we treat them as a joint learning problem. The derived counting model is scalable and it provides more accurate results than existing approaches. Second, we introduce an algorithm that matches groups of pedestrians in images captured by different cameras. The results provide a common domain for knowledge transfer, so we can work with multiple cameras without worrying about their differences. Third, the proposed counting system is comprised of a pair of collaborative regressors. The first one determines the people count based on features extracted from intracamera visual information, whereas the second calculates the residual by considering the conflicts between intercamera predictions. The two regressors are elegantly coupled and provide an accurate people counting system. The results of experiments in various settings show that, overall, our approach outperforms comparable baselinemethods. The significant performance improvement demonstrates the effectiveness of our two-pass regression framework.

People Counting and Human Detection in a Challenging Situation

Author: Ya-Li Hou, *Student Member, IEEE*, and Grantham K. H. Pang, *Senior Member, IEEE*

Abstract: Reliable people counting and human detection is an important problem in visual surveillance. In recent years, the field has seen many advances, but the solutions have restrictions: people must be moving, the background must be simple, and the image resolution must be high. This paper aims to develop an effective method for estimating the number of people and locate each individual in a low resolution image with complicated scenes. The contribution of this paper is threefold. First, postprocessing steps are performed on background subtraction results to estimate the number of people in a complicated scene, which includes people who are moving only slightly. Second, an Expectation Maximization (EM)-based method has been developed to locate individuals in a low resolution scene. In this method, a new cluster model is used to represent each person in the scene. The method does not require a very accurate foreground contour. Third, the number of people is used as *a priori* for locating individuals based on feature points. Hence, the methods for estimating the number of people and for locating individuals are connected. The developed methods have been validated based on a 4-hour video, with the number of people in the scene ranging from 36 to 222. The best result for estimating the number of people has an average error of 10% over 51 test cases. Based on the estimated number of people, some results of the EM-based method have also been shown.

Sensible Organizations: Technology and Methodology for Automatically Measuring Organizational Behavior

Author: Daniel Olguín Olguín, *Student Member, IEEE*, Benjamin N. Waber, *Student Member, IEEE*,

Abstract: We present the design, implementation, and deployment of a wearable computing platform for measuring and analyzing human behavior in organizational settings. We propose the use of wearable electronic badges capable of automatically measuring the amount of face-to-face interaction, conversational time, physical proximity to other people, and physical activity levels in order to capture individual and collective patterns of behavior. Our goal is to be able to understand how patterns of behavior shape individuals and organizations. By using on-body sensors in large groups of people for extended periods of time in naturalistic settings, we have been able to identify, measure, and quantify social interactions, group behavior, and organizational dynamics. We deployed this wearable computing platform in a group of 22 employees working in a real organization over a period of one month. Using these automatic measurements, we were able to predict employees’ self-assessments of job satisfaction and their own perceptions of group interaction quality by combining data collected with our platform and e-mail communication data. In particular,

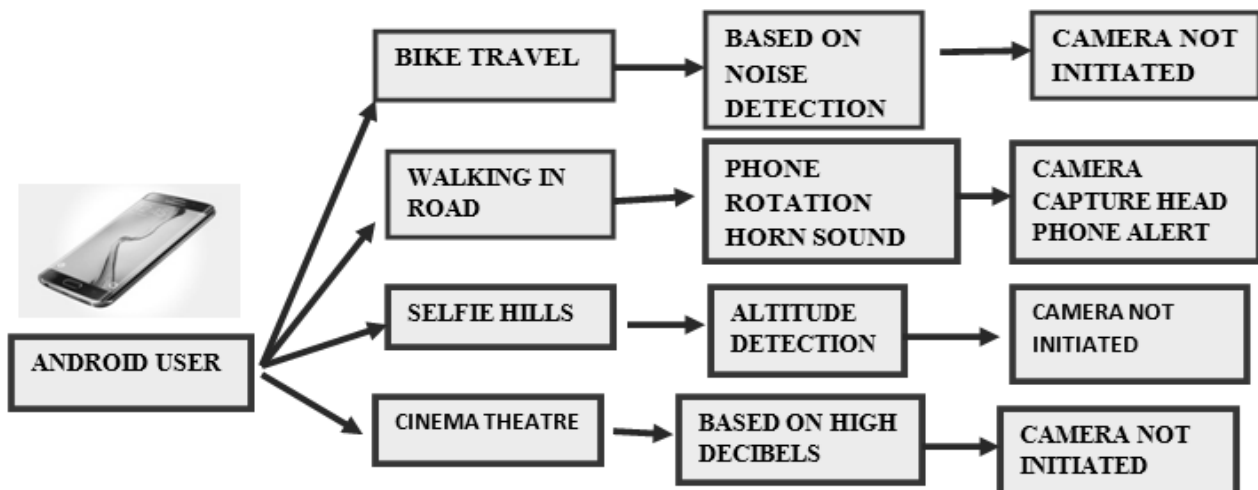
the total amount of communication was predictive of both of these assessments, and betweenness in the social network exhibited a high negative correlation with group interaction satisfaction. We also found that physical proximity and e-mail exchange had a negative correlation of $r = -0.55$ ($p < 0.01$), which has far-reaching implications for past and future research on social networks.

3. PROPOSED SYSTEM OVERVIEW:

- We also analyze other major possibilities of getting accident.
- Major accident is occurring because of taking Selfie in High Altitudes like Hill Areas, Our Android Application stops initiating the camera if user's Altitude is high from the Ground Level.
- Usage of Mobiles during riding Bikes will also be a dangerous, so camera is not initiated if Environmental Air decibels are very high.
- Camera is not initiated in Railway Station Zones because of High Voltage Current.
- In Cinema Theatres usage of camera is avoided when surrounding Audio Decibels are really high.
- During walking if Vehicle Horn is captured immediately photo will be shown to the user to get alert along with Headphone Alert, so that accidents can be avoided.

SYSTEM HARDWARE DESIGN:

SYSTEM ARCHITECTURE:



The hardware requirements may serve as the basis for a contract for the implementation of the system and should therefore be a complete and consistent specification of the whole system. They are used by software engineers as the starting point for the system design. It shows what the systems do and not how it should be implemented.

Hardware Requirements:

- Processor : Core i3/i5/i7
- RAM : 2-4GB
- HDD : 500 GB

SYSTEM SOFTWARE DESIGN:

The software requirements are the specification of the system. It should include both a definition and a specification of requirements. It is a set of what the system should do rather than how it should do it. The software requirements provide a basis for creating the software requirements specification. It is useful in estimating cost, planning team activities, performing tasks and tracking the team's and tracking the team's progress throughout the development activity.

Software Requirements:

- Platform : Windows Xp/7/8
- Front End : Java-JDK1.7, Android-sdk and Eclipse, Apache tomcat
- Back end : MySql

REFERENCES:

1. J. Nasar, P. Hecht, and R. Wener, "Mobile telephones, distracted attention, and pedestrian safety," Accident Anal. Prevention, vol. 40, no. 1, pp. 69–75, 2008.
2. Biztech. Type while walk.

3. Andpi. Walking text.
4. One Llama Technology. (2013). One llama [Online]. Available: <http://www.onellama.com/>
5. S. Jain, C. Borgiattino, Y. Ren, M. Gruteser, and Y. Chen, "On the limits of positioning-based pedestrian risk awareness," in Proc. Workshop Mobile Augmented Reality Robotic Technol.-Based Syst., 2014, pp. 23–28.
6. T. Wang, G. Cardone, A. Corradi, L. Torresani, and A. T Campbell, "Walksafe: A pedestrian safety app for mobile phone users who walk and talk while crossing roads," in Proc. 12th Workshop Mobile Comput. Syst. Appl., 2012, p. 5.
7. X.-D. Yang, K. Hasan, N. Bruce, and P. Irani, "Surround-see: Enabling peripheral vision on smartphones during active use," in Proc. 26th Annu. ACM Symp. User Interface Softw. echnol., 2013, pp. 291–300.
8. J. D. H.-Ramos and P. Irani, "Crashalert: Enhancing peripheral alertness for eyes-busy mobile interaction while walking," in Proc. SIGCHI Conf. Human Factors Comput. Syst., 2013, pp. 3385–3388.
9. Sharp 2y0a710-datasheet.
10. J. Wen, J. Cao, and X. Liu, "We help you watch your steps: Unobtrusive alertness system for pedestrian mobile phone users," in Proc. IEEE Int. Conf. Pervasive Comput. Commun., 2015, pp. 105–113.
11. com/Qingbao/HealthCareStepCounter
12. C. J. C. Burges, "A tutorial on support vector machines for pattern recognition," Data Mining Knowl. Discovery, vol. 2, no. 2, pp. 121–167, 1998.
13. Gonzalo R Arce. Nonlinear Signal Processing: A Statistical Approach. Hoboken, NJ, USA: Wiley, 2005.
14. A. V Oppenheim, R. W Schafer, J. R Buck, et al., Discrete-Time Signal Processing, vol. 2. Englewood Cliffs, NJ, USA: Prentice-hall, 1989.
15. J. Fan, C. Zhang, and J. Zhang, "Generalized likelihood ratio statistics and wilks phenomenon," Ann. Statist., vol. 29, pp. 153–193, 2001.

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Term based personalization of feature selection of autofilling patient transition

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Abstract: We proposed that representation learning has become a rapidly growing of clinical handover and auto-filling areas. In this paper, we present a novel feature selection model which is capable of selecting term-based personalized features for classification. First, each feature subset is evaluated by a term-feature probabilistic relevance model. Afterwards, the feature subset with the highest probabilistic value will be assigned for the given term during classification. Since exhaustive evaluating all the possible feature subsets is computationally intensive, we apply a strategy to generate candidate feature subsets based on mutual information. Traditional methods usually treat all terms with same feature sets, such that performance can be damaged when noisy information is brought via wrong features for a given term. Different from traditional feature selection methods, Conditional Random Field (CRF) model can automatically select the most relevant features for the given term, instead of using the same features for all terms in a learning machine. In this way, we further eliminate the negative impact of noisy information. Conditional Random Fields (CRFs) are a class of statistical modelling method often applied in pattern recognition and machine learning and used for structured prediction.

Key Words: Conditional Random Field, exhaustive.

INTRODUCTION:

Automation is everywhere emerging all over in the real-world applications. It is not only used in the medical field but also used in the organization to maintain and manage the business processes. In the Human Resource operations, interview process can be organized in an automated way by using this methodology. In robotics application, the automation is majorly used for the content filling and other purposes. This will free up the human resource overhead and the process which requires much human power will be minimized. The organization in which the process is managed by human entity, this proposed method can manage the organization with the usage of minimized efforts. This paper addressed a clinical information retrieval challenge to support clinicians in healthcare domain. We propose a term personalized feature selection model for clinical handover form auto-filling task. We show that our proposed model outperforms SVM, CRF and several ensemble methods. We also present that our model is stable and robust by comparing it with several feature selection methods. Electronic handover form with standardized and structured content provides us with a good mechanism to improve quality and safety at shift changes. CHFA can release lots of clinicians' time from documentation to care treatment and medical plan settings, since there are various contents in the handover form to be filled.

PURPOSE OF THE SYSTEM:

- To manage combination all the Pharmacy Information.
- To Manage the Account Transactions between the Customer and the Medical People.
- To Manage the Delivery Time and Discount Provided by the Each Medical People.
- To Maintain the Document Uploaded by the Medical People.
- To Maintain the Accessibility of the System between the Customers and the Medical Peoples.

SCOPE OF THE PROJECT:

Automation is everywhere emerging in all over in the real-world applications. It is not only used in the medical field and also used in the organization to maintain and manage the business processes. In the Human resources operations interview process can be organized in an automated way by using this methodology. In robotics application the automation is majorly used for the content filling and other purposes. This will free up the human resource overhead and the process which requires much human power will be minimized. The organization process is managed by human entity, by this proposed method we can manage the organization with the usage of minimized efforts. In this paper, we present a novel feature selection model which is capable of selecting term-based personalized features for classification. First, each feature subset is evaluated by a term-feature probabilistic relevance model. Afterwards the feature subset with the highest probabilistic value will be assigned for the given term during classification. Since exhaustive evaluating all the possible feature subsets is computationally intensive, we apply a strategy to generate candidate feature subsets based on mutual information. Different from traditional feature selection methods, our model can automatically select the most relevant features for the given term, instead of using the same features for all same term of learning machine. In this way, we furthest eliminate the negative impact of noisy information. We evaluate our approach on the Synthetic Nursing Handover data which is an open dataset used in CLEF e-Health 2016 task. Experiment results show that our method is promising and superior. The clinical algorithm (flow chart) is a text format that is specially suited for representing a sequence of clinical decisions, for teaching clinical decision making, and for guiding patient care.. Clinical algorithms are compared as to their clinical usefulness with decision analysis. The rest of the paper we organized and developed the (CRF) model. Clinical handover form auto-filling (CHFA) is an information extraction task which takes the written text as the input.

LITERATURE REVIEW:

1. Bringing patient safety to the forefront through structured computerisation during clinical handover:

Authors: J. Matic, P. M. Davidson, and Y. Salamonson

This review aims to examine critically, the methods and modes of delivery of handover used in contemporary health care settings and explore the feasibility of a computerised handover system for improving patient safety. Clinicians play a critical role in promoting patient safety, and the handover ritual is recognised as important in exchanging information and planning patient care. Communication failures have been identified as an important cause of adverse incidents in hospitals. Integrative literature review. Search of multiple electronic databases using terms: nursing handover, handoff, shift-to-shift reporting and change of shift report. To date, the focus of research has primarily been on the vehicle of the handover, rather than the content and processes involved in ensuring the reliability and quality of clinical information. Employing a computerised handover system in the clinical arena has the potential to improve the quality and safety of clinical care. Whilst the handover performed from shift-to-shift is a valuable communication strategy, ambiguities and incomplete information can increase the risks of adverse events. Given the importance of effective communication, its key link to patient safety and the frequency of nursing handover, it is imperative that clinical handover undergo increased scrutiny, development and research. This review underscores the challenge in clinical handover and recommends the use of technological solutions to improve communication strategies

2. “Handoff strategies in settings with high consequences for failure: lessons for health care operations

Authors: E. S. Patterson, E. M. Roth, D. D. Woods, R. Chow, J. O. Gomes et al

To describe strategies employed during handoffs in four settings with high consequences for failure. of observational data for evidence of use of 21 handoff strategies. NASA Johnson Space Center in Texas, nuclear power generation plants in Canada, a railroad dispatch center in the United States, and an ambulance dispatch center in Toronto. Evidence of 21 handoff strategies from observations and interviews. Nineteen of 21 strategies were used in at least one domain, on at least an 'as needed' basis. An understanding of how handoffs are conducted in settings with high consequences for failure can jumpstart endeavors to modify handoffs to improve patient safety.

3. Classifying nursing errors in clinical management within an australian hospital

Authors: D. Tran and M. Johnson

Although many classification systems relating to patient safety exist, no taxonomy was identified that classified nursing errors in clinical management. To develop a classification system for nursing errors relating to clinical management (NECM taxonomy) and to describe contributing factors and patient consequences. We analysed 241 (11%) self-reported incidents relating to clinical management in nursing in a metropolitan hospital. Descriptive analysis of numeric data and content analysis of text data were undertaken to derive the NECM taxonomy, contributing factors and consequences for patients. Clinical management incidents represented 1.63 incidents per 1000 occupied bed days. The four themes of the NECM taxonomy were nursing care process (67%), communication (22%), administrative process (5%), and knowledge and skill (6%). Half of the incidents did not cause any patient harm.

Contributing factors (n=111) included the following: patient clinical, social conditions and behaviours (27%); resources (22%); environment and workload (18%); other health professionals (15%); communication (13%); and nurse's knowledge and experience (5%). The NECM taxonomy provides direction to clinicians and managers on areas in clinical management that are most vulnerable to error, and therefore, priorities for system change management. Any nurses who wish to classify nursing errors relating to clinical management could use these types of errors. This study informs further research into risk management behaviour, and self-assessment tools for clinicians. Globally, nurses need to continue to monitor and act upon patient safety issues.

4. Comparing nursing handover and documentation: forming one set of patient information

Authors: M. Johnson, P. Sanchez, H. Suominen, J. Basilakis, L. Dawson, B. Kelly, and L. Hanlen

The aim of this study was to explore the potential for one set of patient information for nursing handover and documentation. Communication of patient information requires two processes in nursing: a verbal summary of the patients' care and another report within the nursing notes, creating duplication. Advances in speech recognition technology have provided an opportunity to consider the practicality of one set of information at the nursing end-of-shift. We used content analysis to compare transcripts from 162 digitally recorded handovers and written nursing notes for similar patients within general medical-surgical wards from two metropolitan hospitals in Sydney Australia. Using the Nursing Handover Minimum Dataset analysis framework similar content [n = 2109 (handover) n = 1902 (nursing notes)] was found within the handovers and notes at the end-of-shift (7:00 am and 2:00 pm). Analysis of the overarching categories demonstrated the emphasis within the differing data sources as: patient identification (31%), care planning or interventions (25%), clinical history (13%), and clinical status (13%) for handover, vs. care planning (47%), clinical status (24%), and outcomes or goals of care (12%) for nursing notes. This study has demonstrated that similar patient information is presented at handover and within documentation. Major categories are consistent with international nursing minimum datasets in use. We can use one set of patient information (within some limitations) for two purposes with system design, practice change and education. Experiments are currently being conducted trialling speech recognition within laboratory and clinical settings. One set of patient information, verbally generated at handover delivering electronic documentation within one process, will transform international nursing policy for nursing handover and documentation.

5. A systematic review of speech recognition technology in health care

Authors: M. Johnson, S. Lapkin, V. Long, P. Sanchez, H. Suominen, J. Basilakis, and L. Dawson

To undertake a systematic review of existing literature relating to speech recognition technology and its application within health care. Methods A systematic review of existing literature from 2000 was undertaken. Inclusion criteria were: all papers that referred to speech recognition (SR) in health care settings, used by health professionals (allied health, medicine, nursing, technical or support staff), with an evaluation or patient or staff outcomes. Experimental and non-experimental designs were considered. Six databases (Ebscohost including CINAHL, EMBASE, MEDLINE including the Cochrane Database of Systematic Reviews, OVID Technologies, PreMED-LINE, PsycINFO) were searched by a qualified health librarian trained in systematic review searches initially capturing 1,730 references. Fourteen studies met the inclusion criteria and were retained. Results The heterogeneity of the studies made comparative analysis and synthesis of the data challenging resulting in a narrative presentation of the results. SR, although not as accurate as human transcription, does deliver reduced turnaround times for reporting and cost-effective reporting, although equivocal evidence of improved workflow processes. Conclusions SR systems have substantial benefits and should be considered in light of the cost and selection of the SR system, training requirements, length of the transcription task, potential use of macros and templates, the presence of accented voices or experienced and in-experienced typists, and workflow patterns.

6. An introduction to variable and feature selection

Authors: I. Guyon and A. Elisseeff

Variable and feature selection have become the focus of much research in areas of application for which datasets with tens or hundreds of thousands of variables are available. These areas include text processing of internet documents, gene expression array analysis, and combinatorial chemistry. The objective of variable selection is three-fold: improving the prediction performance of the predictors, providing faster and more cost-effective predictors, and providing a better understanding of the underlying process that generated the data. The contributions of this special issue cover a wide range of aspects of such problems: providing a better definition of the objective function, feature construction, feature ranking, multivariate feature selection, efficient search methods, and feature validity assessment methods.

7. Learning using unselected features

Authors: J. Taylor, V. Sharmanska, K. Kersting, D. Weir, and N. Quadrianto

Feature selection has been studied in machine learning and data mining for many years, and is a valuable way to improve classification accuracy while reducing model complexity. Two main classes of feature selection methods - filter and wrapper - discard those features which are not selected, and do not consider them in the predictive model. We propose that these unselected features may instead be used as an additional source of information at train time. We describe a strategy called Learning using Unselected Features (LUF_e) that allows selected and unselected features to serve different functions in classification. In this framework, selected features are used directly to set the decision boundary, and unselected features are utilised in a secondary role, with no additional cost at test time. Our empirical results on 49 textual datasets show that LUF_e can improve classification performance in comparison with standard wrapper and filter feature selection.

PROPOSED SYSTEM OVERVIEW:

In this proposed system, automated filling outpatient form is introduced. By this application the patients do not have a need for waiting in the queue for consulting a doctor or does not need of much manpower for maintaining the patients and record of the patient details. In this system not only reducing the manpower but also we are proposed a priority to the patients who need emergency consultation with the doctor. Additionally, we have an online consultation option and appointment booking of the doctor.

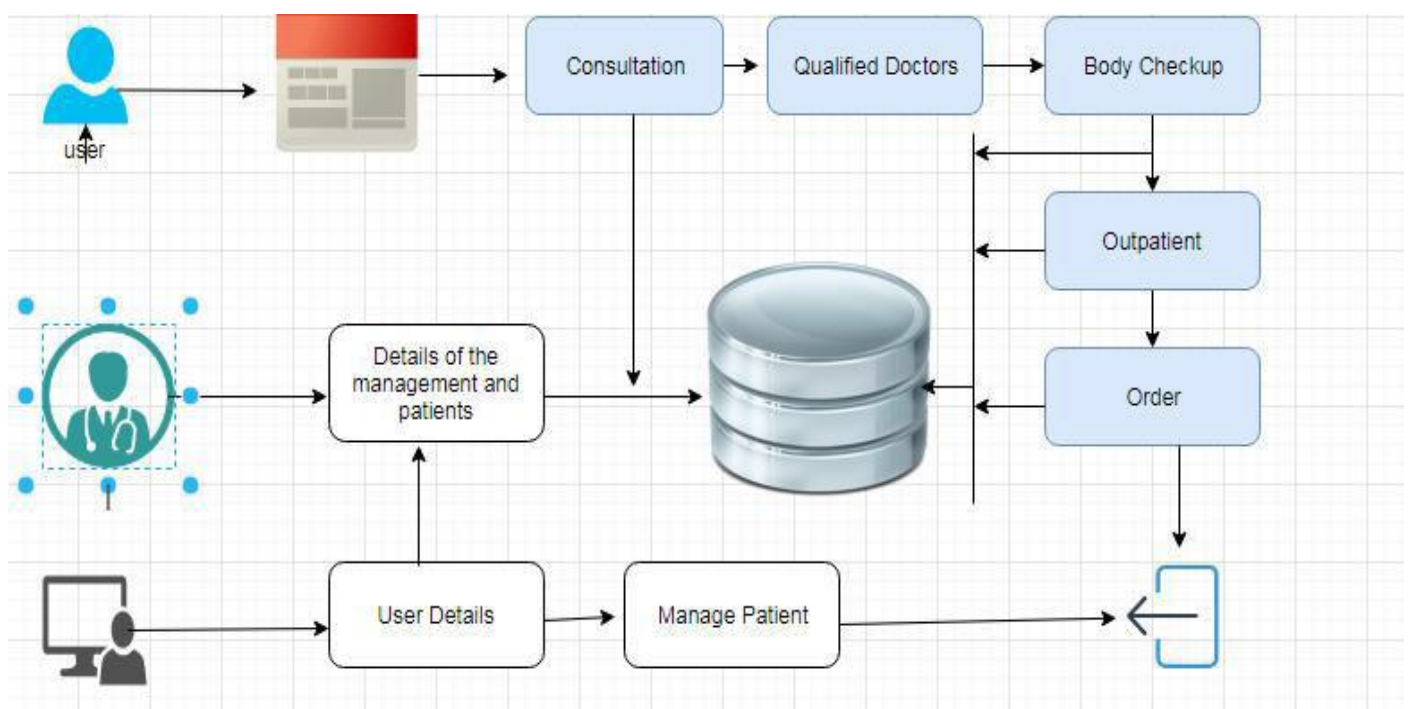
By this scheme we need not go to the hospital thereby we can directly book and consult the doctor according to the patients condition. The main purpose of the application is we consult the doctors via online video call, Getting online appointment of the doctors, this system mainly handling the patient who should be more critical stage that patient will be the first priority to consult the doctors..it will automatic the management of the hospital making it more efficient and error free. it aims at standardizing data, consolidating the data integrity and error free .it aims at standardizing data. Consolidating data and reduce inconsistencies. The main purpose of the application is we consult the doctors via online video call, Getting online appointment of the doctors, this system mainly handling the patient who should be more critical stage that patient will be the first priority to consult the doctors.

ADVANTAGES:

- It is very useful for patients
- It is easy to find the patient whose in critical condition
- This application very useful to take care of patient and prevent cause of death
- The patient details are filled automatically
- The main advantages is getting appointment of the doctors through online
- It will also consult the doctors via phone call and video call
- Easy way to handling the patients

SYSTEM SOFTWARE DESIGN:

SYSTEM ARCHITECTURE:



MODULE DESCRIPTION:

List of Modules:

- ADMIN
- USER
- CONSULTANCY
- MAKE AN APPOINTMENT
- ONLINE CONSULTANCY
- REGULAR CHECKUP
- OUTPATIENT TREATMENT
- ORDER MEDICINE

ADMIN:

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorizes the users.

USER:

In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user will do some operations like View Profile, Add Category, Book appointment, To consult doctors, And order medicine, To consult doctors via text message, And book Specialist.

CONSULTANCY:

A physician typically works in a hospital, and their central duty is to carry out the investigations and procedures necessary to establish a diagnosis, and then to give advice and provide treatment where appropriate. The work of the consultant goes beyond caring for patients.

MAKE AN APPOINTMENT::

If you have an appointment with someone, you have arranged to see them at a particular time, usually in connection with their work or for a serious purpose.

ONLINE CONSULTANCY:

An online doctor consultation is both convenient and easy to use especially for those who live in remote areas and have busy schedules. By using a text conferencing platform smartphone apps, and online management systems, doctors can connect with patients and diagnose them.. A consultation is a rendering of advice or professional opinion, followed by a report of findings to the referring physician. A referral on the other hand is simply a request to assume care of a patient. In order to bill for a consult, it is essential for that to be supported in the medical record.

REGULAR CHECKUP:

Regular health check-ups can identify any early signs of health issues. Finding problems early means that your chances for effective treatment are increased. Many factors, such as your age, health, family history and lifestyle choices, impact on how often you need check-ups.

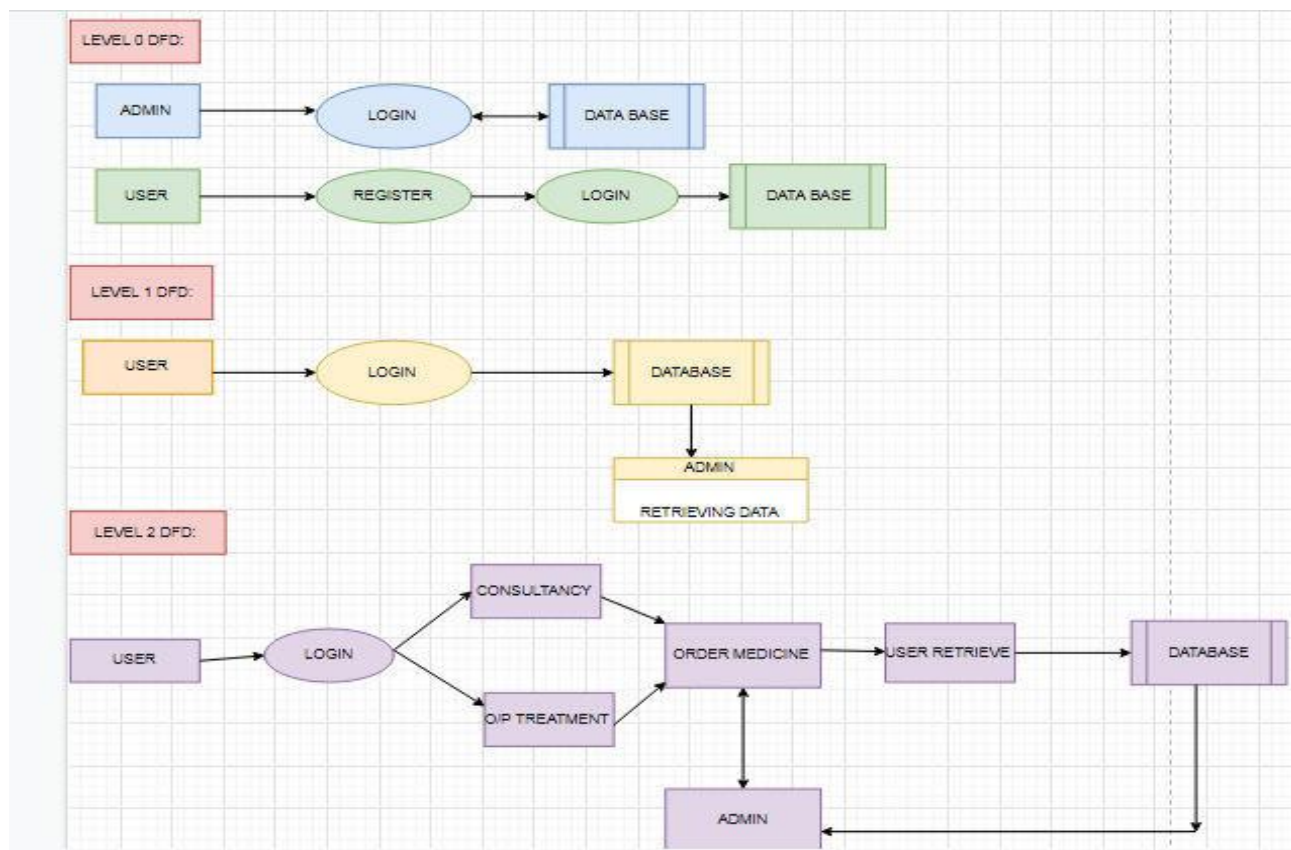
OUTPATIENT TREATMENT:

An outpatient is someone who goes to a hospital for treatment but does not stay overnight. Hospital benefits include reimbursement for both inpatient and outpatient medical care expenses. An outpatient is someone who goes to a hospital for treatment but does not stay overnight. Outpatient cover refers to diagnostic tests, consultations and procedures that do not require a hospital bed overnight. Things such as blood test, X-rays, MRI and CT scans are all examples of outpatient treatments. You can tweak your outpatient cover to make your plan more basic or comprehensive.

ORDER MEDICINE:

A medication order is written directions provided by a prescribing practitioner for a specific medication to be administered to an individual. And we can consult the doctor in online treatment and ordered medicine which is suggest by doctors we purchase the tablets by use of this modules. These orders can be typed, handwritten, preprinted, verbal, or entered into the computer. Emergency orders or as-required orders are called as PRN orders, and these medications are given only when needed. Signs and symptoms for PRN orders include coughing, sneezing, tiredness, headache, earache, etc. In addition, it requires a PRN protocol to administer the medication

DATA FLOW DIAGRAM 0 LEVEL:



CONCLUSION:

We show that our proposed model out performs SVM,CRF and several ensemble methods. This model is more stable and robust by comparing with several feature selection methods. By using this model,the user can make an easy consultance with the doctor.

REFERENCES:

1. J. M. Sotoca and F. Pla, "Supervised feature selection by clustering using conditional mutual information-based distances," Pattern Recognition, vol. 43, no. 6, pp. 2068–2081, 2010.
2. S. Oreski and G. Oreski, "Genetic algorithm-based heuristic for feature selection in credit risk assessment," Expert systems with applications, vol. 41, no. 4, pp. 2052–2064, 2014.
3. H.H.Inbarani,A.T.Azar,andG.Jothi,"Supervisedhybridfeature selection based on pso and rough sets for medical diagnosis," Computer methods and programs in biomedicine, vol. 113, no. 1, pp. 175–185, 2014.
4. A. Paul, A. Dey, D. P. Mukherjee, J. Sivaswamy, and V. Tourani, "Regenerative random forest with automatic feature selection to detect mitosis in histopathological breast cancer images," in International Conference on Medical Image Computing and ComputerAssisted Intervention. Springer, 2015, pp. 94–102.
5. P. A. Mundra and J. C. Rajapakse, "Svm-rfe with mrmr filter for gene selection." Nanobioscience IEEE Transactions on, vol. 9, no. 1, pp. 31–37, 2010
6. Q. Song, J. Ni, and G. Wang, "A fast clustering-based feature subset selection algorithm for high-dimensional data," IEEE transactions on knowledge and data engineering, vol. 25, no. 1, pp. 1–14, 2013.
7. Z. Li, J. Liu, Y. Yang, X. Zhou, and H. Lu, "Clustering-guided sparse structural learning for unsupervised feature selection," IEEE Transactions on Knowledge and Data Engineering, vol. 26, no. 9, pp. 2138–2150, 2014.
8. H.Suominen,L.Zhou,L.Goeuriot,andL.Kelly,"Task1oftheclef ehealth evaluation lab 2016: Handover information extraction," in CLEF 2016 Evaluation Labs and Workshop: Online Working Notes, CEUR-WS, 2016, pp. 60–63.
9. C. D. Manning, M. Surdeanu, J. Bauer, J. R. Finkel, S. Bethard, and D. McClosky, "The stanford corenlp natural language processing toolkit." in ACL (System Demonstrations), 2014, pp. 55–60.
10. J. Yang and V. Honavar, "Feature subset selection using a genetic algorithm," in Feature extraction, construction and selection. Springer, 1998, pp. 117–136

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Energy Preserving Secure Measure against Wormhole Attack in Wireless Sensor Networks

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Abstract As an increasing number of people are going wireless, reducing the criticism of wireless networks is becoming a top priority. Wormhole attack is a severe threat against ubiquitous sensor networks. In a wormhole attack, the intruder sniffs the packets at one point in the network and forwards them with a less latency and relays them to another point in the network. A strategic placement of the wormhole can result in a significant breakdown in communication across a wireless network. The objective of dissertation addresses the efficient comparing the proposed technique with the previous study. In this paper, we have proposed an algorithm where intrusion detection has been done in a proposed approach to detect the wormhole attacks. The AODV routing protocol is used as the underlying network topology. Data tracker is used for detecting and isolating the malice node i.e. acting as a wormhole. This approach is implemented by using NS-2. The Simulation results are presented to validate the stated goal by comparing various performance metrics.

Key Words: Wroholeattack AODV Ad-hoc on Demand distance Vector protocol) ;wireless network ;

INTRODUCTION:

Sensor nodes are used to perform communication in wireless sensor network. Nodes in network here communicate directly with each other using wireless transceivers with no fixed infrastructure. Sensor nodes are deployed in large number to monitor the environment or system by measurement of physical parameters such as pressure, characteristic of object temperature and their relative humidity or motion. Each node of the sensor network consist of the three subsystems: the processing subsystem which performs local computations on the sensed data, the sensor subsystem which senses the environment and the communication subsystem which is responsible for message interchange with neighbouring sensor nodes. Cost and size on sensor nodes result in corresponding constraints on resources such as memory, energy, computational speed and communications bandwidth. The application scenarios for WSNs are many including military surveillance, commercial, medical, manufacturing and home automation. Due to the broadcast nature of the transmission medium and fact that sensor nodes often operate in hostile environments WSNs are vulnerable to variety of security attacks. According to the layers of the OSI model classification of security attacks in WSNs is done. The attacks which operate at the network layer are referred to as routing attacks. There are many types of attacks possible in network layer like selective forwarding, spoofed or replayed routing information, Sybil attack, sinkhole attack, Hello flood attack and Wormhole attack. Intrusion Detection System (IDS) in wireless networks has played an important role in network security by providing an additional level of protection to the network topology and applications beyond the traditional security mechanisms such as encryption and authentication. It detects the attacks and isolates the malicious nodes by matching the patterns of known intrusions or discovering the anomalies in the network activities. Its application environments cover almost all wireless networking scenarios such as ad hoc networks, wireless LANs, and sensor network.

Wireless Sensor Networks (WSNs) have been applied in more and more applications; however in sensor network sensor nodes are responsible not only for-the monitoring of the environment but also for forwarding the data packets toward base station on behalf of other sensor nodes. The sensors must be able to trace the routes to the base station and aware of their neighbours. An attacker can easily access of this, and may try to control the routes and to monitor the data packets that are sent along these routes. One way to achieve this is to set up a wormhole in the network. A wormhole is a specialized man in- the-middle attack in which the adversary connects two otherwise distant regions

of the network. We proposed a scheme for intrusion detection in WSN. They proposed distributed and cooperative framework to detect the attack. Every node in the WSN participates in the process of intrusion detection. It detects the sign of intrusion locally and independently and also propagates this information to other nodes in the network. Intrusion Detection is a security technology that attempts to identify individuals who are trying to break into and misuse a system without authorization and those who have legitimate access to the system and are abusing their privileges. The system protected is used to denote an information system being monitored by the Intrusion Detection system. Routing protocols like table-driven/proactive, demand-driven/reactive or hybrid variants are subjected to routing attacks resulting in compromised confidentiality, integrity and message authentication.

LITERATURE REVIEW

1. Analysis of Different Routing Techniques for Opportunistic Data Transfer

Author-Sheela Rani Arasu, and Immanuel Johnraja Jebadurai, International Journal of Computer Applications (0975 - 8887), volume 62 - No.5, January 2013

Opportunistic networks are mobile networks that rely on the store-carry-and-forward paradigm, using contacts between nodes to opportunistically transfer data. For this reason, traditional routing mechanisms are no longer suitable. To increase the success of successful message delivery, different probability-based techniques were previously studied by various authors. Here we address the question of how much of the forwarding probability of an ON has to be increased, in order for the network to achieve a given desired hit rate. We propose an approach based on percolation theory, which explains the influence of forwarding probability in a network's performance, and we try to prove that such a phenomenon is indeed present in ONs. We demonstrate, through extensive experiments, that the transition phase can be indeed observed in ONs when the forwarding probability is varied from 0 to 0.1. After the transition phase, little benefit is obtained in terms of reachability (exponential relationship) when the forwarding probability is increased. In contrast, the delivery cost increases much faster than the reachability after the transition phase. Consequently, increasing the forwarding probability only impacts on metrics like the delivery cost and latency since high reachability can be assumed in opportunistic networks.

2. The Design and Performance Evaluation of a Proactive Multipath Routing Protocol for Mobile Ad Hoc Networks

Author-Ali Abdalla Etorban, at Heriot - Watt University in the School of Mathematical and Computer sciences, May 2012

Network coding has been studied to enhance reliability and robustness of communications in lossy environments such as high mobile tactical situations. Previous network coding research has exploited on-demand multipath routing, multicasting, or broadcasting to leverage spatial redundancy and improve communication performance. However, one should not ignore proactive routing protocols such as link state protocol OSPF, since the latter is the prevailing protocol used in tactical field communications. This paper proposes a new routing and network coding strategy based on a link state protocol. This strategy extends the shortest path generated by the link state algorithm to multipath routing; thus provides the spatial redundancy required for efficient network coding. The strategy is simple. It can be applied to any link state routing protocol and it greatly improves packet delivery performance in disruptive environments. This paper provides protocol design, implementation and performance evaluation of this strategy, followed by extensive validation via simulation.

3. "Power aware qos multipath routing protocol for disaster recovery networks"

Author-S. Santhi, Dr. G. Sudha Sadasivam, International Journal of Wireless & Mobile Networks (IJWMN) Vol. 3, No. 6, December 2011.

Mobile ad-hoc networks (MANETs) have gained great importance in today's commercial communication markets. These networks consist of several nodes that can communicate with each other without any fixed infrastructure. The nodes in these networks are highly dynamic and they are also battery powered. Hence energy efficiency is one of the important factor that has to be considered in MANETs. In this paper, we have designed an energy efficient multipath routing protocol using adjustable sleeping window (EMRAS) by implementing two algorithms - power and delay aware multipath routing protocol (PDMRP) and slow start exponential and liner algorithm (STELA) using cross layer design. STELA algorithm helps to improve the energy efficiency of the network by adjusting the sleeping window when there are no network activities. When there is any network activity, PDMRP helps to select the path which is energy efficient and also shortest. Simulation results show that EMRAS protocol has improved the overall residual energy and reduced the total energy consumption without degrading the QoS parameters.

4. "Performance Analysis of An Energy Aware Multipath Routing Algorithm for Mobile Ad Hoc Networks"

Author-S. Harous, M. Alidubai, Q. Nasir, University of Sharjah.

A Mobile Ad Hoc Network (MANET) is a dynamic wireless network that can be formed without the need for any pre-existing infrastructure in which each node can act as a router. Wireless mobile ad hoc stations have limited battery capacity, hence, ad hoc routing protocols ought to be energy conservative. Energy aware routing protocols are consistently cited as efficient solutions for ad hoc and sensor networks routing and data management. However, there is not a consistent approach to define the energy related cost metrics that are used to guide the routing protocol performance. In this paper, we provide an analysis and critical review of energy entropy metrics, it present an Energy Entropy on EECA (EE-EECA) multipath routing protocol. The key idea of the protocol is to find the minimal node residual energy of each route in the process of selecting path by descending node residual energy. It can balance individual nodes battery power utilization and hence prolong Hesham the entire networks lifetime. Simulation results show that the proposed EE-EECA routing protocol performed better than EECA.

5."Manet Load Balancing Parallel Routing Protocol"

Author-A. Ali, Taher T. Hamza and ShadiaSarhan , IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 4, No 1, July 2012.

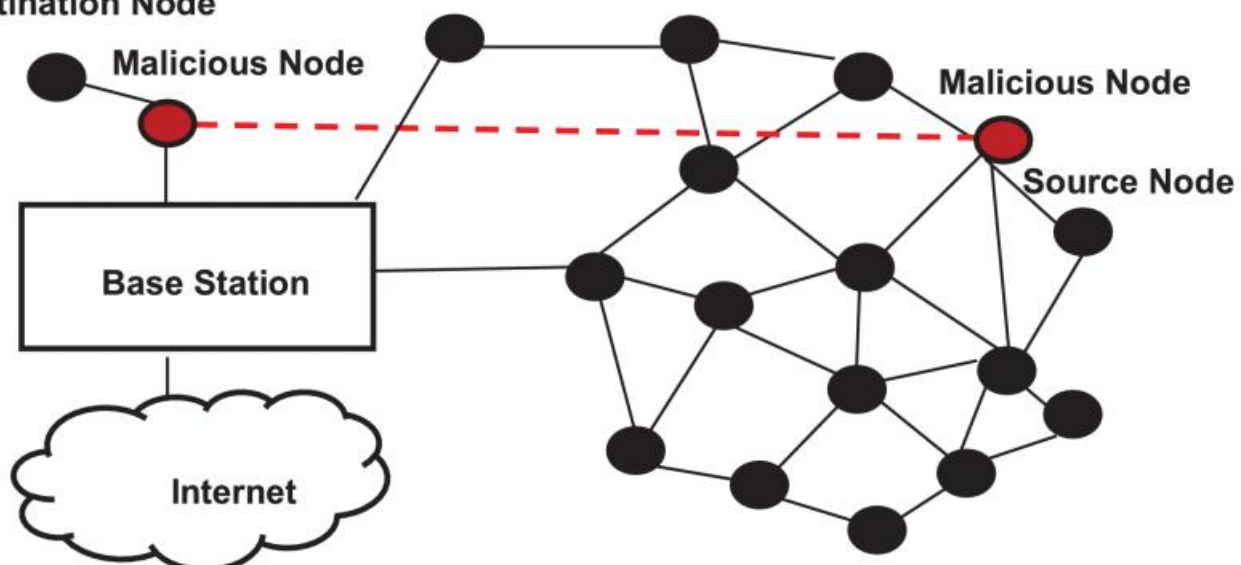
Routing protocol in ad hoc networks essentially needs a routing mechanism to establish a path from source to destination. The protocols differ in techniques used to discover path and recover in case of failure. Traditional routing protocol such as AODV, DSR, DSDV, OLSR, and AOMDV have been found to perform efficiently in the networks without consideration of battery power or network life time. This paper analyzes the traditional routing protocols to find a batter candidate on which further applied energy efficient techniques to optimize the energy consumption. The performance of protocols adjudge energy consumption versus various parameters such as data insertion rate, mobility, network density, the degree of nodes, number of connections in the networks. The performance analysis implemented in NS-2 simulator and finds the reactive routing protocols AODV & AOMDV perform as compared to proactive routing protocols DSDV & OLSR

PROPOSED SYSTEM

- Mobile ad hoc network is a self-organized and special wireless communication network, which is made up of some mobile nodes by using distributed protocols.
- Routing protocol plays an important role in the communication between nodes and the research of it has become a hot spot.
- This project overcomes the existing defects of wormhole detection and prevention using propagation mitigation protocol.
- We introduce a propagation mitigation protocol can effectively improve the performance of AOMDV for detecting and predicting the wormhole attack.

ARCHITECTURE DIAGRAM:

Destination Node



CONCLUSION:

This work analyzed the routing security issues of MANETs, described the worm hole attack that can be mounted against a MANET and proposed a feasible solution for it in the Propagation Mitigation AOMDV protocol. This paper

presents a presents an analysis of Propagation Mitigation AOMDV routing with and without worm hole attack in different scenario in ad hoc network. By the Experimental results it can be observed that the Propagation Mitigation AOMDV. The experimental observations evaluated that the Proposed Mitigation AOMDV with the help of evaluation metrics such as packet delivery ratio, average end-to-end delay and the number of packets dropped. When compared to the existing active trust protocol, Propagation Mitigation protocol has better packet delivery ratio and comparatively low average end-to-end delay. The number of packets dropped in the Propagation Mitigation AOMDV protocol against the worm hole attack is prevented

RESULT AND DISCUSSION:

Attackers exploits wormholes to selectively drop packets, to build bogus route information, to create routing loops to waste the energy of network, to gain unauthorized access, to disrupt routing, to perform denial of service attacks, to blackmail a good node and induce rushing attack. In this paper, the attackers selectively drop packet, replays the data packets, gain unauthorized access and transmit data packets at high energy. The implemented solution of “Energy Preserving Secure Measure Against Wormhole Attacks in Wireless Sensor Networks” solves the problem of this resource consumption wormhole attack that is induced by creating wormholes in the wireless sensor networks. The extension of this protocol is to detect, isolate and prevent other route disruption attacks like Byzantine, Blackhole (Blackhole) and Sybil are under work. Preventing these attacks solves the problem of routing the legitimate packets in the dysfunctional way.

REFERENCES

1. Jie Yang, Yingying (Jennifer) Chen, Senior Member, IEEE, Wade Trappe and Jerry Cheng. (2013). Detection and Localization of Multiple Spoofing Attackers in Wireless Networks. *IEEE*. 24 (1), p44-58.
2. M. Bohge and W. Trappe, “An Authentication Framework for Hierarchical Ad Hoc Sensor Networks,” Proc. ACM Workshop Wireless Security (WiSe), pp. 79-87, 2003.
3. A. Wool, “Lightweight Key Management for IEEE 802.11 Wireless Lans With Key Refresh and Host Revocation,” ACM/Springer Wireless Networks, vol. 11, no. 6, pp. 677-686, 2005.
4. B. Wu, J. Wu, E. Fernandez, and S. Magliveras, “Secure and Efficient Key Management in Mobile Ad Hoc Networks,” Proc. IEEE Int’l Parallel and Distributed Processing Symp. (IPDPS), 2005.
5. L. Xiao, L.J. Greenstein, N.B. Mandayam, and W. Trappe, “Fingerprints in the Ether: Using the Physical Layer for Wireless Authentication,” Proc. IEEE Int’l Conf. Comm. (ICC), pp. 4646- 4651, June 2007.
6. V. Brik, S. Banerjee, M. Gruteser, and S. Oh, “Wireless Device Identification with Radiometric Signatures,” Proc. 14th ACM Int’l Conf. Mobile Computing and Networking, pp. 116-127, 2008.
7. Q. Li and W. Trappe, “Relationship-Based Detection of Spoofing Related Anomalous Traffic in Ad Hoc Networks,” Proc. Ann. IEEE Comm. Soc. on IEEE and Sensor and Ad Hoc Comm. And Networks (SECON), 2006.
8. F. Guo and T. Chiueh, “Sequence Number-Based MAC Address Spoof Detection,” Proc. Eighth Int’l Conf. Recent Advances in Intrusion Detection, pp. 309-329, 2006.
9. L. Sang and A. Arora, “Spatial Signatures for Lightweight Security in Wireless Sensor Networks,” Proc. IEEE INFOCOM, pp. 2137-2145, 2008.
10. Y. Sheng, K. Tan, G. Chen, D. Kotz, and A. Campbell, “Detecting 802.11 MAC Layer Spoofing Using Received Signal Strength,” Proc. IEEE INFOCOM, Apr. 2008.
11. D. Faria and D. Cheriton, “Detecting Identity-Based Attacks in Wireless Networks Using Signalprints,” Proc. ACM Workshop Wireless Security (WiSe), Sept. 2006.
12. Y. Chen, J. Francisco, W. Trappe, and R.P. Martin, “A Practical Approach to Landmark Deployment for Indoor Localization,” Proc. IEEE Int’l Conf. Sensor and Ad Hoc Comm. and Networks (SECON), Sept. 2006.
13. E. Elnahrawy, X. Li, and R.P. Martin, “The Limits of Localization Using Signal Strength: A Comparative Study,” Proc. IEEE Int’ Conf. Sensor and Ad Hoc Comm. and Networks (SECON), Oct. 2004.
14. P. Bahl and V.N. Padmanabhan, “RADAR: An in-Building RFBased User Location and Tracking System,” Proc. IEEE INFOCOM, 2000. P. Enge and P. Misra, Global Positioning System: Signals, Measurements and Performance. Ganga-Jamuna Press, 2001

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Crop Management and Pest management system Using IoT Framework

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Abstract: Agriculture is basic source of livelihood People in India. It plays major role in economy of country. Hence Automation must be implemented in agriculture to overcome these problems. An automatic crop monitoring system thereby saving time, money and power of farmer. The Soil moisture sensor and PIR sensor can be interfaced to the microcontroller to assess further data, send message to farmer and update information by using GSM and IoT.

Key Words: IoT techniques, smart agriculture, using sensor and embedded system.

INTRODUCTION:

This is the project from the motivation of the farmers working in the farm lands are solely dependent on the rains and bore wells for irrigation of their land. In recent times, the farmers have been using irrigation technique through the manual control in which the farmers irrigate the land at regular intervals by turning the water-pump ON/OFF when required. Moreover, for the power indication they are glowing a single bulb between any one of phase and neutral, meanwhile when there is any phase deduction occurs in other phases, the farmer cannot know their supply is low. If they Switch ON any of the motor, there will be the sudden defuse in motor circuit. They may have to travel so far for SWITCHING ON/OFF the motor. They may be suffering from hot Sun, rain and night time too.

As the world is trending into new technologies and implementations it is a necessary goal to trend up with agriculture also. IOT plays a very important role in smart agriculture. Here proposed an IOT and smart agriculture system using automation. This IOT based Agriculture monitoring system makes use of wireless sensor networks that collects data from different sensors deployed at various nodes and sends it through the wireless protocol. This smart agriculture using IOT system is powered by Arduino, it consists of Temperature sensor, Moisture sensor, water level sensor, DC motor and GPRS module. When the IOT based agriculture monitoring system starts it checks the water level, humidity and moisture level. It sends SMS alert on the phone about the levels. Sensors sense the level of water if it goes down, it automatically starts the water pump. If the temperature goes above the level, fan starts. This all is also seen in IOT where it shows information of Humidity, Moisture and water level with date and time, based on per minute. Temperature can be set on a particular level, it is based on the type crops cultivated. If we want to close the water forcefully on IOT there is button given from where water pump can be forcefully stopped. Agriculture sector being the backbone of the Indian economy deserves security and hence an agricultural product needs security, monitoring and maintenance at very initial stage. Hence there is need to implement modern science and technology in the agriculture sector for increasing the yield. These factors include attack of wild animals and birds when the crop grows up. There is also possibility of thefts when crop is at the stage of harvesting. Even after harvesting, farmers also face problems in storage of harvested crop. So, in order to provide solutions to all such problems, it is necessary to develop integrated system which will take care of all factors affecting the productivity in every stages like; cultivation, harvesting and post harvesting storage. This project can be used to control and monitor the agricultural fields from remote location.

MATERIALS:

- Arduino microcontroller,
- Soil Moisture sensor,
- Temperature sensor,
- Humidity sensor
- PIR sensor,

- Battery,
- GSM,
- Power Supply.
- Arduino IDE

METHOD:

Sensor data acquisition

The sensor is interface with microcontroller such as Soil moisture and PIR is used.

Data processing

The data processing is the task of checking various sensors data received from the field with the already fixed threshold values.

Monitoring and updating

To monitor the field and crops from anywhere using internet connection.

DISCUSSION:

As the world is trending into new technologies and implementations it is a necessary goal to trend up with agriculture also. IOT plays a very important role in smart agriculture. Here proposed an IOT and smart agriculture system using automation. This project uses IOT technology in agriculture, gathering crops environmental parameters in a fixed place to help farmers find problems in time. The Soil Moisture Sensor checks the moisture level in the soil and if moisture level is low then Arduino to intimate the farmer by using GSM and switches on a water pump to provide water to the crop. PIR sensor detect the wavering of animals or birds or any other objects within the field, a message is sent to the user via IOT module, updating the status.

ANALYSIS:

This smart agriculture using IOT system is powered by Arduino, it consists of Temperature sensor, Moisture sensor, water level sensor, DC motor and GPRS module. When the IOT based agriculture monitoring system starts it checks the water level, humidity and moisture level. It sends SMS alert on the phone about the levels. Sensors sense the level of water if it goes down, it automatically starts the water pump. If the temperature goes above the level, fan starts. This all is also seen in IOT where it shows information of Humidity, Moisture and water level with date and time, based on per minute. Temperature can be set on a particular level, it is based on the type crops cultivated. If we want to close the water forcefully on IOT there is button given from where water pump can be forcefully stopped.

FINDINGS:

This IOT based Agriculture monitoring system makes use of wireless sensor networks that collects data from different sensors deployed at various nodes and sends it through the wireless protocol. This smart agriculture using IOT system is powered by Arduino, it consists of Temperature sensor, Moisture sensor, water level sensor, DC motor and GPRS module. When the IOT based agriculture monitoring system starts it checks the water level, humidity and moisture level. It sends SMS alert on the phone about the levels. Sensors sense the level of water if it goes down, it automatically starts the water pump. If the temperature goes above the level, fan starts. This all is also seen in IOT where it shows information of Humidity, Moisture and water level with date and time, based on per minute.

RESULT:

The objective of the project is to monitoring of agriculture field by using IOT. To help the farmers and make their harvest economical by helping them in security purpose. This system provides complete monitoring action of sensors in fields that is very easy to control the field. It also provides huge security to the field.

RECOMMENDATIONS:

HARDWARE

- Arduino microcontroller,
- Soil Moisture sensor,
- Temperature sensor,
- Humidity sensor
- PIR sensor,
- Battery,
- GSM,
- Power Supply.

SOFTWARE

- Arduino IDE

Figures:

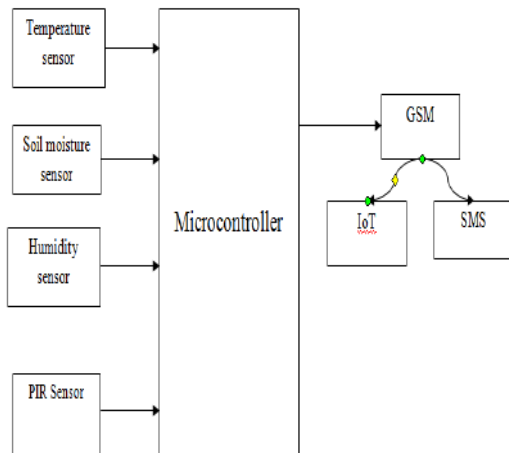


Figure 1 Block diagram



Figure2 ATmega and Arduino



Figure 3. GSM Module

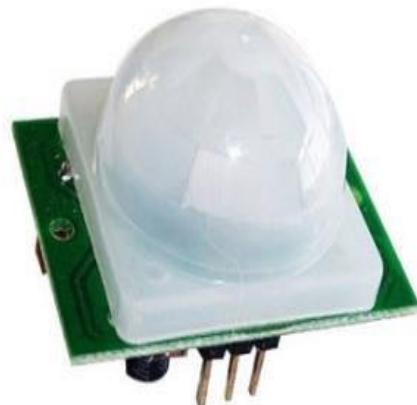


Figure 4. PIR SENSOR

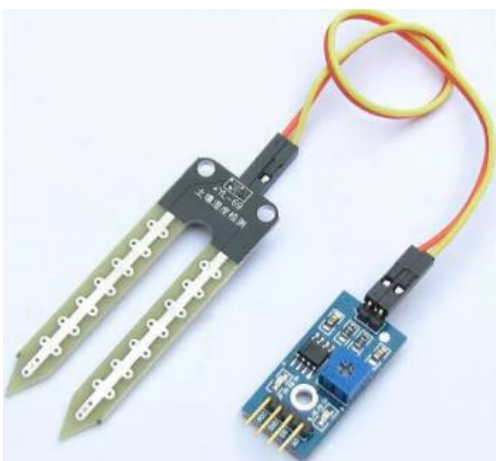


Figure 5. SOIL MOISTURE SENSOR

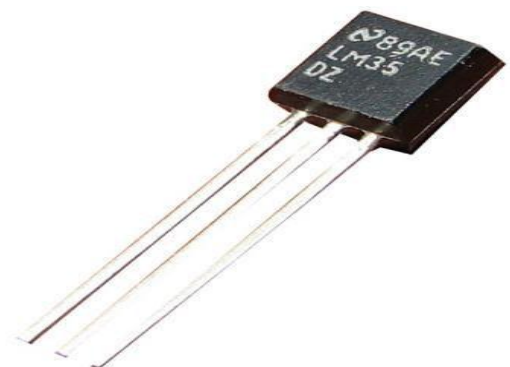


Figure 6 TEMPERATURE SENSOR

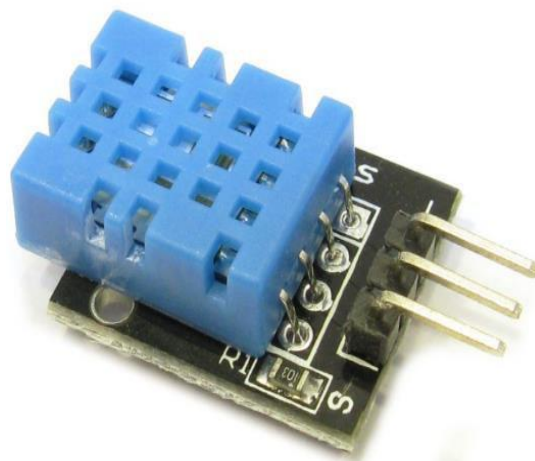


Figure 7. HUMIDITY SENSOR

CONCLUSION:

Thus, this system avoids over irrigation, under irrigation, top soil erosion and reduce the wastage of water. The main advantage is that the system's action can be changed according to the situation (crops, weather conditions, soil etc.). By implementing this system, agricultural, horticultural lands, parks, gardens, golf courses can be irrigated. Thus, this system is cheaper and efficient when compared to other type of automation system. In large scale applications, high sensitivity sensors can be implemented for large areas of agricultural lands.

REFERENCES:

1. Q. T. A. Khan, S. Abbas, and A. Athar, "Advanced Modeling of Agriculture Framing Techniques Using Internet of Things" International Journal of Computer Science and Network Security, vol. 17, no. 12, pp. 114–119, 2017.
2. A. Aher, J. Kasar, P. Ahuja, and V. Jadhav, "Smart Agriculture using clustering and IOT" International Research Journal of Engineering and Technology (IRJET), vol. 5, no. 3, pp. 4065–4068, 2018.
3. N. Gondchawar and R. S. Kawikar, "IoT based Smart Agriculture" International Journal of Advanced Research in Communication Engineering, vol. 5, no. 6, pp. 838–842, 2016.
4. S. Madakam, R. Ramaswamy, and S. Tripathi, "Internet of Things (IoT): A Literature Review" Journal of Computer and Communications, vol. 3, pp. 164–176, 2015.
5. X. Wang and N. Liu, "The application of internet of things in agricultural means of production supply chain management" Journal of Chemical and Pharmaceutical Research, vol. 6, no. 7, pp. 2304–2310, 2014.
6. K. Foughali, K. Fathallah, and A. Frihida, "Using Cloud IOT for disease prevention in precision agriculture" in Science Direct Procedia Computer Science, vol. 130, pp. 575–582, 2018.
7. S. K. Gawali and M. K. Deshmukh, "Energy Autonomy in IoT Technologies" in Science Direct Energy Procedia, vol. 156, pp. 222–226, 2019.
8. K. Gunasekera, A. N. Borrero, F. Vasuian, and K. P. Bryceson, "Experiences in building an IoT infrastructure for agriculture education" in Science Direct Procedia Computer Science, vol. 135, pp. 155–162, 2018.
9. I. Mohanraj, K. Ashokumar, and J. Naren, "Field Monitoring and Automation using IOT in Agriculture Domain" in Science Direct Procedia Computer Science, vol. 93, pp. 931–939, 2016.
10. F. H. Fahmy, H. M. Farghally, N. M. Ahmed, and A. A. Nafeh, "Modeling and Simulation of Evaporative Cooling System in Controlled Environment Greenhouse," Smart Grid and Renewable Energy, vol. 3, pp. 67–71, 2012.
11. V. Stavroulaki, et al, "Enabling Smart Cities through a Cognitive Management Framework for the Internet of Things" in IEEE Communication Magazine, vol. 51, no. 6, pp. 102–111, 2013.
12. S. Wolfert, L. Ge, C. Verdouw, and M. J. Bogaardt, "Big Data in Smart Farming – A review," Agriculture System, vol. 153, pp. 69–80, 2017.
13. A. C. Sarma and J. Girao, "Identities in the Future internet of Things" in Wireless Pers Commun, vol. 49, pp. 353–363, 2009.

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Self destruction of data in cloud using asymmetric key with key generator

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Abstract: People endorse the great power of cloud computing, but cannot fully trust the cloud providers to host privacy-sensitive data, due to the absence of user-to-cloud controllability. To ensure confidentiality, data owners outsource encrypted data instead of plaintexts. To share the encrypted files with other users, Cipher text-Policy Attribute-based Encryption (CP-ABE) can be utilized to conduct fine-grained and owner-centric access control. This is achieved by keeping key authority system and storage nodes in two different paths. Over an insecure channel, a public key is generated along with the corresponding private key and provide to number of users individually. The Key provided is independent of other keys for each users.

Key Words: Cloud storage; network coding; data security.

INTRODUCTION:

Network coding is attractive for its capability of achieving the unconditional security. In principle, network coding simply mixes data from different network nodes based on the well- designed linear combination rules. As long as partial network- coded data are protected, an eavesdropper cannot decode the entire plaintext even with infinite computing power and time. Another advantage of network coding is that no bandwidth expansion occurs compared to the cryptographic approaches. In recent years, network coding is introduced to enhance the security of cloud storage in which customers outsource their data to multiple clouds. Though offering many advantages, cloud storage inevitably poses security threats on the outsourced data. In, the problem of checking the integrity of network coded data in a secure cloud storage system was investigated. In, it was shown that network coding can be used to prevent eavesdropping in distributed cloud storage. However, from the aspect of implementation, the performance issues of network coding for secure cloud storage remains open. This motivates us to explore how to practically and cost-effectively store coded data in multiple clouds.

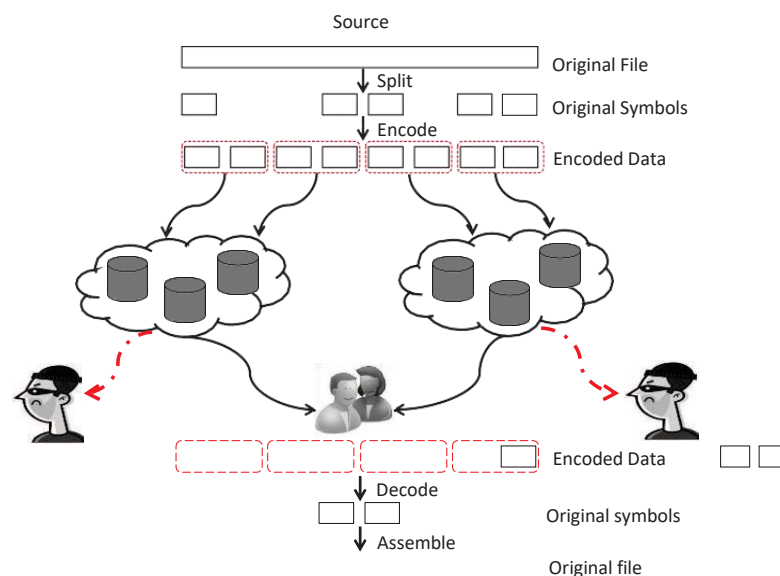


Figure 1. Con-Sidered

Figure 1 illustrates a secure cloud storage scenario considered in this paper. A network coding storage system consists of the following three procedures: splitting, encoding, and distributing. In this figure, an original file is split into smaller chunks of symbols. These symbols are encoded by Vandermonde matrix and then stored to different cloud databases. With network coding protection, a legitimate user can recover the entire original file, but an eavesdropper in only one cloud database cannot decode the original symbols.

LITERATURE REVIEW:

PAPER NAME	METHODOLOGY	DISADVANTAGES	Year
Collusion Resistant Broadcast Encryption With Short Cipher texts and Private Keys	We presented the first fully collusion resistant broadcast encryption scheme with constant size Cipher texts and private keys for arbitrary receiver sets.	The problem is to build a publickey broadcast encryption system to generate different private keys.	

PAPER NAME	METHODOLOGY	DISADVANTAGES	Year
Analysis of Key-Exchange Protocols and Their Use for Building Secure Channels	Any key-exchange protocol that satisfies the security definition can be composed with symmetric encryption and authentication functions to provide provably secure communication channels.	The dynamic generation of private keys are not possible.	

PAPER NAME	METHODOLOGY	DISADVANTAGES	Year
Block-Level Security for Network-Attached Disks	In this paper we have presented a new block-based security scheme for network-attached disks (NADs). Our scheme requires no changes to the data layout on disk and only minor changes to the standard protocol for accessing remote block-based devices.	Although this makes sense for variable-length objects, whose headers must be read first to find out where the desired data actually resides on disk, it is problematic for blocks: changing the permissions of a file would require updating a potentially large number of version numbers.	

MATERIALS:

Software Requirements:

Operating system : Windows7 32-bit Ultimate OS.

Coding Language : Java

Hardware Requirements:

Hard Disk : 300GB.

Monitor : 14' Colour Monitor.

Mouse : Optical Mouse.

Ram : 2GB

Connector : Network Switch

METHOD:

Asymmetric key

RSA algorithm : It is computationally easy for a user to generate their own public and private key-pair and to use them for encryption and decryption. The strength lies in the fact that it is "impossible" (computationally infeasible)

for a properly generated private key to be determined from its corresponding public key. Thus the public key may be published without compromising security, whereas the private key must not be revealed to anyone not authorized to read messages or perform digital signatures.

DISCUSSION:

In this paper, we focus on the performance issue of network coding when applying network coding in multiple untrusted clouds. The objective of this work is to develop a systematic design methodology of a network-coded cloud storage system. Similar methodology for the joint coding and placement problem can be found in [31]–[34]. The authors of [31] considered the relations among the clouds during the encoding process and proposed an encoding-aware data placement scheme to achieve throughput gains of encoding operations. An adaptive network coding storage scheme was proposed in [32]. The encoding strategy is adjusted according to the transmission conditions (e.g., packet loss rate). However, the storage cost of the coded data is not considered. In [33], the authors proposed to encode chunks using binary addition and bitwise cyclic shift in order to reduce encoding complexity. It is shown that the optimal tradeoff between storage capacity and repair bandwidth can be achieved. The most relevant one to our work is [34]. It investigated how to store data reliably in multiple clouds and provided the optimal amount of data to be stored in the clouds. The storage cost is shown to be highly affected by the potential number of colluding cloud databases. However, the number of colluding cloud databases in [34] is assumed to be known, which is impractical in many applications. Compared with these previous works, our proposed methodology has the following unique features.

ANALYSIS:

Storage analysis: Although network coding scheme can prevent eavesdroppers from obtaining the information of the original data [1], the length of encoded data in digital format may become larger than the length of the original data. This phenomenon is called overflow in this paper.

Security analysis: In this section, we analyze the proposed overflow-avoidance NCSS scheme in terms of security level and storage cost. First, we discuss the issue of enhancing security level from a system design aspect. Then, we derive the upper bound on data size that can be stored in the cloud with unconditional security.

FINDINGS:

To share the encrypted files with other users, Cipher text-Policy Attribute-based Encryption (CP-ABE) can be utilized to conduct fine-grained and owner-centric access control. This is achieved by keeping key authority system and storage nodes in two different paths. Over an insecure channel, a public key is generated along with the corresponding private key and provide to number of users individually. The Key provided is independent of other keys for each users.

RESULT:

Since the encoding process is performed at local machines, processing delay may be the performance bottlenecks. Thus, it is of importance to investigate the impacts of the system design parameters of a secure network coding scheme on its delay performance. To implement the user application and cloud storage, we develop the coding layer and storage layer of NCSS. Each original file is associated with the metadata which includes the coding information (e.g., encoding coefficients). The goal of our experiments is to explore the encoding performance of the proposed NCSS in terms of the file encoding time and the storage cost. Our experiments are conducted on a commodity computer with an Intel Core i5 processor running at 2.4 GHz, 8 GB of RAM, and a 5,400 RPM Hitachi 500 GB Serial ATA drive with an 8 MB buffer. Table V shows the parameters setting for experiments. Note that, in our setting, different cloud databases are geographically separated. Hence, the presented results are equivalent to those with p clouds, each having numerous databases.

RECOMMENDATIONS:

Key Authorities, Storage node, Sender, User

CONCLUSION:

Asymmetric cryptography is a class of cryptographic algorithms which requires two separate keys, one of which is secret (or private) and one of which is public. Although different, the two parts of this key pair are mathematically linked. The public key is used to encrypt plaintext or to verify a digital signature; whereas the private key is used to decrypt cipher text or to create a digital signature. Here we propose the concept of regeneration of key at certain time period to fool the hackers based on Asymmetric methodology.

REFERENCES:

1. Y. Wu and S.-Y. Kung, "Distributed utility maximization for network coding based multicasting: A shortest path approach," *IEEE Journal on Selected Areas in Communications*, vol. 24, no. 8, pp. 1475–1488, 2006
2. Y. Hu, H. Chen, P. Lee, and Y. Tang, "NCCloud: Applying network coding for the storage repair in a cloud-of-clouds," in *Proc. of the 10th USENIX Conf. on File and Storage Tech*, vol. 1, 2012.
3. C. Fragouli and J. L. Boudec, "Network coding: An instant primer," *ACM SIGCOMM Computer*, vol. 36, no. 1 (pp. 63–68), 2006.
4. L. Ozarow and A. Wyner, "Wire-tap channel II," *Advances in Cryptography*(pp. 33–50). 1985.

Theses:

1. **Yu-Jia Chen** received the B.S. degree and Ph.D. degree in electrical engineering from National Chiao Tung University, Taiwan, in 2010 and 2015,
2. **Li-Chun Wang (M'96 – SM'06 – F'11)** received the B.S. degree from National Chiao Tung University, Taiwan, R.O.C. in 1986, the M.S. degree from National Taiwan University in 1988, and the Ms. Sci. and Ph.D. degrees from the Georgia Institute of Technology, Atlanta, in 1995, and 1996, respectively, all in electrical engineering.

Web References:

- <http://www.engpaper.com/cloud-computing>

Sri Rangapoopathy College of Engineering, Alampoondi, Tamilnadu, India

LITERATURE REVIEW:

TITLE	AUTHOR NAME	INFERENCE	DISADVANTAGE
Decision support for improvisation during emergency response operations	David Mendonaca, giampiero E.g.Berogg, William A.Wallace	Black board based decision support	Need to maintain the flexibility
Impediments to using GIS for real time disaster decision support	Andre Zerger, David Ingle Smith	Geographical Information System (GIS)	Addressing incompatibility is critical
Towards people centered approaches for effective disaster risk management	Anna scolobig, Tim prior	Disaster Risk Management (DRM)	No simple formulae to resolve the problems

TITLE	AUTHOR NAME	INFERENCE	DISADVANTAGE
Rich Monitoring of Road and Traffic Conditions using Mobile Smart-phones	Venkat Padmanabhan Ramachandran Ramjee	Triggered sensing techniques, wherein a low energy sensor is used to trigger the operation of a high energy sensor.	This method could be eavesdrop
RoADS: A road pavement monitoring system for anomaly detection using smart phones	Fatjon Seraj , Berend Jan van der Zwaag , Arta Dilo, Tamara Luarasi , and Paul Havinga	Audiovisual data labeling technique is proposed	Addressing incompatibility is critical
Distributed Road Surface Condition Monitoring Using Mobile Phones	Mikko Perttunen Oleksiy Mazhelis Fengyu Cong Mikko Kauppila	A pattern recognition system for detecting road condition from accelerometer and GPS readings	No simple formulae to resolve the problems

MATERIALS::

SOFTWARE REQUIREMENTS

- Operating System :
 - Windows 10
- Tool:
 - Java JDK6
- Database:
 - MySQL

HARDWARE REQUIREMENTS

- RAM:
 - 4GB or above
- Hard Disk Drive

- 160 GB HDD or above
- Processor:
 - Intel Core i3

METHOD::

ALGORITHM

- ✓ As the GTPs stream in one after another, we first need to decide where to put the rectangular blocks to bound them.
- ✓ Since users travel along roads, the general trend of a GPS trace is highly related to the direction of the corresponding roads and thus the position of the rectangular block.
- ✓ This can be done by using linear regression (LR) on the GTPs of a trace.
- ✓ LR behaves fitting the observed data with a line, which fits the observed data by minimizing the sum of squared residuals of the data.
- ✓ By incrementally applying linear regression on the streaming-in GTPs, we obtain the best-fit line so far.
- ✓ This line can then be used as the centerline to construct the rectangular block to bound the GTPs up to that point of time.

DISCUSSION:

Near-duplicate IMAGES can be uploaded when resources are sufficient. Due to the bandwidth and energy constraints in disaster environments, we reduce the transmission of near-duplicate/similar images and upload the valuable and unique ones. However, we do not remove any near-duplicate images which are still stored in smartphones without any loss of data. When the energy is sufficient and network is restored, the remaining images can be uploaded. On the other hand, saving energy for extending the battery lifetime will motivate users not to upload redundant images [17].

- SIMILAR IMAGES MAY be also IMPORTANT. In some cases, near-duplicate images may also imply the important information. For instance, two images taken in the same place at different times are near-duplicate, which implies that the conditions in the place haven't changed during the period. However, without uploading near-duplicate images, BEES can still obtain the important information implied by them, due to detecting similarity using image features. When a near-duplicate image in the server is detected, BEES can efficiently obtain the information of the "no change", i.e., the conditions/situations shown in the image have not significantly changed during the period.
- Two knobs in BEES. If a user insists on uploading his/her images no matter whether near-duplicate images exist, a knob being settable by the user in BEES allows the user to directly upload images. The parameter E_{bat} is the remaining energy in default, which is used to guide the tradeoffs between computing precision and energy efficiency. E_{bat} can also be set by the user via a knob. To maximize battery lifetime, the user can always set E_{bat} to 0 even with the full battery energy.

ANALYSIS:

To evaluate the effectiveness of similarity detection, we use the measure of precision (also called positive predictive value), which is the fraction of retrieved instances that are relevant. In the image similarity detection

We can define precision as: We select an image batch with 100 images from the disaster imageset as the uploaded images and store the images in the smartphone. We set different cross-batch redundancy ratios 0%, 25%, 50%, and 75%, by adding and removing the redundant images (similar to the uploaded images) into the servers.

FINDINGS:

- Allows users to potentially save lives with smart phone, tablet or laptop .
- Keeps the group safer by showing anything that looks dangerous or suspicious .
- Increases the effectiveness of emergency answerer by acting as their "eyes on the Spot".
- Trains public users on how to stop and respond to emergencies.

RESULT:

Energy Overhead. We investigate the impact of different schemes on energy overheads. SmartEye, MRC and BEES consume extra energy to compute and upload image features for similarity detection while saving energy by reducing redundant images to be transmitted, compared with Direct Upload. Thus different redundancy ratios of uploaded images produce different energy overheads. Therefore, we capture the energy overheads when the uploaded images are at different redundancy ratios. The redundancy ratio is defined as the ratio of the number of redundant images in the uploaded images to the total number of uploaded images. Battery Lifetime. We investigate the impact of different schemes on the battery lifetime of smartphones. Moreover, in order to demonstrate the efficiency of energy-aware adaptive schemes in BEES, we also examine the battery lifetime using BEES-EA. BEES-EA represents BEES

without energy-aware adaptive schemes in which BEES does not adjust its behaviors based on the remaining energy. For keeping the same conditions in each scheme, the initial energy of battery is full. During uploading images in each scheme, all applications in the smartphone, except BEES App and the system-related programs, are always closed and the screen is always bright. We select 150-group images from the Paris imageset, and store them in the smartphone in advance. Each group contains 40 images. We set the cross-batch redundancy ratio of each group to about 50% by adjusting the server index. There are almost no in-batch similar images in each group. We upload one group every 20 minutes, until the smartphone battery is exhausted. We record the remaining energy of battery every 20 minutes. Thus the battery lifetime of a smartphone is evaluated by computing the time from the smartphone starts up to its battery is exhausted.

MODULES:

- Capture Image or Record Video
- Location Identification
- Emergency Manager Decision
- Emergency Services

CONCLUSION:

It locates the latitude and longitude co-ordinates, to make identification for the Admin to provide the service much better. Since by locating latitude and longitude co-ordinates, the mobile is no need to give the entire address of the incidence where it is happening and time could be saved. Based on the request send by mobile user, the admin identifies the location and judge what type of incident happening?and points it to the corresponding Service. Using latitude and longitude co-ordinates, the admin identifies the location.

REFERENCES:

1. O.Mazhelis. Using recursive Bayesian estimation for matching GPS measurements to imperfect road network data. In Proc. of International IEEE Conference on Intelligent Transportation Systems (ITSC), 2010.
2. N.Meratria and R.By. \Spatiotemporal compression techniques for moving point objects. In Proc. of International Conference on Extending Database Technology (EDBT). 2004.
3. T.H.Cormen, C.E Leiserson, R.L.Rivest, and Stein. Introduction to Algorithms. MIT Press, 3rd edition, 2009
4. J.Muckell, J.Hwang, V. Patil, C.Lawson, F.Ping, and S. Ravi. SQUISH: An online approach for GPS trajectory compression. In Proc. of the International Conference on Computing for Geospatial Research, 2011.

Books:

5. **Pengfei Zuo** received the BE degree in computer science and technology from Huazhong University of Science and Technology (HUST), China, in 2014. He is currently a PhD student majoring in computer science and technology at HUST. His current research interests include data deduplication, non-volatile memory, and key-value store. He published several papers in major journals and conferences including TPDS, USENIX ATC, SoCC, ICDCS, IPDPS, MSST,

Chapters in Books:

6. **Yuncheng Guo** received the BE degree in computer science and technology from Huazhong University of Science and Technology (HUST), China, in 2015. He is working toward the masters degree majoring in computer science and technology at HUST. His current research interests include non-volatile memory, algorithms of hashing and data analytics.
7. **Yu Hua** received the BE and PhD degrees in computer science from the Wuhan University, China, in 2001 and 2005, respectively. He is a full professor at the Huazhong University of Science and Technology, China. His research interests include computer architecture, cloud computing, and network storage. He has more than 100 papers to his credit in major journals and international conferences including IEEE TC, IEEE TPDS, USENIX ATC, USENIX FAST, INFOCOM, SC, ICDCS and MSST. He has been on the program committees of multiple international conferences, including USENIX ATC, RTSS, INFOCOM, ICDCS, MSST, ICNP and IPDPS. He is a senior member of the IEEE, ACM and CCF, and a member of USENIX

Web References:

- <http://ieeexplore.ieee.org/document/8419321>

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BOUNDARY DETECTION IN MEDICAL IMAGES USING TEXTURE GRADIENT FEATURES

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Abstract: Edge detection in medical images for various imaging modalities is a challenging problem as they are inherently fuzzy in nature. Organ edges can be easily measured and there by Transplantation can be done very quickly. Classical intensity gradient based edge detectors and other popular edge detectors like Canny find edges within a single texture which adds lot of undesirable edges along with essential edge information. Since lots of unessential information is covered, it is difficult to measure the internal organs, for organ transplantation. In proposed system, a new edge detection technique based on the regional recursive hierarchical decomposition using quad tree and Sobel Filter. It is optimizable. Reduces the number of recursive calls. Quad-tree decomposition, in addition to the benefits presented above, provides a schema for dimensionality reduction, hence, improving the processing time for edge detection (operating on the dimensionality reduced data). High intensity variations and lack of discrete boundaries in these images make it difficult to get useful results with classical edge detection techniques.

Key Words: Deep learning, low-dose computed tomography (CT), sparse-view CT, view interpolation.

INTRODUCTION:

WITH increased use of X-ray computed tomography (CT) in clinics, potential radiation hazard has been alarmed. There have been developed a host of approaches toward low-dose CT imaging that include reducing or modulating the tube current, optimal selection of the tube voltage, and sparse data sampling to name a few. Sparse data sampling approach is in contrast with the tube current reduction since the former recruits smaller number of ray measurements with a lower noise level of the measured data than the latter. Sparse-view sampling, where the X-ray power is supposed to be turned on-and-off repeatedly, has been actively investigated as a realization of sparse data sampling although its translation to the commercialized diagnostic CT scanners has yet to come. Image reconstruction from sparsely sampled data constitutes a unique, ill-posed inverse problem in CT, and the compressed-sensing-inspired algorithms have been developed to deal with this problem. Minimizing image sparsity such as image total-variation under the constraints of data fidelity and image non-negativity has been searched for in various optimization solver framework. Exploiting image sparsity in such iterative image reconstruction approaches, however, may lead to undesirable image artifacts that heavily depend on the reconstruction algorithm parameters compared to the analytically reconstructed images from fully sampled data. Additionally, the minimal amount of data that guarantees clinically acceptable image quality in various imaging tasks with varying degrees of underlying image sparsity should be carefully determined. The computation time, even though it may not constitute a critical issue with advanced acceleration techniques and parallel computing power, can still be a burden. Direct application of analytic image reconstruction algorithm such as filtered-back projection (FBP) to the sparse-view data would lead to images with poor quality and severe streak artifacts. Attempts have been made to synthesize the missing view data so that the full data can be fed into the analytic image reconstruction engine. An interpolation-based data synthesis in the sinogram space is a straightforward example. Various approaches have been developed for synthesizing sinogram data: linear interpolation method, a principal component analysis-based method, a partial differential equation-based method, a frequency consistency condition-based method, intensity-based directional interpolation method, dictionary learning-based method and some combinatorial methods. For those interpolation approaches, image reconstruction results would highly depend on the restoring capability of the employed interpolation method. Greatly inspired by the recent progresses of machine learning techniques.

LITERATURE REVIEW:

Evolution of Image Segmentation: Image segmentation is the partition of an image into several regions of interest such that the contents of each region have similar characteristics. The segmentation of anatomic structures in the brain plays a crucial role in neuro imaging analyses. The complexity of human brain structure mandates the use of computerized approaches derived from computer vision, image analysis, and applied mathematics fields to extract brain data. Successful numerical algorithms in segmenting anatomic structures in neuro images can help researchers, physicians, and neurosurgeons to investigate and diagnose the structure and function of the brain in both health and disease.

Introduction to Image Segmentation: However, extracting the ventricle, the brain, and brain tumors in magnetic resonance (MR) images is often highly challenging due to the convoluted shape, blurred boundaries, inhomogeneous intensity distribution, background noise, and low intensity contrast between adjacent brain tissues. This has motivated the need for segmentation techniques that are robust in applications involving a broad range of anatomic structure, disease, and imaging type. A number of segmentation methods have been proposed to extract specific brain structures, including threshold-, region-, and statistics-based methods, deformable models, atlas-guided techniques, and knowledge-based approaches. One of the most popular and successful approaches has been the deformable model due to its ability to accurately recover the shape of biological structures in many segmentation applications. Deformable models involve the formulation of a propagating interface, which is a closed curve in 2-D or a closed surface in 3-D that is moving under a speed function determined by local, global, and independent properties.

MULTI-SCALE EDGE DETECTION: Most edge detection algorithms specify a spatial scale at which the edges are detected. Typically, edge detectors utilize local operators and the effective area of these local operators define this spatial scale. The spatial scale usually corresponds to the level of smoothing of the image, for example, the variance of the Gaussian smoothing. At small scales corresponding to finer image details, edge detectors find intensity jumps in small neighborhoods. At the small scale, some of these edge responses originate from noise or clutter within the image and these edges are clearly not desirable. More interesting edges are the ones that also exist at larger scales corresponding to coarser image details. When the scale is increased, most noise and clutter is eliminated in the detected edges, but as a side effect the edges at large scales are not as well localized as the edges at smaller scales. For example, it has been shown that smoothing the image with Gaussian filters of increasing variances causes the edges to move from their actual locations. To achieve good localization and good detection of edges. Edge detection and analysis of edges at multiple scales has a rich history since the early days of edge detection.

Quad tree decomposition: Quad tree decomposition is a befitting technique for edge detection because there is a distinct difference between edges and neighboring pixels. If quad tree decomposition is performed over the images, the leaves of the quad tree or the level above the leaves will represent a maximum intensity of these pixels. By using quad tree, we can eliminate the pixels which do not represent the edges, and post-process only the leaves and their parents from the quad tree decomposed image which are 1x1 and 2x2 blocks using the normal differentiation technique along with other edge detection techniques such as Canny, Roberts, Sobel, and Prewitt to obtain the edges. This approach is advantageous when working with huge images that are already quad tree decomposed. In such a scenario, we can obtain the edges using only the 1x1 blocks (the lowest level) and 2x2 blocks (the second lowest level), since the edge information is stored after quad tree decomposition. The algorithm has been specifically developed for medical images, originating in domains including but not limited to the following: mammography, computerized tomography (CT), and magnetic resonance (MR). The inherent features of medical images are that they have a high-dimensionality, have ill-defined edges, and are corrupted by noise. While, this paper does not address the problem of noise reduction, we focus on the high dimensionality of these images (feature content) and ill-defined edges. Quad tree decomposition, in addition to the benefits presented above, provides a schema for dimensionality reduction, hence, improving the processing time for edge detection (operating on the dimensionality-reduced data).

MATERIALS:

Software Requirements

Jdk1.6

Windows XP

Hardware Requirements

RAM 512MB

40 GB Hard Disk

Pentium-4 Processor

METHOD:

✓ *Convolutional Neural Network :*

CNN is the most commonly used structure of deep neural-network for image applications. It is composed of several layers including convolution layer, pooling layer, and fully connected layer, and of activation functions. The

convolutional layer performs convolutions to the input data with its output results forming input signals to the next layer. For each layer, weight (W) and bias (b) together with an input (x) are given to the layer and a convolution operation is performed as follows: $W * x + b$. (1) The pooling layer down-samples input data with a specific method such as maximum pooling, or average pooling. In general, the pooling layer makes shift-invariant results by maintaining specific values from the input. The shift-invariance is important in the applications such as segmentation and classic-identification where the position of the target can be arbitrarily given in the data. Fully connected layer refers to a layer structure in which each neuron is connected to all the neurons in the previous layer and in the next layer. Activation function is applied after fully connected layer or convolutional layer, and it is in the form of a nonlinear function such as hyperbolic tangent, sigmoid, or rectified linear unit (ReLU).

✓ *Structure of the Proposed Network:*

We constructed our network based on a residual U-Net. The U-Net is one of the CNN model proposed for image segmentation. Residual learning is one of the techniques that can make a network converge faster and more efficiently. It trains the network to learn differences between the ground truth and the input data. Adding the residual learning scheme to the U-Net showed enhanced performances in removing streak artifacts in medical imaging. We employed the residual learning scheme in the network, and replaced pooling layers by convolutional layers to make the down-sampling trainable as well. Replacing a nontrainable layer by a trainable one has shown outperformances in other applications. In our case, the measured values in the sinogram space are more important than the initial guessed values in the missing sinogram. Therefore, giving higher weights to the measured pixels or highly correlated pixels to them is more appropriate than giving higher weights to the maximum values as is often done in a max-pooling.

DISCUSSION:

This paper reveals that the CNN-based interpolation or synthesis of the sparsely sampled sinogram can effectively make up the missing data and can produce reconstructed images of comparable quality to the ones reconstructed from the fully sampled sinogram. It is thought that an over-smoothing during the POCS-TV reconstruction resulted in higher discrepancies compared to the ground-truth FBP reconstructed image, which contains its own noise characteristics, in this paper. Although the POCS-TV reconstruction results from the sparsely sampled data are rather poor in this paper, we would like to note that such an iterative algorithm strongly depends on the optimization cost function and reconstruction parameters. Therefore, we cannot exclude a chance that a fine-tuned iterative algorithm can produce a reasonably acceptable image quality in a given imaging task. However, it is a common understanding that such compressed-sensing inspired algorithms are in general subject to cartoon image artifacts and that they may miss small structures in the reconstructed images from the sparsely sampled data. In contrast, the proposed method is free of such parameter tuning, which indeed highlights its strength. We would like to note that we have used different display window for each patient case to better highlight the performance differences in the investigated methods. Therefore, the visual perception of image quality between patient #1 case and #5 may be different as shown in Fig. 19. The proper comparison, however, should be made between Figs. 10–13 and Fig. 19 accordingly. The performance of the proposed method is indeed consistently higher than the others in all the patient cases as summarized in Tables VII and VIII, which shows its robustness against patient diversity. The training took about ten days for the successive convolutional layers, and about 18 and 24 days for the conventional U-Net, and the proposed U-Net in our computing environment, respectively. However, the sinogram synthesis after the networks complete the training took about 10 s, 40 s, and 50 s for the successive convolutional layers, conventional U-Net, and the proposed U-Net, respectively. One may argue that using more layers in the successive convolutional network so as to require similar training time to that of the U-Nets can possibly reach a higher performance. While we do not exclude such a chance that the successive convolutional network can achieve a similar performance to the U-Nets, we want to emphasize that the number of layers would be much larger and the training time accordingly would be way longer than the ones in the U-Nets. Considering the number of training parameters in the network that would contribute to the computation complexity, the successive convolutional network would need substantially larger number of layers to have a similar computational complexity since the U-Nets use varying number of channels and convolution schemes at different layers. Since we used relatively a small stride while making the training dataset, the data redundancy in the dataset is relatively high. While it helps increasing the number of training data, it also increases the training time. We will further investigate on reducing redundancies of the dataset as an attempt to increase the training speed in the future without compromised performance of the network. The network showed the best performance when the test sinograms had the same subsampling factor with the trained sinograms. It would be interesting to investigate on the image quality as the subsampling factor varies assuming that the network has been trained by each data set at a given subsampling factor. Based on our preliminary study, we will continue investigating the utility of the deep network in clinical environments that include fan-beam CT, cone-beam CT, and helical multiple fan-beam CT. Additionally, an irregular angular sampling in the sparse-view data acquisition as well as handling missing detector channel problem would be our future study.

ANALYSIS:

Training the Network: Since CNN allows a supervised machine learning, we need to provide training data and ground truth data to the network. We re projected seven real patients' images of Lung CT from TCIA using distance-driven projection algorithm in a fan-beam CT imaging geometry in this paper. The number of slice images used for training and validation was 634. The CT scan parameters are summarized in Table I. The field-of-view in Table I means the diameter of a circle covered by the detector with its center located at the isocenter of the system. We sub sampled the original sinograms by a quarter to make them sparsely sampled one. In other words, the sparsely viewsampled sinograms with an equal angular separation between the sampled views has been prepared by selecting every forth views from the original full sinograms. Then, we applied a linear interpolation along the scan angle direction for synthesizing initial full sinograms for training the network. The same size of the input sinogram with that of the original sinogram was thus used in this paper. Example images of an original full sinogram, the sparsely view-sampled sinogram, and the linearly interpolated one are shown in Fig. 2. We would like to note again that the convolution operations have been applied to patch-based data in the CNN.

Image Reconstruction: FBP algorithm [51] was used for image reconstruction from the ground truth sinogram and also from the synthesized sinogram. The array size of the reconstructed images is 512×512 . We used the same pixel size of the original patients' CT images, and the pixel size varies among the patients accordingly. For each given imaging task, we would thus have seven FBP-reconstructed images: ground truth image, image from sparsely sampled sinograms, images from the analytically interpolated sinograms (linear and directional interpolation), and images from the sinograms synthesized by three different deep neural networks.

FINDINGS:

Organ edges can be easily measured and there by Transplantation can be done very quickly It is optimizable
Reduces the number of recursive calls.

RESULT:

✓ Network Training Result

The training loss, or the Euclidean error of the network output of the successive convolution layers, conventional and proposed U-Nets are plotted as a function of epochs in Fig. 6. The solid lines represent the training error, and the scatter points represent the validation error at every 20 epochs. As shown in the plots, the Euclidean loss of validation dataset has similar value to the training error for all networks. Proposed U-Net has resulted in smaller training and validation errors compared to the successive convolutional layers and to the conventional U-Net.

✓ Interpolation Results

To evaluate the performance objectively, we recruited eight patients' from the same Lung CT dataset that did not participate neither in training nor validation phases. The number of slices used for evaluation was 662 slices. The sinograms have been prepared in the same way according to the CT scanning geometry and separated into patches with the same size used for training, and fed into the trained networks. Two example sinograms used for evaluation are shown in Figs. 7 and 8 in their absolute differences with the ground truth sinograms. For comparison, sinogram differences of the other methods are also shown. As one can see in the figures, the synthesized sinogram by CNNs have smaller difference from the ground truth sinogram than the sinograms synthesized by other methods. We plotted line profiles of the absolute difference of the sinograms in Fig. 9(a) and (b) along the line segments highlighted by green color in Figs. 7 and 8, respectively. For a quantitative comparison, we computed normalized root mean-square-error (NRMSE), which is the root mean-square-error divided by the difference between maximum and minimum values of the ground truth images, peak signal-to-noise ratio (PSNR), and structural similarity (SSIM).

RECOMMENDATION:

Noise Reduction, Filtering Image, Identify the essential edges, Skeletonization.

CONCLUSION:

In this paper, a new edge detection technique based on the regional recursive hierarchical decomposition using quad tree and post-filtration of edges using a finite difference operator. This Methodology identifies the essential edges and filters out the undesirable edges. In proposed we use three kind of medical images such as CT, CR, MRI. Since essential information is covered, it is ease to measure the internal organs, for Organ Transplantation.

REFERENCES:

Journal Paper:

1. H. Proença, S. Filipe, R. Santos, J. Oliveira, L. A. Alexandre, "The UBIRIS.v2: A Database of Visible Wavelength Iris Images Captured On-The-Move and At-A-Distance", IEEE Transactions on Pattern Analysis and Machine Intelligence, 32 (8), pp. 1529-1535, August, 2010.

2. L. An, X. Gao, Y. Yuan, and D. Tao, "Robust lossless data hiding using clustering and statistical quantity histogram," *Neuro computing*, vol. 77, no. 1, pp. 1–11, Feb. 2012.

Proceedings Papers: (11)

3. K. H. Jin, M. T. McCann, E. Froustey, and M. Unser, "Deep convolutional neural network for inverse problems in imaging," *IEEE Trans. Image Process.*, vol. 26, no. 9, pp. 4509–4522, Sep. 2017.
4. X. Ren and J. Malik, "Learning a classification model for segmentation," in *Proc. IEEE Int. Conf. Comput. Vis.*, vol. 1, 2003, pp. 10–17.

Books:

5. J. T. Springenberg, A. Dosovitskiy, T. Brox, and M. Riedmiller, "Striving for simplicity: The all convolutional net," *arXiv preprint arXiv:1412.6806*, 2014.

Theses:

6. S. Fenker and K. W. Bowyer, "Experimental evidence of a template aging effect in iris biometrics," *IEEE Computer Society Workshop on Applications of Computer Vision*, January 2011.
7. "Special Issue on Segmentation of Visible Wavelength Iris Images Captured At-a-distance and On-the-move", *Image and Vision Computing* 28 (2), February 2010.

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An approach to boost the searching speed in hadoop framework using map reduce

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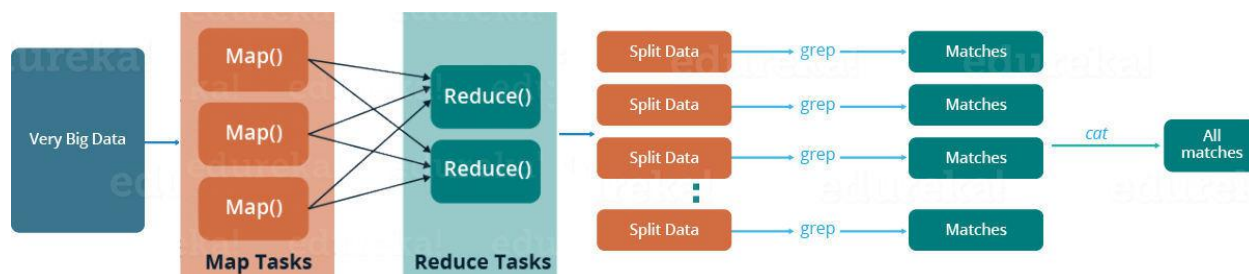
Abstract: Cloud datacenters are underutilized due to server over-provisioning. To increase datacenter utilization, cloud providers offer users an option to run workloads such as big data analytics on the underutilized resources. The paper proposes iSpot, a cost-effective transient server provisioning framework for achieving predictable performance in the cloud. In our proposed system we represents map-reduce, which performance up to 90% of cost for big data analytics jobs.

- In cloud data are stored in tera bytes, it consumes more time to access.
- In this project, reducing the time for taking maximum number of data from the cloud.
- Here Mapreduce introduced, which performance 90% of cost for big data analytics and increase the speed of searching huge data.

Key Words: Predictable performance, big data analytics, cloud computing, transient server provisioning, data checkpointing.

INTRODUCTION:

Deploying and running big data analytics in the cloud is emerging as a critical service for both individuals and IT companies, as predicted by Gartner that over 60% of global enterprises will adopt public clouds for big data analytics by 2020 [1]. To enable such rapid-growing cloud deployment of big data analytics, large providers continue to invest an increasing amount of capital into their cloud in- infrastructures, expected to reach \$383 billion in 2020 [2]. Due to such large infrastructure investments, cloud providers seek to maximize the resource utilization and the revenue of cloud datacenters, by delivering underutilized compute resources to users in the form of revocable *transient servers*, such as Amazon EC2 Spot Instances [3], Aliyun ECS Spot Instances [4], and GCE Preemptible VM Instances [5]. In particular, the cloud transient servers are charged per *second* at a reduced price by up to 50%-90% [3], as compared to the cloud *on-demand servers*. Unfortunately, these transient servers can be revoked at any time by providers, depending on the current demand and supply of compute resources in the cloud.



LITERATURE REVIEW:

1. Lin Gu, Deze Zeng, Peng Li and Song Guo, "Cost Minimization for Big Data processing in geo -distributed data centers", 12th International conference on communications, 2012, pp. 58-69

Big Data contains large-volume, complex and growing data sets with many, autonomous sources. Big data processing is the explosive growth of request on computation, storage, and communication in data centers, which then unpleasant considerable operational outlay to data center providers. Therefore, to reduce the cost is one of the

problems for the upcoming big data era. Using these three components, i.e., task assignment, data placement and data routing, far down influenced by the operational outlay of geo distributed data centers. Here, we are ambitious to learn the cost minimization problem through a joint optimization of these three factors for huge data making in geo-distributed data centers. Proposed using n-D Markova chain and procure average task completion time.

2 A. Qureshi, R. Weber, H. Balakrishnan, J. Gutttag, and B. Maggs, “Cutting the Electric Bill for Internet-scale Systems,” in *Proceedings of the ACM Special Interest Group on Data Communication (SIGCOMM)*. ACM, 2009, pp. 123–134.

The popularity and bandwidth usage of cloud services has increased rapidly in recent years. To provide users cloud storage with less synchronization latency, cloud storage donor are interested whether the achievement of their datacenter topology is effective for their users and how they can improve it. It is not understandable whether distributed cloud storage data-center topologies perform good centralized ones. In this paper, a comparison between centralized and spread cloud storage data-center topologies is made. The topologies used by disguised cloud storage applications are analyzed with data together at global vantage points. The average amount is used as performance criteria. The result of this paper implies that using a distributed data-center topology has an affirmative effect on average throughput compared to a centralized topology. This research consider in getting an sensitive of the impact of various cloud storage data-center topologies on the performance undergo by cloud storage users.

MATERIALS:

SOFTWARE REQUIREMENTS

- Operating system : Windows7 Professional.
- Coding Language : Java, Spring MVC.
- Front End Tool : Eclipse
- Database : MS Sql.
- Back End Tool : Log4J.

HARDWARE REQUIREMENTS

- System : Core i3
- Hard Disk : 500 GB.
- Ram : 2GB.

METHOD:

ALGORITHM

- Map Reduce program executes in three stages, namely map stage, shuffle stage, and reduce stage.
- **Map stage** – The map or mapper’s job is to process the input data. Generally the input data is in the form of file or directory and is stored in the Hadoop file system (HDFS).
- **Reduce stage** – This stage is the combination of the **Shuffle** stage and the **Reduce** stage. The Reducer’s job is to process the data that comes from the mapper.

DISCUSSION:

Near-duplicate IMAGES can be uploaded when resources are sufficient. Due to the bandwidth and energy constraints in disaster environments, we reduce the transmission of near-duplicate/similar images and upload the valuable and unique ones. However, we do not remove any near- duplicate images which are still stored in smartphones without any loss of data. When the energy is sufficient and network is restored, the remaining images can be uploaded. On the other hand, saving energy for extending the battery lifetime will motivate users not to upload redundant images [17].

- **SIMILAR IMAGES MAY** be also **IMPORTANT**. In some cases, near-duplicate images may also imply the important information. For instance, two images taken in the same place at different times are near-duplicate, which implies that the conditions in the place haven’t changed during the period. However, without uploading near-duplicate images, BEES can still obtain the important information implied by them, due to detecting similarity using image features. When a near-duplicate image in the server is detected, BEES can efficiently obtain the information of the “no change”, i.e., the conditions/situations shown in the image have not significantly changed during the period.

- Two knobs in BEES. If a user insists on uploading his/her images no matter whether near-duplicate images exist, a knob being settable by the user in BEES allows the user to directly upload images. The parameter E_{bat} is the remaining energy in default, which is used to guide the tradeoffs between computing precision and energy efficiency. E_{bat} can also be set by the user via a knob. To maximize battery lifetime, the user can always set E_{bat} to 0 even with the full battery energy.

ANALYSIS:

Performance prediction of big data analytics:

There has recently been research on predicting the performance of big data analytics workloads running in clouds. For instance, one naive approach [47] profiles the average task time and simply estimates the job completion time as the sum of execution time of all stages. By profiling several representative

Resource provisioning of mixing transient and on-demand instances:

To improve the cost efficiency of batched job executions, an effective approach is to optimize the resource provisioning of both EC2 spot and on-demand instances using an online learning algorithm [49]. To lower the cost for in-memory storage systems in clouds, two recent studies mix different types (*i.e.*, cold *vs.* hot [50], read-only *vs.* write-only [51]) of storage contents across the spot and on-demand (or burst) cloud instances.

Transient resource provisioning for predictable performance:

Recent research has been devoted to guaranteeing the performance of cloud applications on EC2 spot instances using fault tolerance mechanisms. For example, checkpointing [16] and execution replication [12] techniques are deployed and compared when deploying the MPI applications on EC2 spot instances. By optimizing the resource provisioning problem as a Markov decision process, Cumulon-D [17] achieves predictable performance for the matrix-based data analysis with EC2 spot instances. A more recent work named Tributary [54] guarantees the latency SLOs for elastic Web services by allocating an appropriate number and type of spot instances. It further adopts resource over-provisioning to handle the instance revocations and workload bursts. In contrast, *iSpot* achieves the predictable performance especially for DAG-style big data analytics through designing a delicate job performance model and a critical data checkpointing mechanism, while reducing the monetary cost of job executions.

FINDINGS:

- In our proposed system we represents map-reduce, which performance up to 90% of cost for big data analytics jobs.
- MapReduce is a processing technique and a program model for distributed computing.
- The MapReduce algorithm contains two important tasks, namely Map and Reduce. Map takes a set of data and converts it into another set of data, where individual elements are broken down into tuples (key/value pairs).
- Secondly, reduce task, which takes the output from a map as an input and combines those data tuples into a smaller set of tuples. As the sequence of the name MapReduce implies, the reduce task is always performed after the map job.

RESULT:

Energy Overhead. We investigate the impact of different schemes on energy overheads. SmartEye, MRC and BEES consume extra energy to compute and upload image features for similarity detection while saving energy by reducing redundant images to be transmitted, compared with Direct Upload. Thus different redundancy ratios of uploaded images produce different energy overheads. Therefore, we capture the energy overheads when the uploaded images are at different redundancy ratios. The redundancy ratio is defined as the ratio of the number of redundant images in the uploaded images to the total number of uploaded images. **Battery Lifetime.** We investigate the impact of different schemes on the battery lifetime of smartphones. Moreover, in order to demonstrate the efficiency of energy-aware adaptive schemes in BEES, we also examine the battery lifetime using BEES-EA. BEES-EA represents BEES without energy-aware adaptive schemes in which BEES does not adjust its behaviors based on the remaining energy. For keeping the same conditions in each scheme, the initial energy of battery is full. During uploading images in each scheme, all applications in the smartphone, except BEES App and the system-related programs, are always closed and the screen is always bright. We select 150-group images from the Paris imageset, and store them in the smartphone in advance. Each group contains 40 images. We set the cross-batch redundancy ratio of each group to about 50% by adjusting the server index. There are almost no in-batch similar images in each group. We upload one group every 20 minutes, until the smartphone battery is exhausted. We record the remaining energy of battery every 20 minutes. Thus the battery lifetime of a smartphone is evaluated by computing the time from the smartphone starts up to its battery is exhausted.

MODULES:

- ✓ A Two Dimensional Markov Chain
- ✓ B Mixed Integer Non-Linear Program
- ✓ C Data Center Record
- ✓ D Server Cost Minimization

CONCLUSION:

Thus we represents map-reduce, which performance up to 90% of cost for big data analytics jobs. MapReduce is a processing technique and a program model for distributed computing. The MapReduce algorithm contains two important tasks, namely Map and Reduce. Map takes a set of data and converts it into another set of data, where individual elements are broken down into tuples (key/value pairs). Secondly, reduce task, which takes the output from a map as an input and combines those data tuples into a smaller set of tuples. As the sequence of the name MapReduce implies, the reduce task is always performed after the map job.

REFERENCES:

1. D. Laney and A. Jain. (2017, Jun.) 100 Data and Analytics Predictions Through 2021. [Online]. Available: <https://www.gartner.com/doc/3746424/>
2. C. Pettey and L. Goasduff. (2017, Feb.) Gartner Says Worldwide Public Cloud Services Market to Grow 18 Percent in 2017. [Online] Available: <https://www.gartner.com/newsroom/id/3616417>

Journal Papers:

3. Y. Gong, B. He, and A. C. Zhou, "Monetary Cost Optimizations for MPI-Based HPC Applications on Amazon Clouds: Checkpoints and Replicated Execution," in *Proc. of SC*, Nov. 2015.

Proceedings Papers:

4. M. Zaharia, R. S. Xin, P. Wendell, T. Das, M. Armbrust, A. Dave, X. Meng, J. Rosen, S. Venkataraman, M. J. Franklin, A. Ghodsi, J. Gonzalez, S. Shenker, and I. Stoica, "Apache Spark: A Unified Engine for Big Data Processing," *Communications of the ACM*, vol. 59, no. 11, 2016.

Books:

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Web References:

- <http://www.engpaper.com/cloud-computing>

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MOBILE ASSISTIVE NAVIGATION AID FOR VISUALLY IMPAIRED PEOPLE

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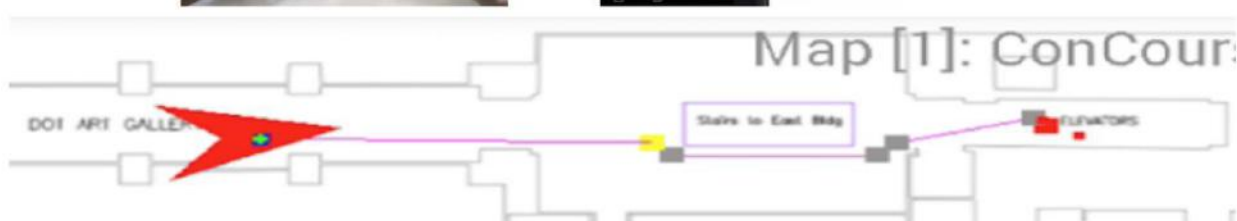
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Abstract: This paper presents a new holistic vision-based mobile assistive navigation system to help blind and visually impaired people with indoor independent travel. The system detects dynamic obstacles and adjusts path planning in real-time to improve navigation safety. First, we develop an indoor map editor to parse geometric information from architectural models and generate a semantic map consisting of a global 2D traversable grid map layer and context-aware layers. By leveraging the visual positioning service (VPS) within the Google Tango device, we design a map alignment algorithm to bridge the visual area description file (ADF) and semantic map to achieve semantic localization. Using the on-board RGB-D camera, we develop an efficient obstacle detection and avoidance approach based on a time-stamped map Kalman filter (TSM-KF) algorithm. A multi-modal human-machine interface (HMI) is designed with speech-audio interaction and robust haptic interaction through an electronic Smart Cane. Finally, field experiments by blindfolded and blind subjects demonstrate that the proposed system provides an effective tool to help blind individuals with indoor navigation and way finding.

INTRODUCTION:

ACCORDING to multiple federal and state civil rights laws in the United States, public areas such as airports as subway stations, need to accommodate the services and facilities accessibility for individuals with disabilities. Independent travel is always a daily challenge to those who are blind or visually impaired. According to the World Health Organization fact sheet as of October 2017, there were 6 million people who are blind and 217 million who have low vision worldwide [1]. Intelligent assistive navigation is an emerging research focus for the robotics community to improve the mobility of blind and visually impaired people. For indoor navigation on mobile devices, numerous studies have been carried out in the past decades, such as using wireless sensor network fingerprints [2], [3], [4], [5], [6], [7], [8], geomagnetic fingerprints [9], inertial measurement unit [10], and Google Glass device camera [11], [12]. There are multiple challenges for mobile indoor assistive navigation: the inaccessibility of indoor positioning, the immature spatial-temporal modeling approaches for indoor maps, the lack of low-cost and efficient obstacle avoidance and path planning solutions, and the complexity of a holistic system on a compact and portable mobile device for blind users. The advancements in computer vision software (such as visual SLAM) and hardware (such as graphics processing units) in recent years have provided the potential capabilities for vision based real-time indoor simultaneous localization and mapping (SLAM).



MATERIALS:

HARDWARE REQUIREMENTS

- MOBILE : ANDROID (Smart Phone)

SOFTWARE REQUIREMENTS

- Operating System : Windows 7/8/10.
- Coding Language : Java 1.7
- Tool Kit : Android 2.3 ABOVE
- IDE(Integrated development environment) : Android Studio.
- Others : JSON,XML
- Server : SQLite / PHP MySQL / Firebase

METHOD:

This project is visually impaired assistance android app, a universal voice control solution for non-visual access to the Android operating system. It has been observed that nearly about 60% of total blind population across the world is present in INDIA. As our society further expands, there have been many supports for second-class citizens, disabled. One of many supports that are urgent is the guarantee of mobility for blind people. There have been many efforts but even now, it is not easy for blind people to independently move.

DISCUSSION

In this paper we discuss about the absence of vision makes unassisted navigation, object identification, and orientation in unfamiliar settings a challenging task. Blindness is an issue that is prevalent and ever increasing due to the aging population. In older people, there is a higher risk of visual impairment that increases the difficulty of autonomous mobility. For many people with visual impairments, assistance plays an important role in social participation. The absence of appropriate assistive devices for people with visual impairments makes them too dependant on their family members. In addition, the cost of rehabilitation might not be affordable for people in low-income countries due to a lack of employment [33]. Assistive technologies are powerful tools for rehabilitation, which improve the functioning, participation, and independence of visually impaired people. According to the World Health Organization's International Classification of Functioning, Disability, and Health (ICF), human functioning problems for visually impaired people are categorized as activity limitations and participation restrictions. To overcome these limitations, visually impaired people often use a white cane to aid them in navigation. White canes are less expensive and can detect obstacles up to knee level. However, a white cane requires continuous and conscious effort from its user to detect obstacles in the surrounding environment. Furthermore, it is not useful in detecting raised obstacles such as ladders and scaffoldings, which may pose the risk of collision with the obstacle and cause injury to them. Thus, a white cane does not sufficiently meet the needs of visually impaired people. Guide dogs are used by visually impaired to assist them in navigation and obstacle avoidance, however, to assist visually impaired people, the guide dogs need to be trained, and fully trained guide dogs are costly. Additionally, owning a dog is much more of a commitment than owning a white cane, and it may not even be possible for some economically disadvantaged people to own a dog. Furthermore, it is a challenging responsibility for a blind person to appropriately take care of a guide dog. The main challenges in indoor navigation and orientation are a lack of knowledge of known landmarks, obstacle detection, object recognition, and hazards.

- ✓ **Analysis:** Media support Beautiful UI Android OS basic screen provides a beautiful and intuitive user interface.
- ✓ **Connectivity:** GSM/EDGE, IDEN, CDMA, EV-DO, UMTS, Bluetooth, Wi-Fi, LTE, NFC and WiMAX.
- ✓ **Storage :** H.263, H.264, MPEG-4 SP, AMR, AMR-WB, AAC, HE-AAC, AAC 5.1, MP3, MIDI, Ogg Vorbis, WAV, JPEG, PNG, GIF, and BMP.
- ✓ **Messaging:** SMS and MMS

FINDINGS:

The android application we have made has the name Assisting application and has been especially designed for such users, to be useful for blind people to assist regularly when they use mobile phones. The application interface contains several screen areas that correspond to the various assistive software modules like music, contact, call, messages, etc. Communication of important data between the mobile phone and the visually impaired person is done in a headphone via TTS (text-to-speech) module.

RESULT:

Designing computer should proceed in an organized, well thought out manner; the right output must be developed while ensuring that each output element is designed so that people will find the system can use easily and effectively. When analysis design computer output, they should identify the specific output that is needed to meet

the requirements. Select methods for presenting information. Create document, report, or other formats that contain information produced by the system.

- Convey information about past activities, current status or projections of the Future.
- Signal important events, opportunities, problems, or warnings.
- Trigger an action.
- Confirm an action.

RECOMMENDATIONS:

- Mobile
- Blind user

CONCLUSION:

This project demonstrates the idea of messaging and calling system for visually impaired people. It allows environmental barriers to be removed for people with a wide range of disabilities. In this project we have presented the system designs and use cases of the application "visually impaired assistance android app ". It is a universal voice control assistant on Android operating system. The application provides enhancements to all applications running on mobile system. This app can benefit large number of users with universal eyes-free and hands-free voice control of their mobile devices.

REFERENCES

The experimental results were evaluated by counting walking errors (which are defined as traveling off course for more than 3 seconds) and traveling time as shown in Tab. 1. As one can see that the average (Avg.) navigation guidance error (unit: times) was reduced greatly by utilizing SmartCane for accurate heading measurement. Therefore, the traveling time (unit: seconds) was also clearly decreased for the same travel journey.

Journal Papers:

1. E. Prassler, J. Scholz, and P. Fiorini, "A robotics wheelchair for crowded public environment," *Robotics & Automation Magazine, IEEE*, vol. 8, no. 1, pp. 38–45, 2001.

Proceedings Papers:

2. R. Golledge, R. Klatzky, J. Loomis, and J. Marston, "Stated preferences for components of a personal guidance system for nonvisual navigation," *Journal of Visual Impairment & Blindness (JVIB)*, vol. 98, no. 03, 2004.

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- <https://tinyurl.com/isanadot>

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HAPTIC TECHNOLOGY FOR VISUALLY CHALLENGED PEOPLE

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Abstract: Technology finds its wide selection of application in each field not exception even the mobile phones. One of the technologies which help the visually impaired individuals to make brings in android portable is Virtual Reality. Even though video game is utilized to hold out operations, the visually impaired individuals' consideration is one among the first. If they commit any mistakes to use apps it results in a wrong decision. So, one may envision of an innovation that lessens the weight of a visually impaired individual by exploitation applications. In new Another android application supporting visually impaired and mostly located individuals in advanced mobile phone use. It empowers to call, send and receive text messages, make use of a "phone book" as well as additional options such as positioning or battery monitoring, through voice commend. Blind person using some type of languages for communication. Sign language, adapted sign, tactile sign language, tadoma language. Haptic is the "Study of applying tangible vibe of human communication with computer". In this paper we identified the essential ideas behind tactile alongside the device and the way these devices are interacted to supply sense of bit and force feedback mechanisms. The visually impaired and outwardly disabled people in a one of a kind situation to acknowledge and utilize haptic device. This mechanical stimulation may may not assist within the creation of virtual objects in an exceedingly theoretical account, to regulate such virtual objects and to reinforce the machines and devices. Haptic technology is used in five type of feedback technologies.

Key Words: Haptic technology, Tactile Sensation, Virtual reality, Data compression, burdens

INTRODUCTION:

People with low vision usually under privileged once info is bestowed within the regular room, elaborated visual info will attack several forms. These visual presentation ways aren't pronto accessible to individuals with visual impairments and might cause a scarcity of understanding and weak conception development. The people not understand what they are missing and others may not know how to sufficiently convey the information. This is very true for mathematics and science, which frequently consider visuals to deliver key aspects of content. There are variety of wonderful ways that offer accessibility to individuals with visual impairments pronto on the market thanks to several factors, one in all that is price.

HAPTIC TECHNOLOGY FIVE TYPES:

VIBRATION: The majority of electronics offering haptic feedback use vibrations and most use a kind of eccentric rotating mass (ERM) actuator, consisting of an unbalanced weight attached to a motor shaft. Vibrotactile feedback is that the most commonest sort of haptics. Vibrotactile stimulators apply pressure to definite human skin receptors. These receptors look layered like onions and may devour of up to 1000 hertz. In Ordinary human speech frequency varies from 80 to 250 hertz, so our skin is in a position to feel sounds.

FORCE FEEDBACK: Force feedback devices use motors to manipulate the movement of peripheral help by the users. A typical use is in car driving, computer game and test systems, which turn the guiding wheel to reproduce powers found while cornering genuine vehicle.

ELECTROTACTILE: Virtual reality is an emerging technology with increasing application. The principle point of computer generated reality is to empower the client to feel submerged in 3D recreated condition and experience the augmented simulation world much like they experience this present reality.

ULTRASOUND: Ultrasound is working to create the most remarkable connection between peoples and technology. By abuse ultrasound to extend sensations onto a hand, ultra haptic is pushing through partner degree time of adjustment and allowing people to feel and the executives innovation like ne'er previously.

THERMAL: The utilization of haptic gadgets as a connection apparatus furnishes clients with another and intriguing sensorial experience the feeling of touch through material and power input. It is in direct contact with the skin. Individuals don't characterize well the spot of the warm improvement in inconsistency to material correspondence. Along these lines, there is no need in a huge number actuators to make a warmth input, and they can be situated not all that near one another.

EXISTING SYSTEM:

Already existing techniques of mobile calls done by search contact list in phone memory. Blind person not able to call with this facility. Contacts are presented in the phone memory. Eg. Keypad phones. Existing techniques of mobile calls made by search contact list in phone memory. Contacts are provided in phone memory. The android phones we use are simplified by using haptic technology to change the way people with visual impairments use them. Previously, they used only the keypad phone. This made them easier to take contact numbers. This is why haptic is used by the Android phone to get to the contact list. A person with a vision can draw only a pattern and talk to people they think. Thus, just one pattern can be used to expose others to the dangers they are experiencing when they are in danger. For this they have to utilize an android application. You have to open it first and afterward you can converse with the individuals who are considering the example. The entirety of this is guaranteed by the innovation of haptic vibration for every one of their touch.

ALGORITHM:

An algorithm for Search and call with manual.

DRAWBACKS:

- ✓ Time consuming.
- ✓ Not effective.
- ✓ Required manual Search.

PROPOSED SYSTEM:

This innovative technology and software system will integrate made data through the sense of bit T to feature to the knowledge being provided through modality and visual means that. Blind person to call in android mobile with help of apps Calling done by drawing patterns i.e., gesture. We make a small change in this application and use their mobile signal only to convert numeric and send msg and get an help for visual impairments people. This will empower the GPRS to send the area of thei to area others utilizing the mobile signal that the previously used internet connection has missed. People with help form the visual impairments may be able to communicate with others via the MSG option when they do not know their landing location and when they are landing elsewhere. This MSG will send a numeric number using their GPRS location and copy it to Google Maps Past and locate their location and call them.

ADVANTAGES IN PROPOSED SYSTEM

- ✓ More effective.
- ✓ Easy way to call
- ✓ Easy way to msg
- ✓ Blind person No need others help.

PROPOSED DESIGN:

Haptic innovative technology and software system will integrate data through the sense of bit to feature to the knowledge being provided through modality and visual. Blind persons can decision in golem mobile with facilitate of applications. Calling done by drawing patterns i.e., gesture. To achieve this, contacts ought to be in Application memory. Search based algorithms perform disabilities to use golem mobile for decision, different design pattern applied for each contacts in application contact list. This put demands on the haptic algorithm. Not search based algorithm.

ALGORITHM: HAPTIC ALGORITHMS:

Used by way of interplay designers. Haptic algorithms that the time to acquire a target could be a perform of the gap is a function of the distance and Size of the target. In "choice reaction time tasks," a set of stimuli are assigned precise responses, and participants must give the right response when receiving the stimulus. J.Merkel designed an experiment in which the stimulus was a number selected from a set of size N with uniform

probability and the participant was required to press a key corresponding to the number. As N increased, so did the reaction time TR. Defining the information capacity for a communication channel, C, as:

$$C = B \log_2 \left(\frac{S + N}{N} \right) \dots \dots (1)$$

Where B is the channel bandwidth, S is signal strength and N is noise power. Shannon also defined the information I of a symbol based on the probability of receiving the symbol,

$$I = \log_2 \left(\frac{1}{P} \right)$$

$$T_R = a + b \log_2 N$$

Where a and b are experimentally determined constants. Fitts defined a tab between two targets of distance (amplitude) A with width of W as a movement class, Fitts defined the index of difficulty (I) to be the “information” transmitted during the task:

$$I = \log_2 \left(\frac{2A}{W} \right)$$

Fitts then modeled movement time T as a linear function of the “information” transmitted, producing his classic two-parameter Logarithmic model.

$$T = a + b \log_2 \left(\frac{2A}{W} \right) \dots \dots (2)$$

$$T = b \log \left(\frac{A + \frac{1}{2}W}{W} \right) = b \log \left(\frac{A}{W} + 0.5 \right)$$

Where N to be the variation around a specific signal S, so the signal equals the movement amplitude (s = A) and the noise equals the width (N = W). By analogy to Shannon’s model (equation 1), movement time is given by:

$$T = a + b \log \left(\frac{A}{W} + 1 \right)$$

Although Fitts’s Logarithmic model was originally developed for industrial pick-and-place tasks, it has been applied to a variety of human reaching movements. The first application of Fitts Logarithmic model to Human Computer Interaction dates from before the commercialization of modern personal computers.

MODULES:

ADD NAME AND MOBILE NUMBER: If user clicks the “Input Place of Give Name and Mobile number” button from home page then “Save Name and the Contact Number” screen will appear. After entering Name and Mobile number click the “Save” button and it will display a confirmation dialog box if you click “Yes” button it will save the details in the database and it will ask you to draw a pattern for the user. If you select “No” in the dialog box the data will not be saved and you can alter it again.

DRAW PATTERN: After clicking “Yes” button in dialog box a Message dialog box will appear as “Draw a pattern for saved name”. At an equivalent a Toast message are going to be displayed that “Contact saved successfully”. After clicking “Draw Pattern” button in the message dialog box it will re-direct you to a “Create a gesture” screen. In this screen draw any pattern for the contact person for whom you’ve got saved the contact details. After drawing any pattern for the contact person. That person’s name will be appear on the Edit Text box once you clicked the done button. The done button can highlight only if pattern drawn on the desired space.

DATABASE CREATION: Contact name and number has been stored after Add details. Android used SQLite Database for storing and fetching contact details.

VIEW LIST: After saving some contacts and pattern for them. The Home page can show the pattern beside the Contact name within the list once saving.

RELOAD: After saving contacts and pattern if any contacts not displaying within the list means that click the “Reload” button to refresh the content. It will show the pattern beside the Contact name within the list once saving.

QUICK CALL: After clicking “Quick call” button in the home screen will re-direct you to “Draw pattern and make a call” screen. In that blank space you should draw the pattern almost as like as you have given while saving the contact. Our application will recognize the pattern which you have drawn and it will identify and pick the respective person and make a call to them automatically. Our pattern needn’t to be 100% good however it somewhat ought to match with the saved pattern. But the directions of drawing pattern is very important (i.e., If saved pattern drawn from left to right, this pattern also must draw from left to right in direction) else our recognizer will not identify our pattern. After ending call it will come back to Quick call page where you can make any number of calls consecutively. In our home page contact list you’ll simply Delete your pattern.

MESSAGE SEND: These apps are very useful for the visually impaired. Others can use this to tell you where they are. Thus, visually impaired people can go to their destination and there location with relatives without fear and help.

EXIT: When you decided to Quit our application simply click “Home” button and it will go directly to the home page where you click “Exit” button to exit our application.

ARCHITECTURE DIAGRAM

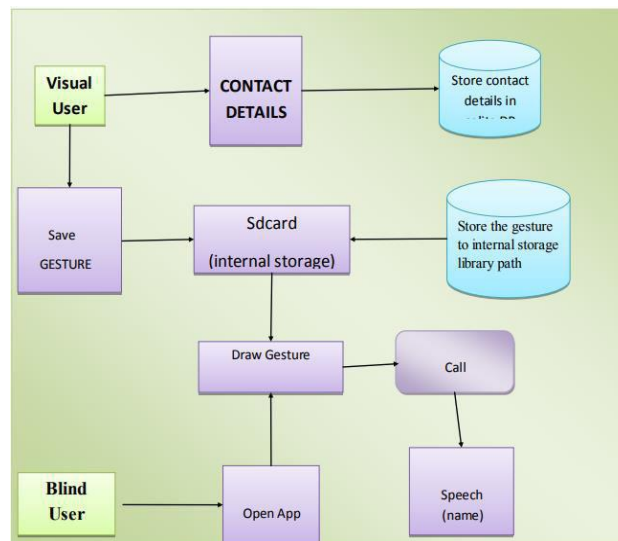


Figure 1. ARCHITECTURE DIAGRAM

ADVANTAGES:

- Physically challenged people can also use android mobile without others help.
- This system helps to motivate physically challenged people.
- This process make the physically challenged people mentally on par with normal people in this world.

CONCLUSION:

Innovative technology and code will integrate data through the sense of bit to feature to the knowledge being provided through modality and visual means. This can be a new tool for blind persons to add to their tool box Already existing techniques of mobile calls done by search contact list in phone memory. Blind person also can call in android mobile with help of apps. Calling can be done by drawing patterns i.e., gesture based Application can be a useful tool for blind persons. The algorithms perform disabilities to use robot mobile for decision, different design pattern applied for each contacts in contact list. The basic idea of this algorithm is to add phone contact lists from apps with gesture. As in the previous case, the contact list from phone memory. This innovative technology and code will integrate made data through the sense of bit to feature to the knowledge being provided through modality and visual means that.

REFERENCES:

1. M.Darrah, K.Murphy, K.Speranski, and B.DeRoos,” Frame work for K-12 Education Haptic Application,”proc:2014 IEEE Haptics Symposium(HAPTICS).
2. Jones M, Bokinsky A, Tretter T, and Negishi A, A comparison of learning with haptic and visual modalities, Haptics-e The Electronic Journal of Haptics Research.
3. http://en.wikipedia.org/wiki/haptic_technology
4. <http://electronics.howstuffworks.com/everyday-tech/haptic-technology.htm>
5. <http://www.immersion.com/haptic-technology/what-is-haptics/>
6. <http://butterflyhaptics.com/prducts/system>
7. Wachs, J. P., Kolsch, M., Stern, H., & Edan, Y. (2011). Vision-Based Hand-Gesture Applications. Communications of the ACM, 60 - 71.
8. Ken Goldberg, Siamak Faridani, and Ron Alterovitz,(2013) “A NEW DERIVATION AND DATASET FOR FITT’S LAW OF HUMAN MOTION,”.
9. <http://www.cip.ifi.lmu.de/~drewes/science/fitts/A%20Lecture%20on%20Fitts%20Law.pdf>
10. <https://www.interaction-design.org/literature/book/the-glossary-of-human-computer-interaction/fitts-s-law>

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**IDENTIFICATION OF WIRELESS POWER TRANSFORM AND
DETECTION OF THEFT VEHICLE VIA BLOCKCHAIN**

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Abstract: *Wireless power transfer technology is an emerging trend in the world today. In this project the wireless power transform is used in charging the electric cars. If the charge of the car came down while travelling then it is a complicated situation. so we are implementing wireless power transfer technology to charge the vehicle while travel. The working principle behind the wireless power transmission is electromagnetic induction in between transmission coil and receiving coil. The receiving coil in the vehicle module gets power and store it in vehicle battery the power is rectified to get pure DC and the vehicle is charged.*

Key Words: *wireless power transform, RFID, electro magnetic induction, blockchain, LCD.*

INTRODUCTION:

With the need for environmentally green energy, supply of electric vehicles is increasing popularity. The spread of electric vehicles led to the development of electric vehicles battery charging modes. Electric vehicles charging technologies are evolving day by day. However the development of the technologies mainly performed in the hardware part of the charging fields and there is not yet the software study on the secure billing system which is essential. The charging station request payment to the credit card company with the billing information provided by the electric vehicles user and charging stations to the electric vehicles. The electric vehicles or charging stations can provide fault information, which may result in invalid billing. For example, the charge profile measured at the electric vehicles can differ from the charge amount provided from the charging stations. This can happen because electric vehicles and charging stations measure the charge amount with their own measurement equipment. Therefore the electric vehicle or charging station can intentionally manipulate the charging information, which can cause confusion in the contractual relationship between ev and charging stations. A block chain was introduced in 2008 by Nakamoto satoshi to make a Bitcoin. The blockchain is a technique that uses a distributed ledger based on hash function. Enabling the transaction of trust less nodes without a trusted third party. The current blockchain technology is being considered for the application of whole society beyond the field of crypto currency.

LITERATURE REVIEW:

“Investigating Wireless Charging and Mobility of Electric Vehicles on Electricity Market”

- In this paper, we study a critical yet open problem for this application, i.e., the impact of wireless charging and mobility of EVs on the wholesale electricity market based on locational marginal price (LMP), which is mainly determined by the EV mobility patterns.
- To capture the dynamics in vehicle traffic flow and state of charge of EV batteries, we model the EV mobility as a queuing network based on the statistics obtained via traffic information systems. Then, the load on each power system bus with respect to EV wireless charging is obtained using the stationary distribution of the queuing network.
- An economic dispatch problem is formulated to incorporate the EV wireless charging demand, and the LMP of each power system bus is obtained. Furthermore, a pricing mechanism based on the LMP variations of power system buses is investigated to enhance the social welfare.

“Optimized Training Design for Wireless Energy Transfer”

- In this paper, we study the design of an efficient channel acquisition method for a point-to-point multiple input multiple-output (MIMO) WET system by exploiting the channel reciprocity,

- i.e., the ET estimates the CSI via dedicated reverse-link training from the ER. Considering the limited energy availability at the ER, the training strategy should be carefully designed so that the channel can be estimated with sufficient accuracy, and yet without consuming excessive energy at the ER.

“AutoCharge: Automatically Charge Smartphones Using a Light Beam”

- We propose a new approach, called Auto Charge, to explore the feasibility of automatic smart phone charging.
- The Auto Charge approach automatically locates a smart phone on a desk and charges it in a transparent manner from the user.
- This is achieved by two techniques. First, we leverage solar charging technique but use it in indoor spaces, to remotely charge a smart phone using a light beam without a wire.
- Second, we employ an image-processing-based technique to detect and track smart phones on a desk for automatic smart phone charging.

“Efficient Wireless Charger Deployment for Wireless Rechargeable Sensor Networks”

- Harvest energy emitted from wireless chargers for refilling their batteries so that the WRSN can operate sustainably.
- This paper assumes wireless chargers are equipped with directional antennas, and are deployed on grid points of a fixed height to propose two heuristic algorithms solving the following wireless charger deployment optimization (WCDO) problem: how to deploy as few as possible chargers to make the WRSN sustainable.
- Both algorithms model the charging space of chargers as a cone and calculate charging efficiency according power regression expressions complying with the Friis transmission equation.

“An Opportunistic Wireless Charging System Design for an On-Demand Shuttle Service”

- System right-sizing is critical to implementation of in-motion wireless power transfer (WPT) for electric vehicles. This study introduces a modeling tool, WPTSim, which uses one second speed, location, and road grade data from an on-demand employee shuttle in operation to simulate the incorporation of WPT at fine granularity.
- Vehicle power and state of charge are simulated over the drive cycle to evaluate potential system designs. The required battery capacity is determined based on the rated power at a variable number of charging locations. Adding just one WPT location can more than halve the battery capacity needed.
- Many configurations are capable of being self sustaining with WPT, while others benefit from supplemental stationary charging.

MATERIALS:

HARDWARE MATERIALS:

The hardware components are,

- PIC67877A Microcontroller
- Wireless power transmitter and receiver (coils and circuits)
- Rechargeable battery
- Relay
- RFID reader
- High frequency transformer
- Bridge rectifier

SOFTWARE MATERIALS:

The software components are

- MPLAB IDE
- Hi-Tech C Compiler
- PICKIT2 programmer
- Embedded C Language
- Proteus circuit design

ANALYSIS:

EXISTING SYSTEM: In our existing system we are using wired chargers for charging the electric vehicle There is only stationary vehicle charging station is available, while travelling if power is down we cannot charge the vehicle until we reach the recharging station.

PROPOSED SYSTEM: In the proposed system wireless power transmission (WPT) technology is implemented to charge electric vehicles. The fossil fuel level is reducing due to over usage so we are using electric vehicle which is charged by solar resource. The module has solar panel, battery and wireless power transmitter coil. Wireless power transfer transmitter module is installed/ inbuilt in vehicle. With the help of solar panel, battery is charged and the power is given to transmission coil with the principle of electromagnetic induction there is a power transmission power from

transmission coil and rectification between transmission coil and receiving coil. The wireless power transmission requires a coil at both the ends (transmitter and receiver). The transmitter coil is connected to the plug point using a power chord. The receiver coil receives of supply takes place that power is used for charging vehicle. We can charge our electric vehicle while charge needed vehicles, i.e vehicle to vehicle charging.

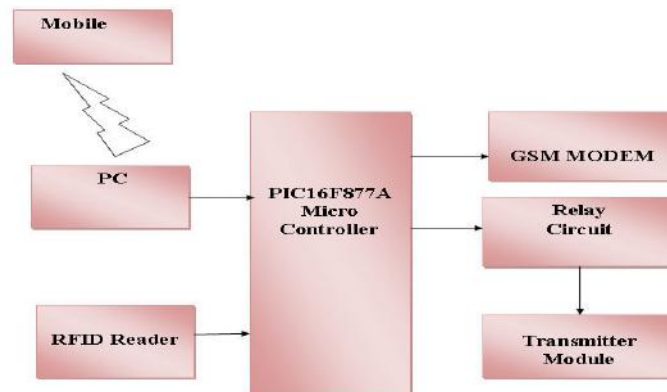


Figure 1. Block diagram of proposed system

The block diagram consists of many blocks namely mobile, pc, RFID reader, PIC16F877A microcontroller, GSM modem, Relay circuit and transmitter module. Let us discuss the blocks in detail.

TRANSMITTER MODULE:

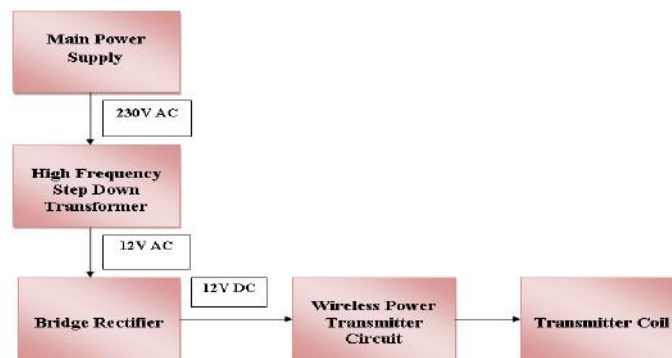


Figure 2. Transmitter module

The transmitter module consist of main power supply which is of 230v AC supply. The controller works with the small voltage and the voltage is reduced by using the step down transformer. The 230V is reduced to 12V AC power supply. The bridge rectifier is used to convert the AC current to DC current. This converted form of current is given to the transmitter coil.

RECEIVER MODULE:

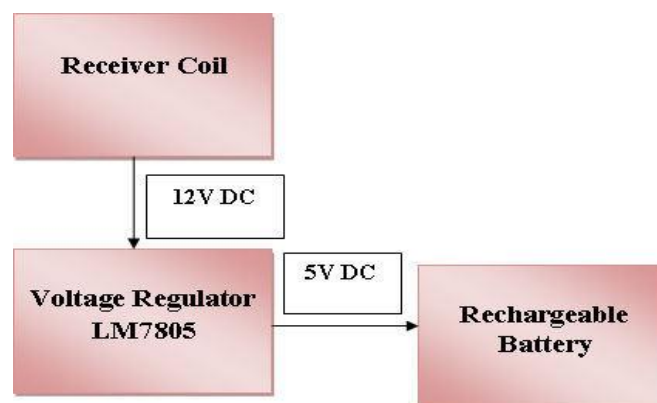


Figure 3. Receiver module

SYSTEM HARDWARE DESIGN: MICRO CONTROLLER:

The microcontroller used here is PIC16F877A. It is a 40 pin IC. . There are three memory blocks in each of PIC devices. The program memory and data memory have separate busses so that the concurrent access can occur and it is detailed in the section.

FEATURES:

- 100,000 erase/write cycle Enhanced Flash program memory typical
- 1,000,000 erase/write cycle Data EEPROM memory typical
- Data EEPROM Retention > 40 years
- Self-reprogrammable under software control
- Single-supply 5V In-Circuit Serial Programming
- Watchdog Timer (WDT) with its own on-chip RC oscillator for reliable operation
- Programmable code protection
- Power saving Sleep mode
- Selectable oscillator options
- In-Circuit Debug (ICD) via two pins

CMOS Technology:

- Low-power, high-speed Flash/EEPROM technology
- Fully static design
- Wide operating voltage range (2.0V to 5.5V)
- Commercial and Industrial temperature ranges
- Low-power consumption

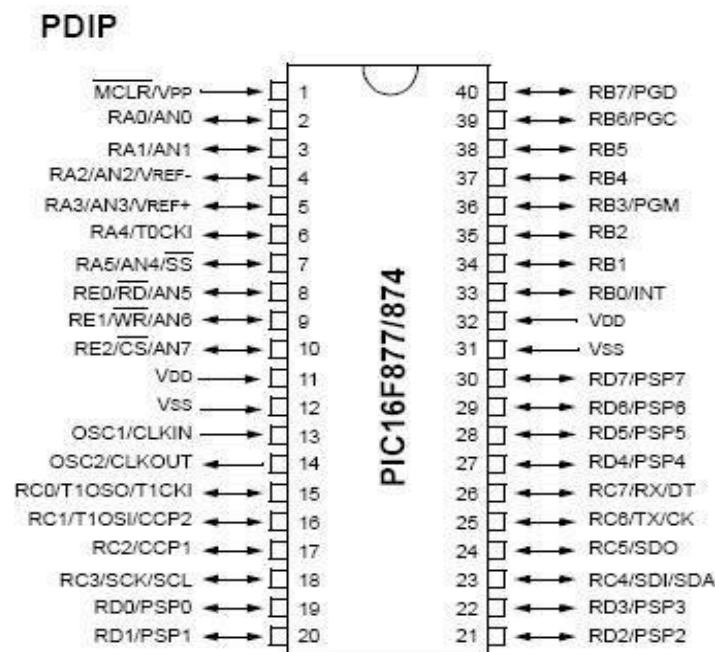


Figure 4. Pin diagram of PIC16F877A

GSM: GLOBAL SYSTEM FOR MOBILE COMMUNICATION: It is the specialized type of modem which accepts the sim card and operates over the subscription to a mobile operator just like the mobile phone.

RELAY CIRCUIT: A Relay is an electromagnetic switch operated by relatively small electric current that can turn ON or OFF a much larger electric current .The HEART of the relay is an ELECTROMAGNET.

LCD: LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined

task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

Specification:

Display: 16 characters x 2 lines
Backlight: Yellow
Operating temperature: 0°C to 50°C
Operating voltage: 4.5V - 5.5V
Backlight voltage: 5.0V (100mA)

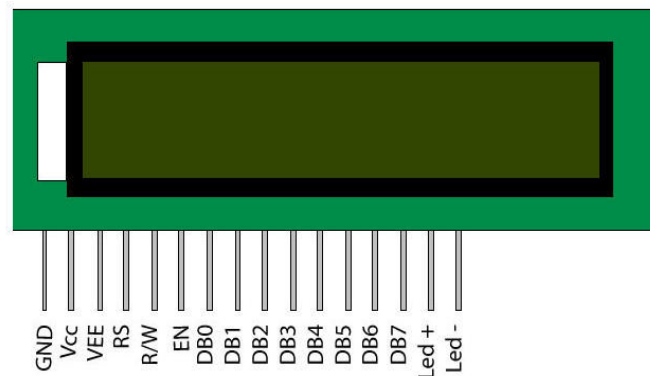


Figure 5. pin diagram of LCD

POWER SUPPLY:

The KA78XX/KA78XXA series of three-terminal positive regulator are available in the TO-220/D-PAK package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.



Figure 6. Power supply

Features:

- Output Current up to 1A
- Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating Area Protection

BLOCK DIAGRAM OF POWERSUPPLY:

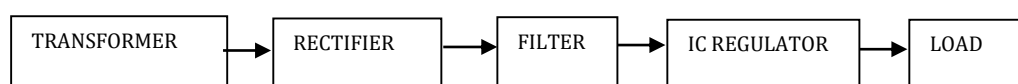


Figure 7. Block Diagram of Power supply

WORKING PRINCIPLE: TRANSFORMER:

The potential transformer will step down the power supply voltage (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op-amp. The advantages of using precision rectifier are it will give peak voltage output as DC, rest of the circuits will give only RMS output.

BRIDGE RECTIFIER:

When four diodes are connected as shown in figure, the circuit is called as bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners. Let us assume that the transformer is working properly and there is a positive potential, at point A and a negative potential at point B. the positive potential at point A will forward bias D3 and reverse bias D4. The negative potential at point B will forward bias D1 and reverse D2. At this time D3 and D1 are forward biased and will allow current flow to pass through them; D4 and D2 are reverse biased and will block current flow. The path for current flow is from point B through D1, up through RL, through D3, through the secondary of the transformer back to point B. this path is indicated by the solid arrows. Waveforms (1) and (2) can be observed across D1 and D3. One-half cycle later the polarity across the secondary of the transformer reverse, forward biasing D2 and D4 and reverse biasing D1 and D3. Current flow will now be from point A through D4, up through RL, through D2, through the secondary of T1, and back to point A. This path is indicated by the broken arrows. Waveforms (3) and (4) can be observed across D2 and D4. The current flow through RL is always in the same direction. In flowing through RL this current develops a voltage corresponding to that shown waveform (5). Since current flows through the load (RL) during both half cycles of the applied voltage, this bridge rectifier is a full-wave rectifier.

SYSTEM SOFTWARE DESIGN:

MPLAB IDE:

MPLAB Integrated Development Environment (IDE) is a FREE, integrated toolset for the development of embedded applications employing Microchip's PIC® and dsPIC® microcontrollers. MPLAB IDE runs as a 32-bit application on MS Windows®, is easy to use and includes a host of free software components for fast application development and super-charged debugging. MPLAB IDE also serves as a single, unified graphical user interface for additional Microchip and third party software and hardware development tools. Moving between tools is a snap, and upgrading from the free software simulator to hardware debug and programming tools is done in a flash because MPLAB IDE has the same user interface for all tools. Some of the MPLAB IDE features include:

- Recordable macros
- Context sensitive color highlighting
- Drag and drop variables to watch windows
- Full featured debugger
- Third Party tools

HI-TECH C compiler:

HI-TECH Software is a world class provider of development tools for embedded systems, offering compilers featuring Omniscient Code Generation™, whole-program compilation technology, and an Eclipse-based IDE (HI-TIDE™) for 8-, 16-, and 32-bit microcontroller and DSC chip architectures. NEW freeware compilers supporting Microchip PICmicro® devices. HI-TECH C® PRO compilers include Lite mode - a significant feature sure to impress the students and hobbyists. Lite mode is a FREE download, has NO memory or time restrictions and supports ALL devices. However, the OCG optimizations are disengaged.

- HI-TECH C Compiler for PIC10/12/16 MCUs (Lite mode)
- HI-TECH C Compiler for PIC18 MCUs (Lite mode)
- HI-TECH C Compiler for PIC32 MCUs (Lite mode)

HI-TECH Software has provided this freeware HI-TECH PICC-Lite compiler as a tool for hobbyists and students, but the licence allows its use for commercial purposes as well. It is ideal as a teaching tool for an introduction into the 'C' language and embedded programming on a Microchip device. The selected processors were chosen for this compiler due to their popularity.

The HI-TECH PICC-Lite compiler is a freeware version of industrial-strength HI-TECH PICC™ STD compiler available for Windows, Linux and Mac OS X. The HI-TECH PICC-Lite compiler is the same in every respect as the full HI-TECH PICC STD compiler, except that it has support for only a limited subset of processors, there are some limitations on the amount of memory that can be used and source code for the standard libraries is not provided. The supported processors and their limitations (if any). Due to program memory constraints, support for printing floating-point and long data types via printf family functions is not included.

CONCLUSION:

Thus the paper infer that through this system people can track the theft vehicle using RFID number. The RFID is a Radio Frequency identification, it will communicate with the reader when the vehicle cross that location or any bunk.

REFERENCES:

1. Chia-Ho Ou, *Member, IEEE*, Hao Liang, *Member, IEEE*, and Weihua Zhuang, *Fellow IEEE*, “Investigating Wireless Charging and Mobility of Electric Vehicles on Electricity Market” IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, VOL. 62, NO. 5, MAY 2015
2. Yong Zeng, and Rui Zhang, “Optimized Training Design for Wireless Energy Transfer” IEEE TRANSACTIONS ON COMMUNICATIONS, VOL. 63, NO. 2, FEBRUARY 2015
3. Yunxin Liu, Zhen Qin, Chunshui Zhao “AutoCharge: Automatically Charge Smartphones Using a Light Beam” Microsoft Research, Beijing 100080, China.
4. Jehn-Ruey Jiang * and Ji-Hau Liao, “Efficient Wireless Charger Deployment for Wireless Rechargeable Sensor Networks” Department of Computer Science and Information, National Central University, Taoyuan 32001, Taiwan August 2016.
5. Kate Doubleday Andrew Meintz and Tony Markel, “An Opportunistic Wireless Charging System Design for an On-Demand Shuttle Service” National Renewable Energy Laboratory, 2016 IEEE.

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EFFECTIVE TRACKING OF MONEY FLOW USING NFC AND BLOCKCHAIN TECHNOLOGY

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Abstract: Counterfeiting money has become an enormous problem around the world. However, cost and lack of mobility currency validation devices are big problem for the general consumers. Normally NFC (Near Field Communication) chip, It is based on the QR code. In our project, the NFC chip is embedded in the currency note include the value, serial number, expiry date used for the validation we insert the NFC tag in currency notes, we aim to track black money rotation as well as GST payers with taxation process. The block chain technology is upcoming one, we used for taxation process. The proposed system, track money with NFC card and automatic alert system for black money. Our project aim reduces the black money rotation.

Key Words: CashTransaction, GST monitoring, NFC, Blockchain, Tracking money, QR code.

INTRODUCTION:

Near-field communication (NFC) is a set of communication protocols, it used for cash transaction. NFC devices are used in contactless payment systems, similar to those used in credit cards and electronic ticket smartcards and allow mobile payment to replace/supplement these systems. NFC is used for social networking, for sharing contacts, photos, videos or files. NFC-enabled devices can act as electronic identity documents and keycards. NFC offers a low-speed connection with simple setup that can be used to bootstrap more capable wireless connections. Similar ideas in advertising and industrial applications were not generally successful commercially, outpaced by technologies such as barcodes and UHF RFID tags. NFC protocols established a generally supported standard. When one of the connected devices has Internet connectivity, the other can exchange data with online services. The block chain technology is upcoming one, we used for taxation process. The blockchain is an undeniably ingenious invention – the brainchild of a person or group of people known by the pseudonym, Satoshi Nakamoto. By allowing digital information to be distributed but not copied, blockchain technology created the backbone of a new type of internet. Originally devised for the digital currency, Bitcoin, (Buy Bitcoin) the tech community is now finding other potential uses for the technology. Bit coin has been called “digital gold,” and for a good reason. To date, the total value of the currency is close to \$112 billion US. And blockchains can make other types of digital value. Like the internet (or your car), you don’t need to know how the blockchain works to use it. However, having a basic knowledge of this new technology shows why it’s considered revolutionary. So, we hope you enjoy this, What Is Blockchain Guide. Nodes in the blockchain agree on an ordered set of blocks, each containing multiple transactions, thus the blockchain can be viewed as a log of ordered transactions. In the database context, blockchain can be viewed as a solution to distributed transaction management: nodes keep replicas of the data and agree on an execution order of transactions. However, traditional databases assume a trusted environment and employ well known concurrency control techniques to order transactions. In the original design, Bitcoin’s block chain stores coins as the system states. For this application, Bitcoin nodes implement a simple replicated state machine model which moves coins from one address to another. Since then, blockchain has grown beyond crypto-currencies to support user defined states and Turing complete state machine models.

LITERATURE SURVEY:

Bitcoin: A Peer-to-Peer Electronic Cash System:

A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-

spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.

Coordination Avoidance in Database Systems:

Minimizing coordination, or blocking communication between concurrently executing operations, is key to maximizing scalability, availability, and high performance in database systems. However, uninhibited coordination-free execution can compromise application correctness, or consistency. When is coordination necessary for correctness? The classic use of serializable transactions is sufficient to maintain correctness but is not necessary for all applications, sacrificing potential scalability. In this paper, we develop a formal framework, invariant confluence, that determines whether an application requires coordination for correct execution. By operating on application-level invariants over database states (e.g., integrity constraints), invariant confluence analysis provides a necessary and sufficient condition for safe, coordination-free execution. When programmers specify their application invariants, this analysis allows databases to coordinate only when anomalies that might violate invariants are possible. We analyze the invariant confluence of common invariants and operations from real-world database systems (i.e., integrity constraints) and applications and show that many are invariant confluent and therefore achievable without coordination. We apply these results to a proof-of-concept coordination-avoiding database prototype and demonstrate sizable performance gains compared to serializable execution, notably a 25-fold improvement over prior TPC-C New-Order performance on a 200 server cluster.

A research paper on goods and service tax (GST) and its impact on Indian economy:

The concept of Goods and Service Tax popularly known as GST was introduced on 1st July, 2017. The GST will have a 'dual' structure, which means it will have two components- the Central GST and the State GST. GST is expected to simplify tax administration, ensure 'Ease of Doing Business' and promote 'Make in India.' On bringing GST into practice, there would be amalgamation of Central and State taxes into a single tax payment. It would also enhance the position of India in both, domestic as well as international market. At the consumer level, GST would reduce the overall tax burden, which is currently estimated at 25-30%.

BLOCKBENCH: A Framework for Analyzing Private Blockchains:

Blockchain technologies are taking the world by storm. Public blockchains, such as Bitcoin and Ethereum, enable secure peer-to-peer applications like crypto-currency or smart contracts. Their security and performance are well studied. This paper concerns recent private blockchain systems designed with stronger security (trust) assumption and performance requirement. These systems target and aim to disrupt applications which have so far been implemented on top of database systems, for example banking, finance and trading applications.. Such a framework can be used to assess blockchains' viability as another distributed data processing platform, while helping developers to identify bottlenecks and accordingly improve their platforms. In this paper, we first describe BLOCKBENCH, the first evaluation framework for analyzing private blockchains. It serves as a fair means of comparison for different platforms and enables deeper understanding of different system design choices. Any private blockchain can be integrated to BLOCKBENCH via simple APIs and benchmarked against workloads that are based on real and synthetic smart contracts. BLOCKBENCH measures overall and componentwise performance in terms of throughput, latency, scalability and fault-tolerance. Next, we use BLOCKBENCH to conduct comprehensive evaluation of three major private blockchains: Ethereum, Parity and Hyperledger Fabric. The results demonstrate that these systems are still far from displacing current database systems in traditional data processing workloads. Furthermore, there are gaps in performance among the three systems which are attributed to the design choices at different layers of the blockchain's software stack.

Bitcoin and Beyond: A Technical Survey on Decentralized Digital Currencies:

Besides attracting a billion dollar economy, Bitcoin revolutionized the field of digital currencies and influenced many adjacent areas. This also induced significant scientific interest. In this survey, we unroll and structure the manifold results and research directions. We start by introducing the Bitcoin protocol and its building blocks. From there we continue to explore the design space by discussing existing contributions and results. In the process, we deduce the fundamental structures and insights at the core of the Bitcoin protocol and its applications. As we show and discuss, many key ideas are likewise applicable in various other fields, so that their impact reaches far beyond Bitcoin itself.

MATERIALS:

HARDWARE MATERIALS

- PIC16F458 microcontroller
- MFRC522 Reader
- LCD
- Power supply
- PC
- NFC

SOFTWARE MATERIALS

- MPLAB IDE software
- C18 Compiler
- Pickit2 Programmer
- Proteus circuit designer
- Embedded C Language

ANALYSIS:

EXISTING SYSTEM

The existing system of our project is no chip on currency note, so, counterfeiters used black money freely, we cannot track the money. Recently, they launch new currency notes and ban on old notes. To destroy the black money is not possible. Because of the people are not pay the correct tax amounts. More number of m oneys are hold on single person in a shape of black money. There is no tracking system for GST

PROPOSED SYSTEM

In this project, we aim to track the black money rotation as well as to track the GST payers with Taxation process. We add NFC Hardware to the high value currency from Rs. 500 to Rs. 2000 and also we include Expiry date for all the notes implicitly in the server. This system includes a specified machine. In first case once the people are given a currency note to the machine. This machine is connected to the server. Then the machine is to check the serial number, amount and expired date. Finally it is intimate the original note or fake note. This system is used to minimize and control the circulation of counterfeit currency notes. The proposed scheme allows standard and non specialist consumers to identify fake currency notes.

By using this system individual consumers can report fake currency notes to the administration. During any process vender has to scan the NFC so that received amount is recorded to the main Government server. GST is automatically collected from the vendor. Taxation is also verified with GST from both purchaser and the vendor. Both the accounts are monitored so that malpractice is totally avoided. This system will ensure 100 % genuine Transaction.

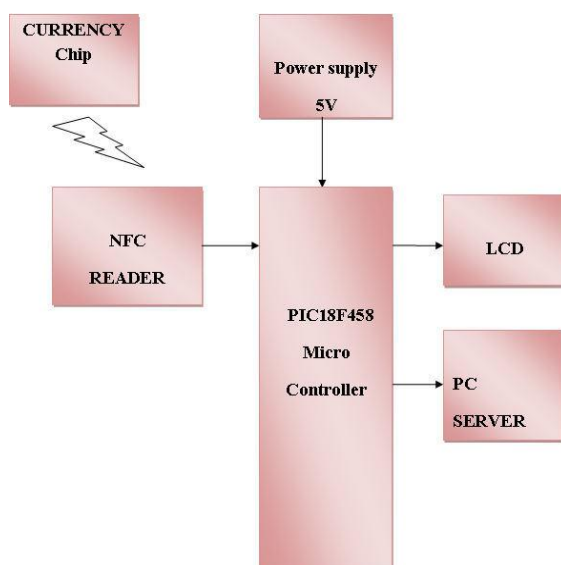


Figure 1..Block diagram of PC Server Section

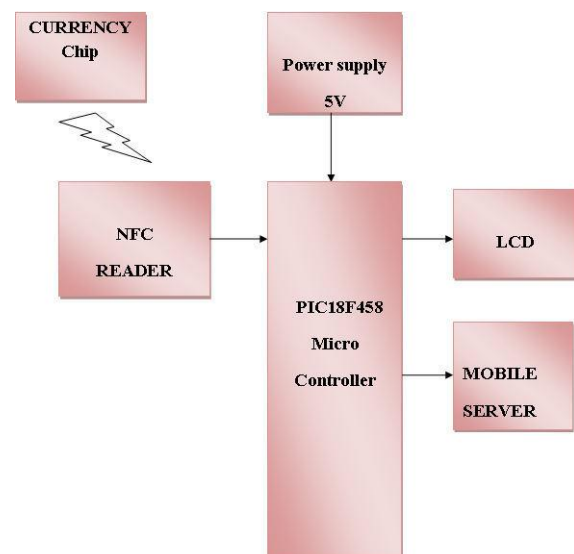


Figure 2.. Block diagram of Mobile Server Section

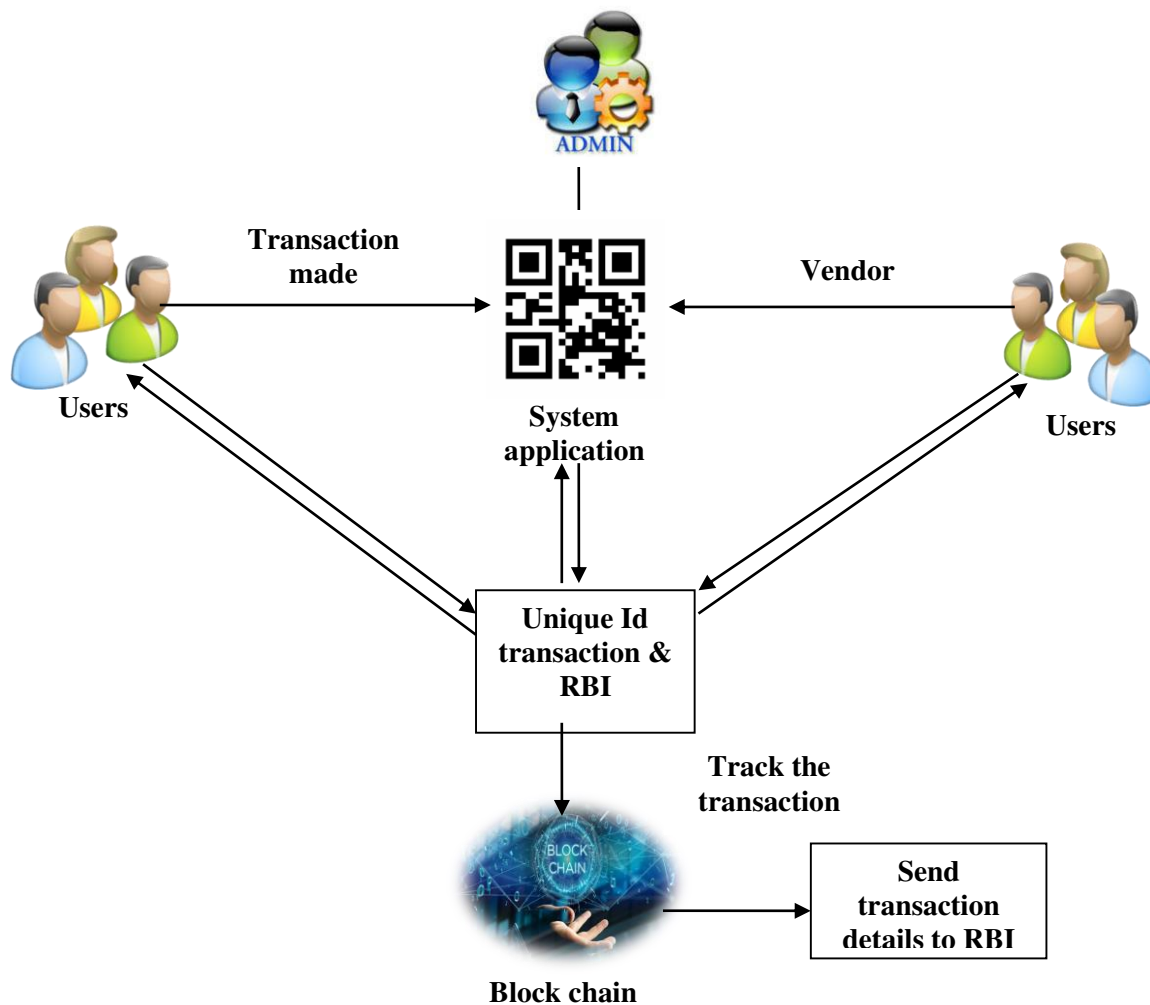


Figure 3. . System Architecture

SYSTEM HARDWARE DESIGN:

MICRO CONTROLLER:

The microcontroller used here is PIC18F458. It is a 40 pin IC. There are three memory blocks in each of PIC devices. The program memory and data memory have separate busses so that the concurrent access can occur and it is detailed in the section. It based on high performance RISC CPU and Flash technology in this microcontroller.

High-Performance RISC CPU:

- Linear data memory addressing to 4 Kbytes
- Up to 10 MIPS operation

Peripheral Features:

- High current sink/source 25 mA/25 mA
- Three external pins

Special Microcontroller Features:

- Power-on Reset (POR), Power-up Timer (PWRT) and Oscillator Start-up Timer (OST)
- Programmable code protection
- Power-saving Sleep mode

Flash Technology:

- Low-power, high-speed Enhanced Flash technology
- Fully static design
- Wide operating voltage range (2.0V to 5.5V)
- Industrial and Extended temperature ranges

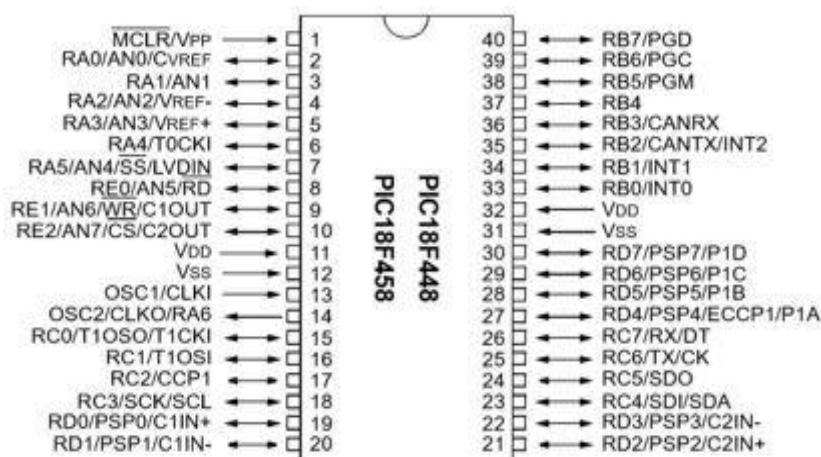


Figure 4. Pin diagram of PIC18F458

LCD:

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. LCD is easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data

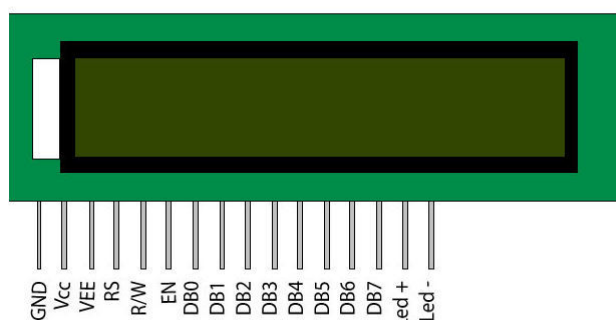


Figure 5 .Pin diagram of LCD

NFC (Near Field Communication):

Near-field communication (NFC) is a set of communication protocols that enable two electronic devices, one of which is usually a portable device such as a smart phone to establish communication by bringing them within 4 cm (1.6 in) of each other. NFC devices are used in contactless payment systems, similar to those used in credit cards and electronic ticket smartcards and allow mobile payment to replace/supplement these systems. NFC offers a low-speed connection with simple setup that can be used to bootstrap more capable wireless connections. NFC is a set of short-range wireless technologies, typically requiring a separation of 10 cm or less. NFC operates at 13.56 MHz on ISO/IEC 18000-3 air interface and at rates ranging from 106 k bit/s to 424 k bit/s. NFC tags contain data and are typically read-only, but may be writeable.

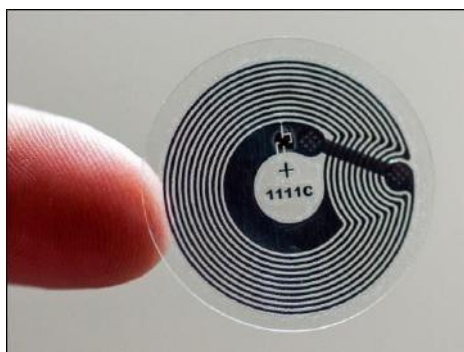


Figure 6. NFC chip

POWER SUPPLY:

The KA78XX/KA78XXA series of three-terminal positive regulator are available in the TO-220/D-PAK package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

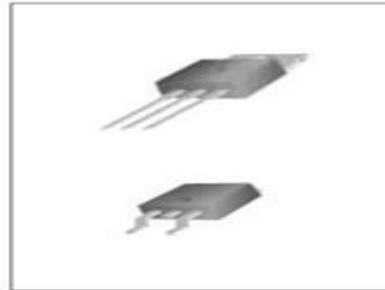


Figure 7. Power supply

SYSTEM SOFTWARE DESIGN:

MPLAB IDE:

MPLAB Integrated Development Environment (IDE) is a FREE, integrated toolset for the development of embedded applications employing Microchip's PIC® and dsPIC® microcontrollers. MPLAB IDE runs as a 32-bit application on MS Windows®, is easy to use and includes a host of free software components for fast application development and super-charged debugging. MPLAB IDE also serves as a single, unified graphical user interface for additional Microchip and third party software and hardware development tools. Moving between tools is a snap, and upgrading from the free software simulator to hardware debug and programming tools is done in a flash because MPLAB IDE has the same user interface for all tools. Some of the MPLAB IDE features include:

- Recordable macros
- Context sensitive color highlighting
- Drag and drop variables to watch windows
- Full featured debugger
- Third Party tools

EMBEDDED C LANGUAGE:

Embedded c language is software specification of the project. We run the project in embedded language. And we use the netbeans software for the run process. Embedded C is designed to bridge the performance mismatch between Standard C and the embedded hardware and application architecture. It extends the C language with the primitives that are needed by signal-processing applications and that are commonly provided by DSP processors. The Embedded C specification extends the C language to support freestanding embedded processors in exploiting the multiple address space functionality, user-defined named address spaces, and direct access to processor and I/O registers. These features are common for the small, embedded processors used in most consumer products.

CONCLUSION:

The paper is conclude that reduce the blackmoney rotation. NFC is scanned by the QR code for money transaction, and track the blackmoney. As well as track the GST using NFC and blockchain.

REFERENCES:

1. Bitcoin: A Peer-to-Peer Electronic Cash System Author: Satoshi Nakamoto
2. Towards a Non-2PC Transaction Management in Distributed Database Systems Author: Qian Lin Pengfei Chang, Gang Chen ,Beng Chin Ooi† Kian-Lee Tan†, Zhengkui Wang
3. Calvin: Fast Distributed Transactions for Partitioned Database Systems Author :Alexander Thomson, Thaddeus Diamond, Shu-Chun Weng, Kun Ren, Philip Shao, Daniel J. Abadi
4. Coordination Avoidance in Database Systems
5. Author: Peter Bailis, Alan Fekete†, Michael J. Franklin, Ali Ghodsi, Joseph M. Hellerstein, Ion Stoica
6. A research paper on goods and service tax (GST) and its impact on Indian economy Author: Shilpa Rani
7. A research paper on goods and service tax (GST) and its impact on Indian economy Author: Shilpa Rani
8. BLOCKBENCH: A Framework for Analyzing Private Blockchains Author: Tien Tuan AnhDinhJiWangz Gang ChenxRuiLiuzBeng Chin OoizKian-Lee Tan

9. Bitcoin and Beyond: A Technical Survey on Decentralized Digital Currencie Author: Florian Tschorsch and Björn Scheuermann
10. T. Jung, X.-Y. Li, W. Huang, J. Qian, L. Chen, J. Han, J. Hou, and C. Su. Account trade: Accountable protocols for big data trading against Dishonest consumers. In INFOCOM, pages 1–9. IEEE, 2017.
11. T. Jung, J. Han, and X.-Y. Li. Pda: Semantically secure time-series data analytics with dynamic subgroups. TDSC, PP(99):1–1, 2016.
12. X.-Y. Li, C. Zhang, T. Jung, J. Qian, and L. Chen. Graph-based privacy preserving data publication. In INFOCOM, pages 1–9. IEEE, 2016. X.-Y. Li, C. Zhang, T. Jung, J. Qian, and L. Chen. Graph-based privacy preserving data publication. In INFOCOM, pages 1–9. IEEE, 2016.
13. D. Tsai, Y. Jing, Y. Liu, H. A. Rowley, S. Ioffe, and J. M. Rehg. Largescale image annotation using visual synset. ICCV, 2011.
14. A. Haeberlen, P. Aditya, R. Rodrigues, and P. Druschel. Accountable
15. virtual machines. In OSDI, pages 119–134, 2010.

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BRAIN-BASED COMPUTER INTERFACES USING EEG SENSOR

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Abstract: Virtual brain research is accelerating the development of inexpensive real-time Brain Computer Interface (BCI). Hardware improvements that increase the capability of Virtual brain analyse and Brain Computer wearable sensors have made possible several new software frameworks for developers to use and create applications combining BCI and IoT. In this paper, we complete a survey on BCI in IoT from various perspectives; including Electroencephalogram (EEG) based BCI models, machine learning, and current active platforms. Based on our investigations, the main findings of this survey highlights three major development trends of BCI, which are EEG, IoT, and cloud computing. Using this it is completely useful for finding the true state of whether the brain is alive or dead. If it is alive, then the activity of the brain is monitored and stored. Through this anyone can come to conclusion that whether the action done is legal or illegal. And this has an advantage for 2 scenarios. First is for AUTISM affected people and secondly Forgery in asset documents. And if any changes in the status of the brain then it will be send to the specific person in their relation using SMS & Email id.

Key Words: BCI, IoT, EEG sensor, cloud, machine learning, Arduino.

INTRODUCTION:

Top on the list of the US Government's BRAIN Initiative is the ability to map the human brain at different scales with improved throughput and resolutions. A complete picture of the brain structure will provide new insights into how the human brain functions and may facilitate new treatments and drug discovery for brain disorders. Recent advances in intact brain imaging, such as the CLARITY and MAP (Magnified Analysis of the Proteome) tissue clearing techniques, make it possible to collect large volumetric images of brain tissue at cellular and sub-cellular resolutions. The high throughput and high resolution brain imagery, however, poses a challenge for efficient processing and analysis. Brain graphs offer a framework to represent the structural or functional topology at multiple levels. A number of software tools exist for analysing topology of brain networks using graph theory. They primarily focus on studying the correlations of anatomically separated brain regions. Few are designed for high throughput dense and long-range neuron analysis at the cellular level, which is critical for understanding brain circuits and for comparing healthy and diseased brains. High throughput and low latency analysis of brain data will require high speed databases and programming interfaces amenable to large scale graph analytics.

LITERATURE REVIEW:

T. R. Insel, S. C. Landis, and F. S. Collins, "The nih brain initiative," Science, vol. 340, no. 6133, pp. 687–688, 2013.

In addition to these spatial scales, there are temporal scales, as brain circuits are not static but continually change as a result of neural activity, developmental stage, and aging. Despite this complexity, the technologies emerging from the BRAIN Initiative are opening new doors to decipher how the brain records, processes, uses, stores, and retrieves vast quantities of information. They have the potential to facilitate a quantum leap toward understanding brain function and its disruption in disease, making circuit abnormalities the basis of diagnostics and the normalization of circuit function the target of future intervention in neuro/mental/substance-abuse disorders.

K. Chung and K. Deisseroth, "Clarity for mapping the nervous system," Nat Meth, vol. 10, no. 6, pp. 508–513, 06 2013. [Online].

With potential relevance for brain-mapping work, hydrogel-based structures can now be built from within biological tissue to allow subsequent removal of lipids without mechanical disassembly of the tissue. This process creates a tissue-hydrogel hybrid that is physically stable, that preserves fine structure, proteins and nucleic acids, and that is permeable to both visible-spectrum photons

Multiplexed and scalable super-resolution imaging of three-dimensional protein localization in size-adjustable tissues T. Ku, J. Swaney, J.-Y. Park, A. Albanese, E. Murray, J. H. Cho, Y.-G. Park, V. Mangena, J. Chen, and K. Chung 2015

The expanded tissue preserves its protein content, its fine subcellular details, and its organ-scale intercellular connectivity. We use off-the-shelf antibodies for multiple rounds of immune labelling and imaging of a tissue's magnified proteome, and our experiments demonstrate a success rate of 82%. We show that specimen size can be reversibly modulated to image both inter-regional connections and fine synaptic architectures in the mouse brain.

The human connectome: a complex network: The human connectome O. Sporns 2016

The human brain is a complex network. reviews current empirical efforts toward generating a network map of the human brain, the human connectome, and explores how the connectome can provide new insights into the organization of the brain's structural connections and their role in shaping functional dynamics.

Network modelling methods for FMRI S. M. Smith, K. L. Miller, G. Salimi-Khorshidi, M. Webster, C. F. Beckmann, T. E. Nichols, J. D. Ramsey, and M. W. Woolrich, 2014

methods based on higher-order statistics are less sensitive, and lag-based approaches perform very poorly. More specifically: there are several methods that can give high sensitivity to network connection detection egularised inverse covariance estimation and several Bayes net methods

MATERIALS REQUIREMENTS:

Hardware:

- EEG Sensor
- EEG Signalling unit
- Arduino Uno
- TFT Touchscreen
- IoT Module ESP8266

Software:

- Arduino Uno IDE

PROPOSED SYSTEM OVERVIEW:

- The main findings of this survey highlights three major development trends of BCI, which are EEG, IoT, and cloud computing.
- Using the EEG (Electro EncephaloGram) sensor we are going to visualize the brain Function with the help of Arduino TFT controller.
- The information of the authorized person is stored in the ANC cloud sytem.
- The TFT controller is used to sense whether the brain is Alive or dead.
- When the brain dead the stored information in the cloud will be transfer automatically to the trusted person.

VIRTUAL BRAIN MODULE:

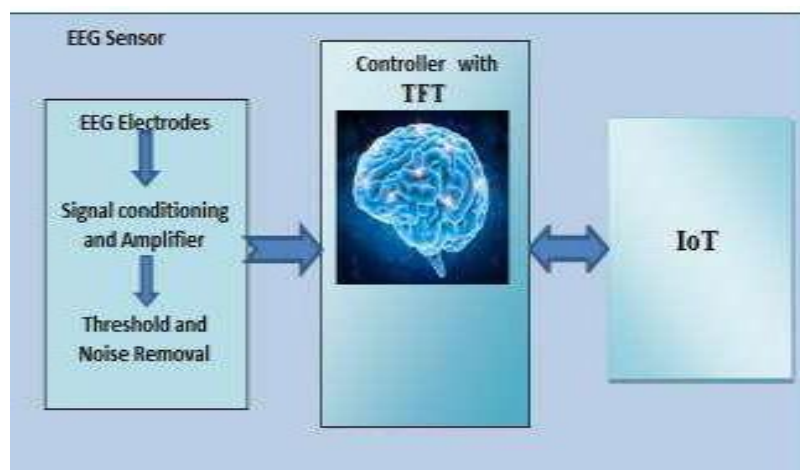


Figure 1. Structure of the project

Description: The above figure shows the structure of the project and flow of control how it goes on.



Figure 2. Device before Activation

Description: The above figure shows the hardware kit of the project after connection and before activation.



Figure 3. Device after Activation

Description: The above figure shows the project after it gets activated and for few seconds it checks for the EEG signal.

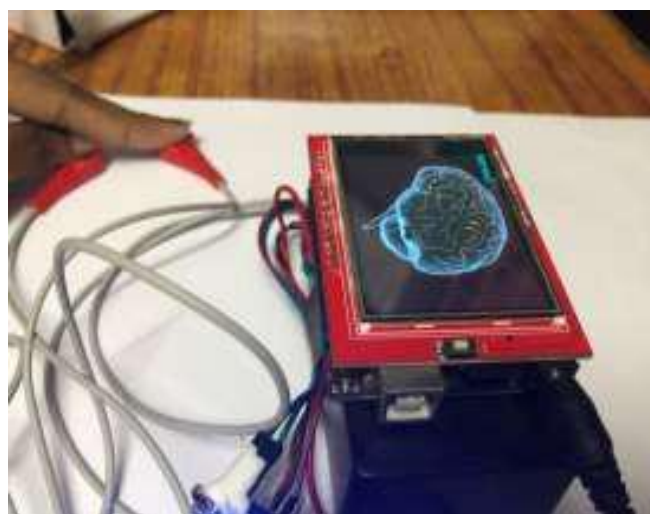


Figure 4. Device with output (NORMAL)

Description: From the above figure, it is confirmed that after the EEG signal gets received, it checks for the state of the brain whether it is normal (alive).



Figure 5. Device with output (ABNORMAL/ BRAIN DEAD)

Description: From the above figure, after getting the signal and checks for the status, if it is abnormal it shows the message on the touch panel as Brain dead.

COMPONENTS DETAILS:

EEG SENSOR:

EEG sensor has the work to measure the electrical activities which is generated by the synchronized activity of multiple neurons in volts which results in turn gives outstanding resolution in terms of time, which makes us to find the activity within the limit of different divisions of cortical areas even at sub-second timescales. EEG, the fastest imaging techniques available has high sample rate. Firstly when discovered many many years ago EEG was plotted on paper. Nowadays in current systems, it digitally displays the data as a continuous flow of voltages on scenarios which we want.



Figure 6. EEG SENSOR

EEG SIGNAL:

EEG signal which is calculated in terms of intensity and frequency. Signal intensity is measured in microvolts (μV). Signal frequency of the human. EEG waves are of four types and they are theta, delta, alpha and beta.

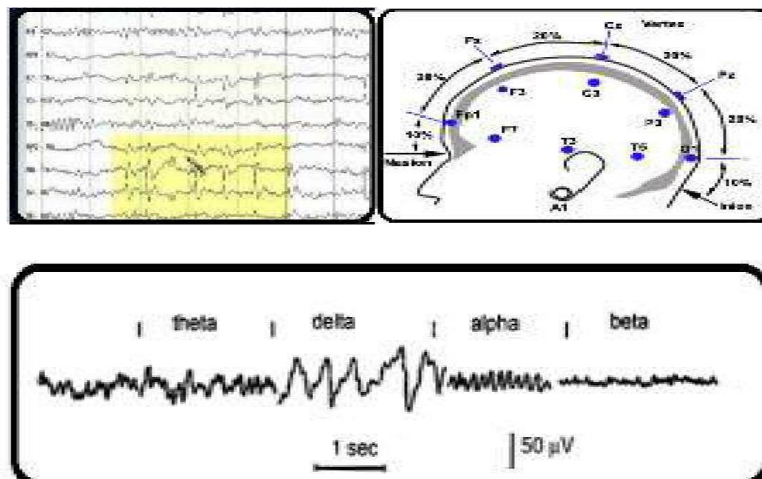


Figure 7. EEG SIGNAL

MICROCONTROLLER – ARDUINO:

Arduino Microcontroller is one of the powerful single board computers that have gained special interest on the markets to make many inventions with technologies. The Arduino is open-source, means and development software is free. In United States, Sparkfun is a good source in Arduino hardware. Using this Arduino board, we can create interface circuits to read switches and other sensors, and to control operations like motors and lights with less effort.



Figure 8. ARDUINO

TFT TOUCHSCREEN:

TFT Touch Screen is an Arduino with compatible multi-coloured TFT display with compatible footprint. The TFT driver has professional Driver IC with 8 bit data and 4 bit control interface. We can draw text or do anything with the TFT library. It also has on board micro-SD card slot on the back of the screen and store bitmap images to display on the screen. The TFT library interfaces/interacts with the controller of the screen through SPI when using the TFT library.



Figure 9. TFT TOUCHSCREEN

ESP8266:

ESP8266 - Wi-Fi Module, self-contained SOC (System on Chip)/integrated circuits (i.e.), chip with connection to the TCP/IP protocol stack that can give any different microcontroller access to other Wi-Fi network. The microcontroller which we are using in this project is ARDUINO. The ESP8266 suits whether for hosting an application or offloading all Wi-Fi networking functions from processor of other applications. This module comes with AT commands firmware allows

Arduino Wi-Fi shield. It's completely fast growing community support in economy. This module has on-board 80 MHz low power 32 bit processor and supports Bluetooth co-existence interfaces; it contains special feature of self-calibrated RF which works under all operating conditions. And also it has APSD – (Automatic Power Save Delivery) with power saving mechanism.

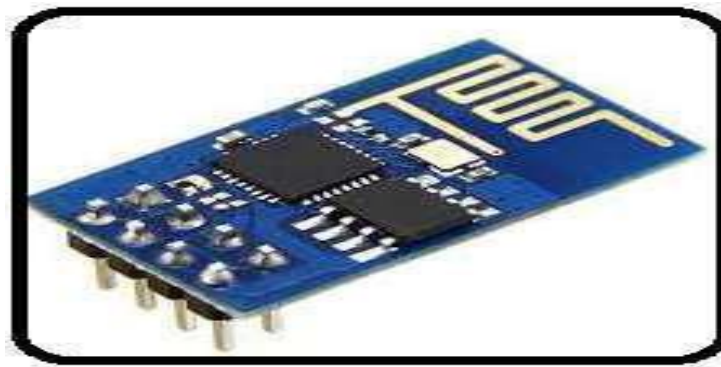


Figure 10. WiFi Module

ESP8266

ARDUINO UNO IDE:

This is a cross-platform application (for Windows, macOS, Linux) that is written in the programming language Java and is used to write and upload programs to Arduino compatible boards, and also with the help of 3rd party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using some special conditions with rules of code structuring.

IMPLEMENTATION:

Here, firstly the EEG headset with sensor is connected to the microprocessor ARDUINO board and it is connected to the ESP8266 which is interconnected to the TFT Touchscreen. Firstly the EEG headset sensors the EEG signal from the brain with the electrodes present in the headset and it checks whether it is alive or dead. After sensing, if the result comes it is normal, and then it will be displayed on the touch screen. If we want in Software application, then we can check the status of the brain in ARDUINO IDE using the cable connected to hardware kit and the device is to be installed into the system/laptop in which Arduino software has been installed. In Tools menu, present in the Arduino application, click on the port which is enabled and after that we can directly see the status of the brain in the monitor. If any modification or update is noticed then the status will be sent through SMS and Email id for specific person in contact.

Brain Status Logs

[Click Here To Delete Logs](#) [CLEAR LOG](#)

LogID	DATA	Logdate	LogTime
1	Normal	04/11/2019	19:28:44
2	Normal	04/11/2019	19:36:56
3	Normal	04/25/2019	12:44:03
4	Brain_Dead	04/25/2019	12:45:46
5	Normal	04/25/2019	12:51:23
6	Brain_Dead	04/25/2019	12:52:34
7	Normal	04/25/2019	12:55:31
8	Brain_Dead	04/25/2019	12:56:17

CONCLUSION & FUTURE ENHANCEMENT:

In this paper, we described a cloud-based system for performing large-scale brain connectivity analysis. We demonstrated that our approach can achieve fast data query and extraction for analytics and visualization. There are many avenues for future work. First, we would like to enhance the web GUI by making it more interactive and user friendly. Further, we intend to scale up to process much larger datasets (terabytes and above) with the goal of one day being able to perform such analysis on the human brain. We are also exploring the use of a polystore database such as BigDAWG as a data. Here we are using logid for every user, through that they are accessing their data. In future, thumb impression for every user can be added instead of logid. With this logid, misuse of data is possible. And this great kit can be converted into a chip and can insert either internally or externally. For autism people and illness people this can be inserted internally. And also, every person can use this in day to day life and can definitely escape from accidental health issues and also from forgeries being done without the particular person's knowledge.

REFERENCES:

1. Surekha, M. and Aswathy, S R.H. A Survey Paper-EEG Based Keyboard for Crippled with Mind Wave Sensor using IAUI. International Conference on Advanced Computing and Communication Systems (2015).
2. Mufti Mahmud, David Hawellek, Aleksander Valjamae
3. (2009): A Brain Machine Interface Based on EEG: Extracted Alpha Waves Applied to Mobile Robot
4. N.R. Raajan, G.N.Jayabhavani (2007) : A smart way to play using Brain Machine Interfacing
5. Chen, X., Wang, Y., Gao, S., Jung, T.P. and Gao, X. Filter bank canonical correlation analysis for implementing a high-speed SSVEP-based brain-computer interface. Journal of neural engineering 12 (4) (2015).
6. Jae-Ho Han, Ji-hyun Kim, Jaeyoung Shin, Yiyu Chen, Shi Chang, Seungbae Ji, Seung-Beom Yu, Jichai Jeong (2014) : Non- Invasive Optical Methods for Brain Machine Interfacing and Imaging.
7. Francisco, Á., Ricardo, R.A., Leandro, S.S. and Salvador, S.R. BCI-based Navigation in Virtual and Real Environments. 12th International Work-Conference on Artificial Neural Networks, 2014.
8. Krusienski, D.J. and Shih, J.J. Control of a Visual Keyboard Using an Electrocutic graphic Brain- Computer Interface, Neurorehabilitation and neural repair 25 (4) (2011) 323-331.
9. Chatterjee, R. and Bandyopadhyay, T. EEG based Motor Imagery Classification using SVM and MLP. 2nd International Conference on Computational Intelligence and Networks (CINE), 2016, 84-89.
10. Ehsan Kamrani, S.K.Hahn, S.H.Andy Yun (2015); Optical EEG (OEEG): A Novel Technique toward Plug and Play Non-Invasive Brain Imaging and Human – Machine Interfacing.
11. John Paul Muelle, What is the Internet of Things? <https://smartbear.com/learn/software-testing/internet-ofthings>
12. Bi, L., Lian, J., Jie, K., Lai, R. and Liu, Y. A speed and direction-based cursor control system with P300 and SSVEP. Biomedical Signal Processing and Control 14 (1) (2014) 126-133.
13. Ponce, P., Molina, A., Balderas, D.C. and Grammatikou, D. Brain computer interfaces for cerebral palsy. Cerebral Palsy-Challenges for the Future, Access book publisher, 2014.
14. Gandhi, V., Prasad, G., McGinnity, T.M., Coyle, D. and Behera, L. Intelligent adaptive user interfaces for BCI based robotic control. Proceedings of the Fifth International Brain-Computer Interface Meeting, 2013.
15. Chambayil, B., Singla, R. and Jha, R. EEG Eye Blink Classification Using Neural Network. Proceedings of the World Congress on Engineering, 2010, 2-5.
16. Chambayil, B., Singla, R. and Jha, R. Virtual Keyboard BCI using Eye blinks in EEG. IEEE 6th International Conference on Wireless and Mobile Computing, Networking and Communications, 2010.

Web References:

- <https://smartbear.com/learn/software-testing/internet-ofthings>

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Implementation of Automatic Power Factor Controller using Static Capacitor in Domestic Loads

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Abstract: Most of the commercial and industrial loads are inductive in nature, causes lagging Power Factor. For reducing losses as well as for improvement of Power Factor, Static Capacitors is used in our project. Power factor correction is the capacity of absorbing the reactive power produced by a load. In case of fixed loads, this can be done manually by switching of capacitors, however in case of rapidly varying scattered loads it becomes difficult to maintain a high power factor by manually switching on/off the capacitors in proportion to variation of load within an installation. This drawback is overcome by using an APFC. We have done simulation in PROTEUS and MATLAB for the software output for the prototype. Advanced Microcontroller is used for designing the circuit and our main objective is Automatic Power Factor Correction by injecting capacitance of required values from capacitor bank when Power Factor falls below a specified value.

Key Words: Power Factor Correction (PFC), Static Capacitor, Proteus.

INTRODUCTION:

In the revolution of present technology, power is very important and power system is becoming more complex day by day. It is necessary to transmit each unit of power generated over increasing distance with minimum power loss. However, with increasing number of inductive loads, large variation in loads etc., the losses also increased. Hence it has become necessary to find the causes of power loss and to improve power system. Due to the increasing use of inductive loads, the power factor of the load decreases considerably which increases the losses in the system hence power system loses its efficiency. An automatic power factor correction device reads power factor from line voltage and line current by determining the delay in the arrival of the current signal with respect to voltage signal from the source. It determines the phase angle (ϕ) between the voltage and current signals and then determine the corresponding power factor ($\cos \phi$). Then the microcontroller calculates the compensation requirement and accordingly switches on the required number of capacitors from the capacitor bank until power factor normalized to about unity. Automatic power factor correction techniques can be applied to industrial units, power systems and also households to make them stable. The use of microcontroller based power factor corrector results in the reduction of overall costs. Power factor correction using capacitor banks reduces reactive power consumption which will lead to the minimization of losses and at the same time increases the electrical system's efficiency. Consider an inductive circuit taking a lagging current I from supply voltage V ; the angle of lag being Φ . The phasor diagram of the circuit is shown in figure 1.

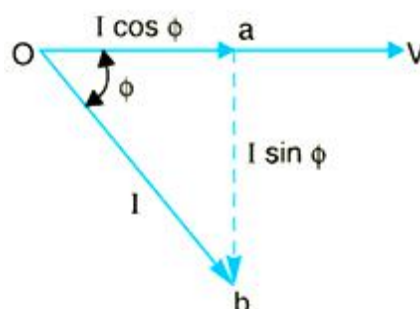


Figure 1. Phasor Diagram for Lagging Circuit

The reactive component is a measure of the power factor. If the reactive component is small, the phase angle Φ is small and hence power factor $\cos \Phi$ will be high. Therefore a circuit having small reactive current (i.e., $I \sin \Phi$) will have high power factor and vice-versa. The lagging reactive power is responsible for the low power factor. It is clear from the power triangle that smaller the reactive power component, the higher is the power factor. The basic idea for Power factor correction is to connect a capacitor in parallel with the device which have low power factor. One of traditional method for power factor correction is static type compensation in which static type capacitors are used for power factor correction.

Advantages of Power Factor Improvement:

Advantages which can be achieved by employing proper power factor correction scheme are:

- Reduction of electricity bills.
- Extra KVA available from the existing supply.
- Reduction of I^2R losses.
- Improves Voltage Drop.
- Extended equipment life- reduced electrical burden on cables and electrical components.
- Avoid Penalty for Low Power Factor.

METHODS OF POWER FACTOR CORRECTION (PFC):

Static Compensation:

In this method, static capacitors are connected in parallel with the device which works on low power factor. These static capacitors provide leading current which eliminates lagging component of load current and improves power factor.

Synchronous Condenser:

When a synchronous motor operates at no load and at over excited condition then it is called synchronous condenser. When a synchronous condenser is over excited then it provides leading current and works like capacitor. When a synchronous condenser connected across supply then it provides leading current and improves power factor.

Automatic Power Factor Correction Scheme:

In this project, we have used a technique which is called automatic power factor correction. This system is based on technique of continuous monitoring of the systems parameters such as voltage and current with the use of potential transformer and current transformer respectively. Through continuous monitoring phase difference between the two quantities will be calculated continuously and depending upon phase difference correspondingly suitable amount of capacitors will be switched on or off in the system in order to improve power factor as close as unity. The cost of capacitor is less compared to other power factor correction devices and also it has less switching losses.

LITERATURE REVIEW:

Long term effect of power factor correction on the industrial load: A case study.

In a power system, the power factor that is close to 1 is a good power quality. Low Power factor quality leads to loss of power and affects the efficiency of the power system. The economic value is also depend on the power factor. Most of the commercial loads distort the power supply and reduce the power factor. Power factor is controlled by using power factor improvement method.

Power quality improvement of a distribution system by reactive power compensator.

Improving power quality of a system by reactive power management. Active power loss is reduced by optimally placing and sizing of the capacitor. Sizing of capacitor is done by using PSO technique to calculate the amount of reactive power compensator. The optimal placement of capacitor is done by combination of VSI and VSF (sensitivity factors) and sizing by Particle swarm Optimization. The proposed methodology and optimization technique have been tested on IEEE-24 bus system.

Corporate wide power factor correction application: Economic and Technical Assessment.

Useful working power is produced by the effect of active power (P) conversion. The reactive power (Q) does not produce any useful power. The reactive power enables active power to be transmitted to electrical loads. Power factor is the ratio of real power to apparent power.

$$P.F = P/S = MW/MVA.$$

Power factor reflects how efficiently electric power is being utilized. Reactive power (Q) takes up a space on transmission lines leaving less room for active power (P). Reactive power is difficult to transfer over long distances and is attributed to recent major block outs worldwide. Implementation of power factor to existing facilities requires careful technical and economic analysis.

Intelligent control of fixed Capacitor-Thyristor controlled reactor for Power Quality Improvement.

High inductive loads like machine, arc welding, etc. being used in industries, power factor variation and maintaining constant balance between active and reactive power is a big challenge. The paper deals with the proper power quality improvement by the use of FC-TCR compensator and to verify the effectiveness filters which are

essential for eliminating harmonics and designed and simulated using MATLAB. MATLAB is used for the purpose of simulation and modeling of thyristor controlled reactor. Simulation through MATLAB proves that SVC (FC-TCR) along with intelligent system is capable proving efficient reactive power controller.

Automatic power factor improvement using Microcontroller.

In the power system, when the load power factor falls below certain value it results in the increase of line current, resulting in more line loss and greater voltage drop. Thus the aim is to inject capacitors of required values when power factor falls below the specified level. The exact value of the capacitance to be injected is then found out using some mathematics. Microcontroller will switch the capacitors.

MATERIALS:

The following components are used,

- Potential transformer (PT) & current transformer (CT).
- Zero Cross Detector.
- Microcontroller.
- Relay
- Capacitor Bank
- Power Supply

PROPOSED SYSTEM:

The AC power is given to the load through the Current Transformer (CT) and Potential Transformer (PT) is connected parallel to the load. Current transformer and Potential transformer senses the current and voltage signal and gives to the zero crossing detector. Both the current signal and voltage signal from zero crossing detector are given to the PIC18F4550 microcontroller. The microcontroller calculates the power factor and generates the firing pulse to the switching circuit. The switching circuit is connected to the 'n' number of capacitors grouped as a capacitor bank. The capacitors are added across the load depending upon the firing pulse given to the switching circuit.

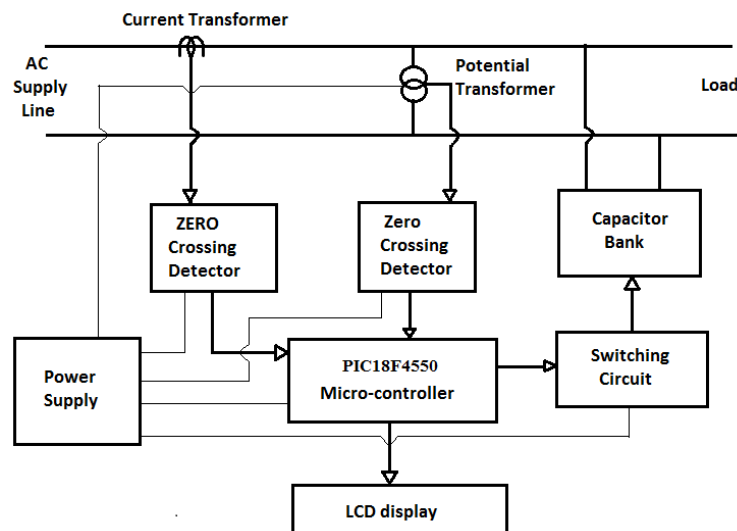


Figure 2. Block diagram of proposed system

In proposed system, the PIC microcontroller in the existing system is replaced with PIC18F4550 microcontroller. The microcontroller reads the RMS value for voltage and current used in its algorithm to select the value of capacitor in demand for the load to correct the power factor and monitors the behavior of the load on the basis of the current depleted by the load. In case of low power factor, microcontroller send out the signal to switching unit, that will switch on the demand value of capacitor. The tasks executed by the microcontroller for correcting the low power factor by selecting the demand value of capacitor. The output from the microcontroller and the corrected power factor is displayed in the LCD display.

SIMULATION OF PROPOSED SYSTEM:

All the required components for existing system is collected from Components Library in PROTEUS and the connections are given as per the existing system circuit diagram.

The simulation of the existing system done by PROTEUS software is given below:

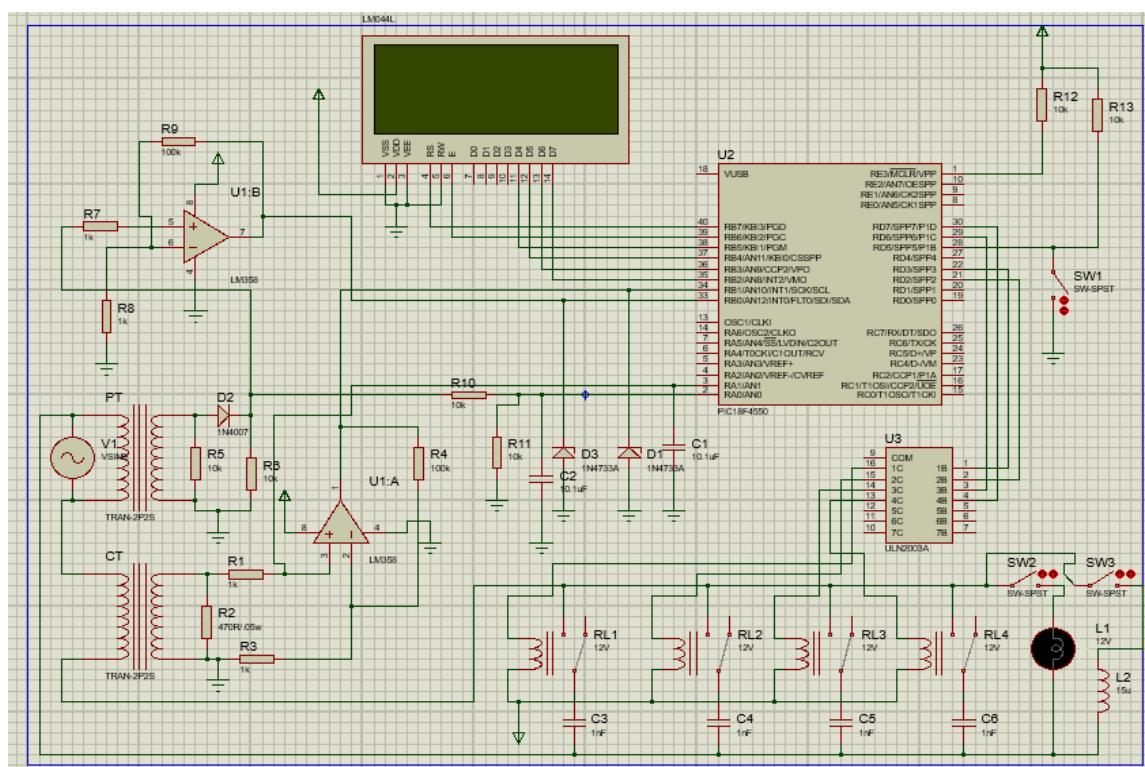


Figure 3. Simulation of the proposed system in PROTEUS

Before insertion of APFC circuit Power factor is observed as 0.731, while after insertion of APFC circuit power factor gets improve to 0.980.

CONCLUSION:

The power factor of any distribution line can also be improved easily by low cost small rating capacitor. This system with static capacitor can improve the power factor of any distribution line from load side. As Switching of capacitors are done automatically hence we get more accurate result, Power factor correction techniques makes system stable and due to improvement in power factor its efficiency also increases. As, if this static capacitor will apply in the high voltage transmission line then its rating will be unexpectedly large which will be uneconomical & inefficient. So a variable speed synchronous condenser can be used in any high voltage transmission line to improve power factor & the speed of synchronous condenser can be controlled by microcontroller.

REFERENCES:

1. Fu Zheng and Wang Zhang, "Long term effect of power factor correction on the industrial load: A case study", IEEE journals, 2017.
2. Heribertus Himawan, Catur Supriyanto and Adrin Thamrin, "Design of prepaid energy meter based on PROTEUS", IEEE journals, 2015.
3. Neha Smitha Lakra, Prem Prakash and R.C. Jha, "Power quality improvement of distribution system by reactive power compensation", IEEE journals, 2017.
4. Rakan El-Mahayni, Roland Van De Vijver, Rashid Rashidi and AbduAllah Al-Nujaimi, "Corporate wide power factor correction application: Economic and Technical Assessment", IEEE journals, 2017.
5. Mohammed Ali Khan, K.V. Sathya Bharath, Sachin Mishra and Amit Kumar Singh, "Intelligent control of fixed Capacitor-Thyristor controlled reactor for Power Quality Improvement", IEEE journals, 2016.
6. Mr. Manan Y. Pathak and Dr. J.G. Jamnani, "Design and hardware implementation of SVC using thyristorized control for improving power factor and voltage profile of inductive loads", IEEE journals, 2016.
7. Han-Shin Youn, Jin-Sik Park, Ki-Bum Park, Jae-Il Baek and Gun-Woo Moon, "A digital predictive peak current control for power factor correction", IEEE journals, 2016.
8. Reetam Sen Biswas and Dr. Satadal Mal, "Automatic power factor improvement using Microcontroller", IEEE journals, 2015.
9. Deepak. M and Rajesh Joseph Abraham, "Improving the AGC performance in a power system with thyristor controlled series compensator", IEEE journals, 2016.
10. Naveen Kumar R Kulkarni, Prof. H. Vijay Murthy and Akhil P Raju, "PLC based intelligent power factor correctors for industrial power system – A case study", IEEE journals, 2015.

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Flicker Mitigation in DFIG based Wind Turbine (WT) using DIgSILENT

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Abstract: Wind energy is becoming the most viable renewable energy source mainly because of the growing concerns over the carbon emission and uncertainties in fossil fuels supplies. This increasing penetration of wind power in distribution systems may significantly affect voltage stability of the systems, particularly during wind speed variations cause voltage fluctuations as FLICKER. Currently, doubly fed induction generator wind turbine (DFIG-WT) is the most popular wind turbine. This paper investigates the issues of voltage stability improvement and simulation studies are carried out for a system with DFIG using DIgSILENT software to examine these issues during steady state operations.

Key Words: voltage stability, doubly-fed induction generator (DFIG), distribution systems, wind turbines.

INTRODUCTION:

The worldwide concern about environmental pollution and a possible energy shortage has led to increasing interest in technologies for the generation of renewable electrical energy. Among various renewable energy sources, wind power is the most rapidly growing one in all over the world mainly in India. In the past, the total installed wind power capacity was a small fraction of the power system and continuous connection of the wind farm to the grid was not a big concern. With increasing share from the wind power sources, it has become important for continuous connection of the wind farm to the system to enable uninterrupted power supply to the load even in the case of some minor disturbances. Typically, most of the wind turbines are located at remote places or offshore where the power grid is usually long and weak characterized by under voltage condition. Flicker is an unwanted behavior especially in wind turbine connected weak grid where the penetration level of wind power is significantly high so as to affect the power system operation and control [2]. This is mainly caused by fluctuations in the output power due to wind speed variations, the wind gradient, the tower shadow effect and voltage fluctuations because of load flow changes in the grid. Flicker is such an undesired disturbance in electrical system which can cause consumer annoyance and complaint. Furthermore, flicker is a limiting factor for integrating wind turbine into weak grids where the wind power penetration levels are high. As the penetration level of the wind power in power system increases, the overall performance of the power system will be increasingly affected by the characteristics of wind power generators [1]-[3]. With the recent progress in modern power electronics, the concept of a variable-speed wind turbine (VSWT) equipped with a doubly fed induction generator (DFIG) is receiving increasing attention because of its advantages over other wind turbine generator concepts. In the DFIG concept, the induction generator is grid-connected at the stator terminals. The rotor is connected to the utility grid via a partially rated variable frequency ac/dc/ac converter (VFC), which only needs to handle a fraction (25%–30%) of the total DFIG power to achieve full control of the generator. The VFC consists of a rotor-side converter (RSC) and a grid side converter (GSC) connected back-to-back by a dc-link capacitor [4], [7].

Although variable speed wind turbines have better performance in comparison with fixed speed wind turbines, compensation and mitigation may still become necessary as the wind power penetration level increases. Under the condition rather high capacity of induction generator connected to relatively weak grids, there is a possibility of voltage instability. Because of the limited reactive power capability of converters in DFIG, Doubly Fed Induction Generator cannot always supply required reactive power. As a result, its terminal voltages fluctuate. By using the Static Synchronous Compensator (STATCOM), the point of common coupling (PCC) can reduce the flicker emission as well as regulate the terminal voltage of DFIG wind turbine. Flicker study becomes necessary and imperative as the wind power penetration level increases. Several solutions have been proposed to mitigate the flicker caused by grid connected wind turbine [4]. But our study presents the technique to mitigate flicker by using

STATCOM and give ample scope for integrating wind turbine into weak grids [1]-[5]. In this paper, the voltage variation and flicker caused by wind turbines are analysed. Then the flicker during continuous operation is discussed, the factors that affect flicker emission of wind turbines, such as wind speed, turbulence intensity, and short circuit capacity, are illustrated. A method of improving voltage quality by using a STATCOM is described. Simulation results show that STATCOM is an effective means to improve voltage quality. The DFIG and STATCOM control schemes are suitably designed and coordinated in DigSILENT simulation software.

DFIG BASED WIND TURBINE:

The DFIG is a wound rotor induction machine with slip rings attached to the rotor. The AC/DC/AC converter is divided into two parts, rotor side and grid side. The rotor is fed by the rotor side power converter and the grid side power converter is used to generate or absorb power in order to keep the DC link voltage constant. Generation of power at variable speeds ranging from below synchronous speed to above synchronous speed can be achieved using DFIG. Control of the DFIG is achieved by control of the RSC and control of the GSC. The model is shown in Fig 1.

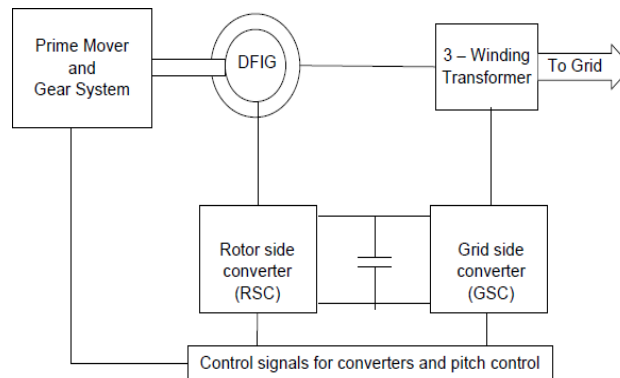


Figure 1.. Block diagram of DFIG.

FLICKER EMISSION

Flicker is induced by voltage fluctuations, which are caused by load flow change in the grid. The flicker emission produced by grid connected wind turbines during continuous operation is mainly caused by fluctuations in the output power due to wind speed variation, the wind shear and tower shadow effect [2]. The wind shear and tower shadow effect are normally referred to as the 3p oscillation. As a consequence, output power drop will appear three times per revolution for a three bladed wind turbine. There are many factors that affect flicker emission of grid connected wind turbine during continuous operation such as wind characteristics and grid conditions. Variable speed wind turbines have shown better performance related to flicker emission in comparison with fixed speed wind turbine [1]-[4]. Variable wind conditions cause power fluctuations in wind farms, causing voltage variations at the point of grid connection. This phenomenon can be understood by considering a generator feeding active and reactive power to an external grid via a distribution line as shown in Fig. 2. R_l , X_l , V_s , V_g , P and Q denote distribution line resistance, distribution line reactance, grid voltage, generator voltage, active power and reactive power respectively.

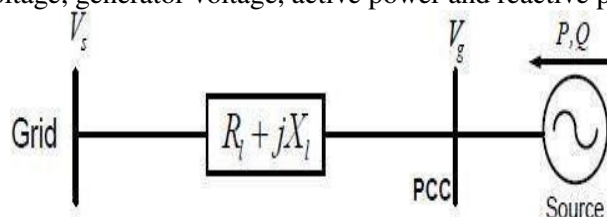


Figure 2. Single machine system

Voltage fluctuation (ΔV) due to variable active and reactive power output from a grid connected generator can be shown to take the form in eqn which is shown in below.

$$\Delta V = \frac{R_l(\Delta P) + X_l(\Delta Q)}{V_g}$$

The wind speed fluctuations will result fluctuations in active power output (P), and hence will lead to voltage fluctuations (ΔV) at the generator terminal. Consequently, voltage fluctuation will lead to flicker emission in distribution feeders. However, the change in reactive power output (ΔQ) is mainly determined by the control strategy of the renewable generator, and hence according to (1) it will also influence flicker emission. Therefore, following reactive power (Q) control strategies are evaluated during variable power generation

- ☐ Power factor control strategy
- ☐ Voltage control strategy
- ☐ Fixed reactive power dispatch

In recent years, power system researchers have examined the feasibility of using wind farm reactive power capability for system ancillary services [13]. The reactive power dispatch strategy generates constant reactive power output from a wind farm despite any active power fluctuations. Therefore, voltage fluctuations can be epitomized as given by (1), and hence flicker emission occurs due to fluctuations in active power output from the wind farm. However, this control strategy emulates behaviour similar to a static synchronous compensator (STATCOM) and ultimately enforces a stiff voltage profile for weak networks.

STATCOM:

The STATCOM is a static var generator, whose output can be varied so as to maintain or control certain specific parameters of the electric power system. The reactive output power of the compensator is varied to control the voltage at given terminals of the transmission network so as to maintain the desired power flow under possible system disturbances and contingencies. STATCOMs have the ability to address transient events at a faster rate and with better performance at reduced voltages than a Static Voltage Compensator (SVC). The maximum compensation current in a STATCOM is independent of the system voltage. In all, a STATCOM provides dynamic voltage control, power oscillation damping, and improves the transient stability of the system. By controlling the angle Φ , the flow of current either from the converter to the ac system or vice versa, can be controlled currents in the dq coordinates and they are needed to calculate the power injections by the STATCOM as in below equations.

$$P_{inj} = v_i (i_d \cos \theta_i + i_q \sin \theta_i)$$

$$Q_{inj} = v_i (i_d \sin \theta_i - i_q \cos \theta_i)$$

Where i_d and i_q are the reference d and q axis currents of the ac system. The control variables are the current injected by the STATCOM and the reactive power injected into the system. The block diagram of STATCOM is in fig 3. The exact ratings of STATCOM are derived based on many parameters. The rating of the STATCOM required to serve its purpose is mostly governed by the amount of reactive power demanded by the system to recover and ride through typical faults on the power system and to reduce the interaction of other system equipment from going out of synchronism with the grid

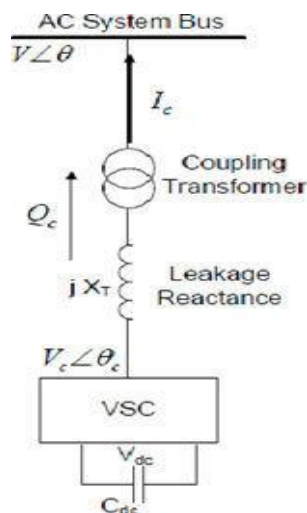


Figure 3. Block diagram of STATCOM

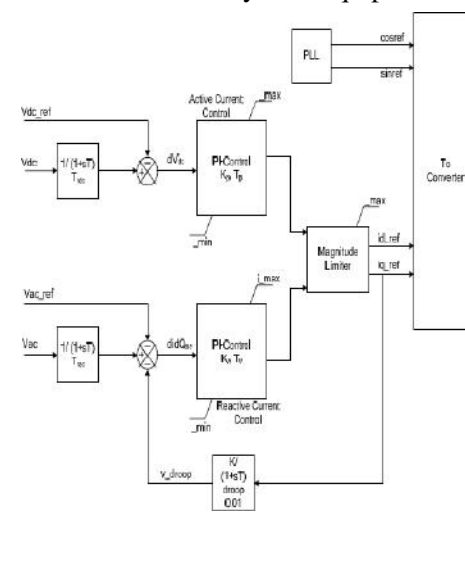


Figure 4. Control scheme of STATCOM

Though the final decision of the desired rating of the STATCOM is decided based on economics of the system the capacity thus chosen will be at least enough for the system to stabilize after temporary disturbances in the system. In the case of this test system, the STATCOM rating chosen is ± 150 MVA which is found to be the maximum capacity required to maintain the voltage of the load bus to 0.9p.u. The location of STATCOM is mostly chosen as close as possible to the grid or the load. Also, a STATCOM connected in a transmission system is mostly used to support the grid voltage at severe disturbances and to control the reactive power. The control scheme of STATCOM is in fig 4. The above diagram shows the control scheme of the STATCOM which is modelled in DigSILENT POWER FACTORY 15.0 using DigSILENT Simulation Language (DSL).

TEST SYSTEM:

The simulation study has been conducted on the system shown in Fig. 5, which represents a typical power system load being supplied by the local synchronous generators and also by the installed wind turbine (DFIG). Fig. 4 is a sketch of the power system that has been studied to evaluate the system performance under different transient conditions like a three phase fault and a sudden load change.

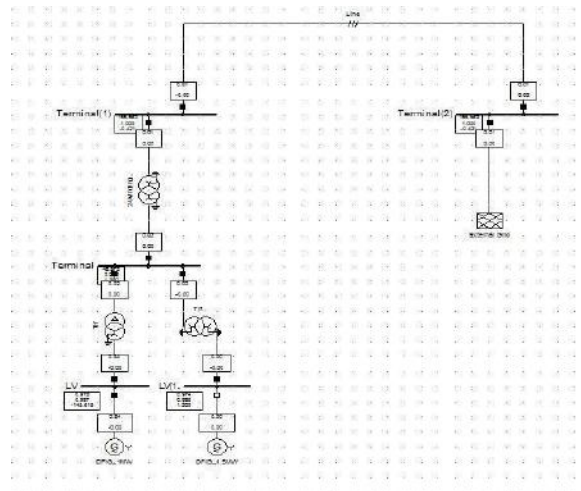


Figure 5. Single line diagram of the test system

The wind turbine has more constraints and is complex to control and make it react to the emerging power system problems. Hence, additional system equipment is required to help maintain the power grid to be stable during and after the occurrence of a fault. The proposed test system has two generators; one source is the wind turbine which is Doubly Fed Induction Generator (DFIG) and the other is a synchronous generator. The total system has a typical load connected to the system at bus 3. The active voltage supporter, STATCOM is connected to the load bus. Grid represents an external system which is connected to the system of interest through a weak link. The main reason is that the intent to force the generator and STATCOM to respond to faults in the area of interest. The short circuit power of the connected electric power grid is 13 MVA. This is a very weak grid and hence requires a compensating device of a higher rating. One of the objectives of this paper is to mitigate the flicker level whenever the voltage fluctuation occurring in the system by using STATCOM. The STATCOM capacity required to restore after a three phase short circuit fault for this test system is about ± 150 MVA. This is very high and is the maximum required capacity to restore and prevent the wind turbine from tripping during or after the fault has been initiated. The source of reactive power is always connected as close to point where it is required and this is basically the main motivation for connecting the STATCOM and the load to the same bus. This is specifically done to facilitate the effective operation of the STATCOM and to avoid excessive interaction of the connected power system. This whole test system is designed, coordinated and simulated in DigSILENT POWERFACTORY 15.0.

SIMULATION RESULTS

Study and mitigation of flicker emission from the DFIG becomes very crucial at low short circuit capacity ratio (SCR) values. Fig. 6 shows the variation of short term flicker severity with the reactive power injection. Here, the reactive power injection variation is from zero (per unit) to 0.5 (per unit) and the result obtained is demonstrated in Fig. 3.

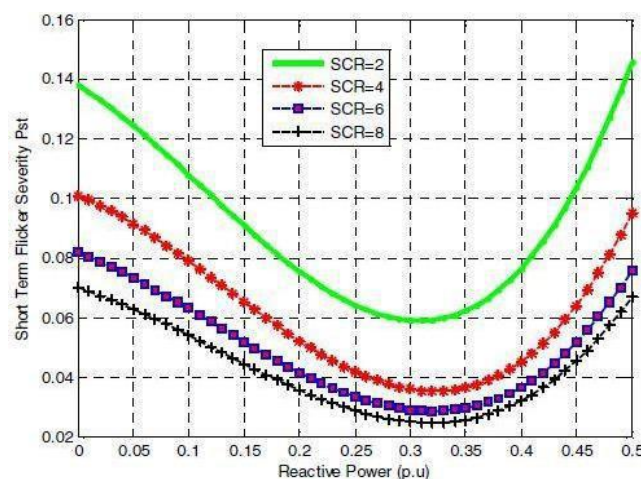


Figure 6. Short term flicker severity versus reactive power injection at different short circuit capacity ratio and due to change in wind speed.

It follows that if the reactive power is injected in to the system, the flicker levels could be reduced considerably. The flicker levels are reduced from a reactive power reference of 0.1 p.u. to around 0.32 p.u. It is evident from Fig. 3. that if a reactive power greater than 0.32 p.u. is injected, it gives rise to a negative voltage variation which makes increase the flicker levels. The compensation by reactive power below the limiting value can be efficient for mitigating the short term flicker severity at weak grid condition. From (15), it is evident that the higher the short circuit capacity ratio (SCR) the stronger the grid where the wind turbine is connected. So when there is an increase of SCR, the short term flicker severity decreases which is also depicted in Fig. 6. It is also illustrated that an approximately inversely proportional relationship exists between the short term flicker severity (P_{st}) and the short circuit capacity ratio (SCR).

Fig. 7 depicts the variation of flicker levels with reactive power injection at different grid impedance angle. Normally the variable speed wind turbine with DFIG is controlled to operate at unity power factor, which means no reactive power is injected in to or drawn from the grid. In this case, the resistive value of the grid impedance is the determining factor that affects the flicker emission from the wind turbine. When the grid impedance angle increases, the resistive value decreases which results in a reduced flicker emission. In Fig. 7, the group of curves indicates that, through injecting the reactive power, we can mitigate the flicker level. But it shows, after a certain amount of injected reactive power if we inject more, then the flicker levels will tend to rise. So the compensation by reactive power below the limiting value can be efficient for mitigating the short term flicker severity. Moreover, when the difference between the grid impedance angle θ_k and the power factor angle θ tends to 900, the voltage flicker level minimizes. But when the reactive power reference set to zero, power factor angle also reduces to zero. In that case, the flicker will be minimized when the grid impedance angle tends to be 900. The curves plotted at different grid impedance angle testify this phenomenon. Another important parameter is wind speed. Due to increase in wind speed standard deviation, the flicker level rises. Fig. 8 shows the rising slope curve of short term flicker severity with the increase of wind speed standard deviation. We know that wind speed standard deviation is the product of mean wind speed and turbulence intensity, so due to the change of mean wind speed as well as turbulence intensity, wind speed standard deviation changes. It is obvious that the mean wind speed and turbulence intensity have strong influence on short term flicker severity, for that reason there exists a strong effect on P_{st} due to wind speed standard deviation. For the variable speed wind turbine with DFIG, when the turbulence intensity increases, the short term flicker severity increases. Though it is dependent on different mean wind speed, but the relationship is almost linear. For the same reason, we can see that when the wind speed standard deviation increases, the short term flicker severity also increases. If we inject the reactive power by using the STATCOM, then this could be mitigated.

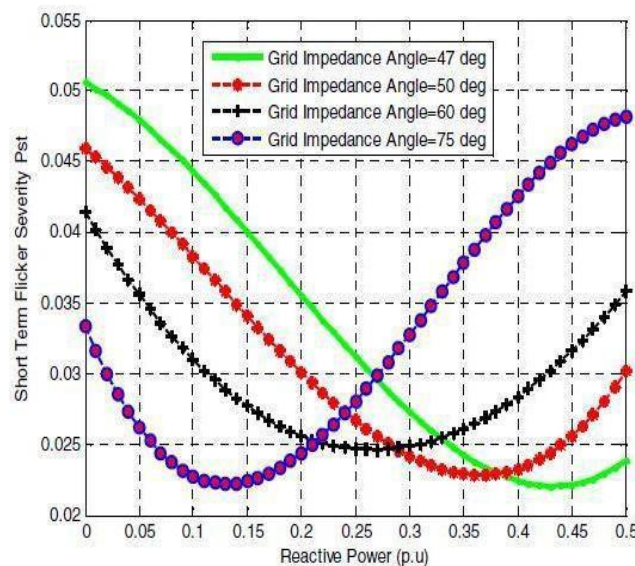


Figure 7. Short term flicker severity versus reactive power injection at different grid impedance angle.

We know that wind speed standard deviation is the product of mean wind speed and turbulence intensity, so due to the change of mean wind speed as well as turbulence intensity, wind speed standard deviation changes. It is obvious that the mean wind speed and turbulence intensity have strong influence on short term flicker severity, for that reason there exists a strong effect on P_{st} due to wind speed standard deviation. For the variable speed wind turbine with DFIG, when the turbulence intensity increases, the short term flicker severity increases. Though it is dependent on different mean wind speed, but the relationship is almost linear. For the same reason, we can see that when the wind speed standard deviation increases, the short term flicker severity also increases. If we inject the reactive power by using the STATCOM, then this could be mitigated.

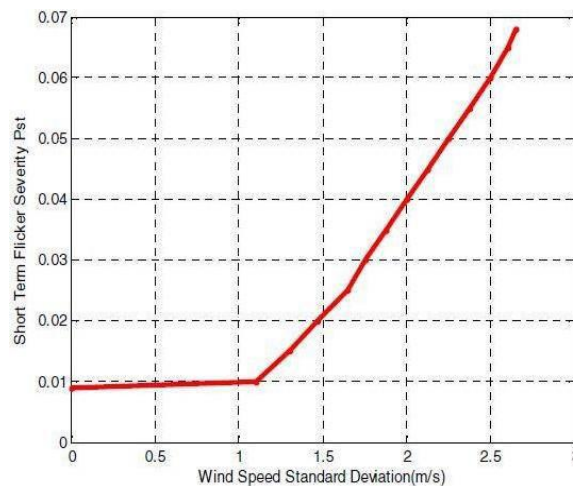


Figure 8. Short term flicker severity at different wind speed standard deviation.

STATCOM is a device that is capable of producing or absorbing reactive power using a combination of capacitors, reactors and power electronics switches. In this article, flicker output has been analysed by connecting a STATCOM to the network. For weak grid having a small grid impedance angle, the STATCOM provides an appreciable reduction of flicker level. Since the absorption or generation of reactive power varies the power factor angle and hence power factor angle is useful to mitigate the flicker level, so STATCOM can be used as an efficient device for flicker mitigation. Figure 6 indicates the improved performance of the unit using STATCOM. So, it is evident from Fig. 6. that the use of STATCOM can effectively reduce the flicker levels for weak grids.

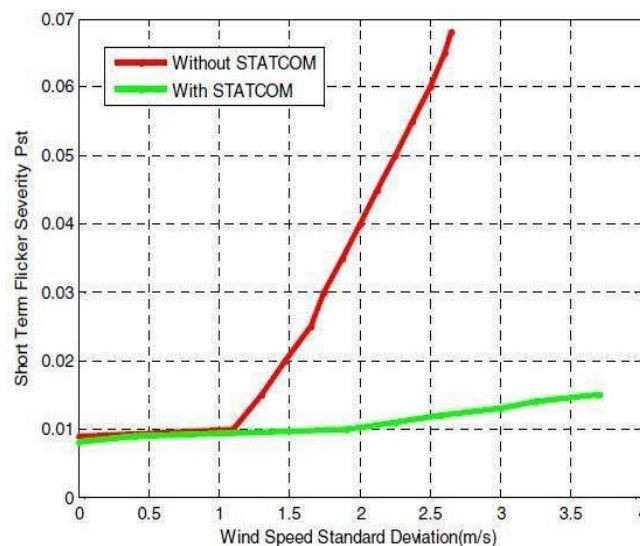


Figure 9. Short term flicker severity under wind speed standard deviation with and without STATCOM.

Then considered IEC Flicker meter studies which is simulated on DigSILENT POWERFACTORY also proves that STATCOM mitigates the flicker emission in DFIG based wind farms which is connected to weak grid. For IEC Flicker meter studies, flicker event is created by creating voltage dip in any bus by creating any switching event or fault event. From the report of IEC Flicker meter studies, the flicker level (Pst) in p.u after the simulation of IEC Flicker studies when the system is without STATCOM is 130.4708 p.u. But in the case of the system connected with STATCOM, the flicker level (Pst) is only 117.3982 p.u. From the simulation studies we can conclude that the STATCOM is used to mitigate the flicker emission for DFIG based wind farms which is connected to weak grid in an efficient manner.

CONCLUSION:

This paper explores the possibility of connecting a STATCOM to the wind power system in order to provide mitigation of flicker in DFIG based wind farms which is connected to weak grid. In this thesis, the wind turbine modeled is a DFIG that is an induction machine which requires reactive power compensation during grid side disturbances. An appropriately sized STATCOM can provide the necessary reactive power compensation when connected to a weak grid. Also, a higher rating STATCOM can be used for mitigating flicker emission and improved reliability in grid connected wind farm but economics limit its rating. Simulation studies have shown that the additional voltage/var support provided by an external device such as a STATCOM can significantly improve the wind turbines

fault recovery by more quickly restoring voltage characteristics. The extent to which a STATCOM can provide support depends on its rating. The higher the rating, the more support provided..

REFERENCES:

1. Y. S. Kim, and D. J. Won, "Mitigation of the Flicker Level of a DFIG Using Power Factor Angle Control," IEEE Transactions on Power Delivery, vol. 24, no. 4, pp. 2457-2458, October 2009.
2. T. Sun, Z. Chen, and F. Blaabjerg, "Flicker study on variable speed wind turbines with doubly fed induction generators," IEEE Transactions on Energy Conversion, vol. 20, no. 4, pp. 896-905, December 2005.
3. A. Larson, "Flicker emission of wind turbines during continuous operation," IEEE Transactions on Energy Conversion, vol. 17, no. 1, pp. 114-118, March 2002.
4. Y. S. Kim, A. Marathe, and D. J. Won, "Comparison of various methods to mitigate the flicker level of DFIG in considering the effect of grid conditions," Journal of Power Electronics, vol. 9, no. 4, pp. 612-622, July 2009.
5. T. Sun, "Power Quality of Grid-Connected Wind Turbines with DFIG and Their Interaction with the Grid," Ph.D. thesis: Afhandling, Institute for Energiteknik, Aalborg Universitet, 2004.
6. H. Sharma, S. Islam, T. Pryor, and C. V. Nayar, "Power quality issues in a wind turbine driven induction generator and diesel hybrid autonomous grid," Journal of Electrical and Electronic Engineering, vol. 21, no. 1, pp. 19-25, 2001.
7. F. Blaabjerg, and Z. Chen, "Power electronics as an enabling technology for renewable energy integration," Journal of Power Electronics vol. 3, no. 2, pp. 81-89, April 2003.
8. R. Pena, J. C. Clare, and G. M. Asher, "Doubly fed induction generator using back-to-back PWM converters and its application to variable speed wind-energy generation," Proc. Inst. Elect. Eng., Elect. Power Appl., vol. 143, no. 3, pp. 231-241, May 1996.
9. L. Rosetto, P. Tenti, and A. Zuccato, "Electromagnetic compatibility issues in industrial equipment," IEEE Industrial Applications Mag., vol. 5, no. 6, pp. 34-46, Nov-Dec 1999.

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Implementation of Semi Automatic Packing Machine Using ATMEGA for Industrial Purpose

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Abstract: The main aim of this project is to design a compactable vibrator controller with RS485 communication system, to feed the material for the further process and provide vibrations according to the quantity of the material (for fine, medium and bulk) in this and also design a weighing controller to measure weight of material. ATMEGA328P-PU microcontroller is used to control the control units. This project is meant for small industries and these low cost automated machines can be operated by semi skilled operators.

Key Words: ATMEGA328P-PU, HX711, Text HMI, RS485-IC.

INTRODUCTION:

Now a day when everything is automated everyone is looking forward to automate his life as much as possible. Automation reduces the efforts and completion time of any task. Whenever we walk through a super mart we can see everywhere goods are packed in the most beautiful way. Few years back automated packing machine was implemented using PLC. A programmable logic controller is a digitally operated system designed for use in an industrial environment. In the early years they designed a small and simple conveyor belt system and automate the process for packaging small paper box. Photoelectric sensor and inductive sensor are used to provide information to the controller. PLC was used control and automate the system by ladder logic diagram. The designed SCADA is commensurate with troubleshooting and safety also makes easier to access it. In advance ATMEGA128 microcontroller is used to as a central controller in automatic packing machine. Under the same precision control, it's cost much less than using stepper motor. The packing machine found in the market is high in price and also the power consumption of the machine is higher due to conveyor belt mechanism.

The main aim of this project is to implement a low cost semi automatic packaging machine using ATMEGA328P-PU. Here we are using two types of controllers, Vibrator controller and weighing controller. Vibrator controller which are used to control the feeding of material for further processing and vibrations are provide based on the quantity of material. Micro fill weighing controller is a special function controller available to measure load cell input and control filling of the machine. Based on latest microcontroller to provide a maximum reliability at low cost of ownership. Our project is meant for small industries and these low cost automated machines can be operated by semi skilled operators.

Here we are going to discuss about the industrial packing machine which are used to pack consumer products as per the attractive way as possible. Different kinds of devices are used to pack different materials like powder, liquid and granule etc. Below is the short description of all these packaging machines.

EXISTING SYSTEM:

Automated packing machines consist of programmable logic controller for digital control of machines to be connected. A programmable controller is a digitally operated system, designed for use in an industrial environment, which uses a programmable memory for the internal storage of user oriented instructions for implementing specific function such as logic, sequencing timing, counting and arithmetic to control, through digital or analog inputs or outputs, various types of machines or processes. Sensing units are used to sense the materials to be packed in the packing machine and also to detect events or changes in its environment and send the information to other electronics, frequently a computer processor. A sensor is always used with other electronics.

Conveyor belt mechanism is used to carry the material to be packed. The dc motor is one the output. It is driven by the instructions given through the PLC. In advance ATMEGA128 microcontroller is used as the central controller in automatic packing machine. It's cost much less than using PLC. Flash memory of the ATMEGA128 is less than the ATMEGA328P-PU

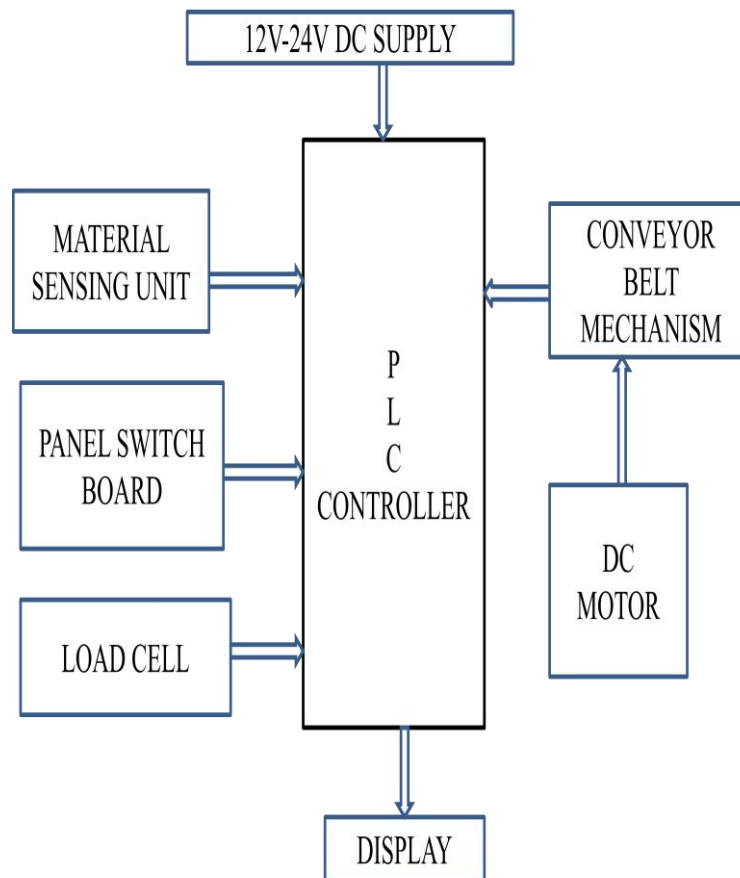


Figure. 1 Block diagram for existing system.

PROPOSED SYSTEM:

Semi automatic packing machine using ATMEGA328P-PU is economic for small industries. ATMEGA328P-PU is an advanced microcontroller than the ATMEGA128 with high flash memory and also economic than the PLC. Here we are introducing two types of controllers, vibrator controller and weighing controller. These controllers are controlled by the microcontroller ATMEGA328P-PU.

✓ Atmega 328p-pu

High Performance, Low Power AVR® 8-Bit Microcontroller- 131 Powerful Instructions Most Single Clock Cycle Execution and 32 x 8 General Purpose Working Registers. It has fully Static Operation.

High Endurance Non-volatile segments- 256/512/512/1K bytes EEPROM (ATmega48PA/88PA/168PA/328P) and 512/1K/1K/2K bytes Internal SRAM (ATmega48PA/88PA/168PA/328P) Write/Erase Cycles: 10,000 Flash/100,000 EEPROM. Data retention for this is 20 years at 85°C/100 years at 25°C. It has optional Boot Code Section with Independent Lock Bits. In System Programming by On-chip Boot Program. ATMEGA 328P-PU is true Read While Write Operation and has programming Lock for Software Security.

✓ RS 485 communication

RS485 communication gives half duplex transmission system allowing transmission distances of up to 1.2 km. Here fast data communication with HMI and controllers is provided by RS485 communication. MODBUS application protocol is used in this.

✓ HMI

A Human Machine Interface (**HMI**) is a user interface or dashboard that connects a person to a machine, system, or device. While the term can technically be applied to any screen that allows a user to interact with a device, HMI is most commonly used in the context of an industrial process.

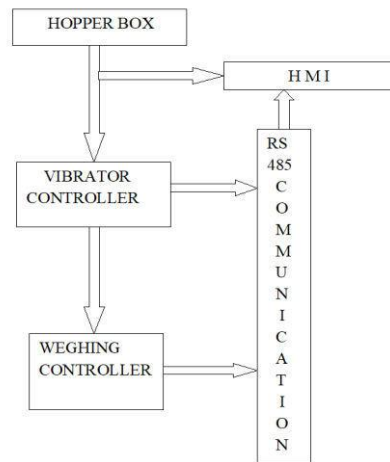


Figure 2. Block diagram for proposed system

3.4 Weighing controller

Micro fill weighing controller is a special function controller available to measure load cell input and control filling of the machine. Based on latest microcontroller to provide a maximum reliability at low cost of ownership, State of art technology makes this product prime choice of packaging industry.

HI link convertor convert 230V AC in to 5V DC and given to ATMEGA328P-PU. HX711 sensor sensing the materials to be packed in the machine, and gives data to the microcontroller. Tariff values measured by the weighing controller are displayed on the LCD display.

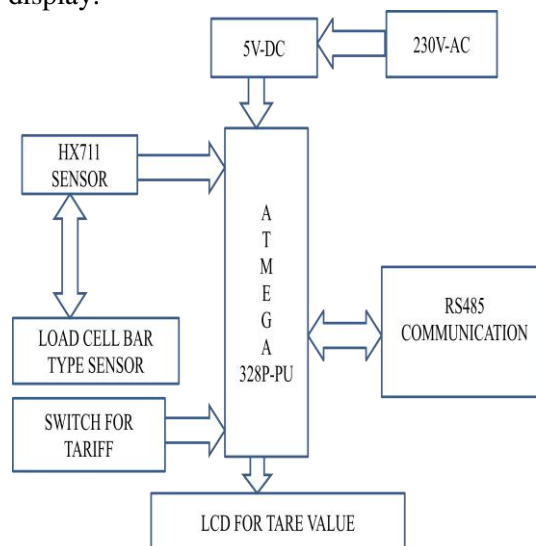


Figure 4. Block diagram for weighing controller

Vibrator controller

Vibrator controller which are used to control the feeding of material for further processing and vibrations are provide based on the quantity of material.

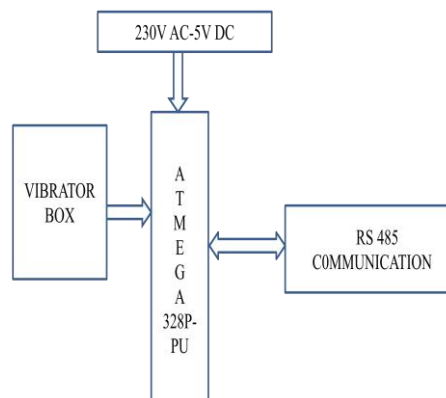


Figure 5. Block diagram for vibrator controller

RESULT:

Implementation of semi automatic packing machine using ATMEGA for industrial application.

ATMEGA328P-PU micro controller have high flash memory with less input voltage and which is highly economic than the PLC under the same precision control. Using this microcontroller we implemented a semi automatic packing machine. The below figure shows the weighing controller, which is used to control the filling of the machine and available to measure load cell input.

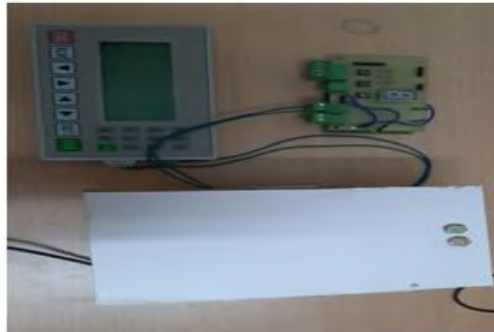


Figure 6. weighing controller and HMI connected with packing machine

The below figure shows the vibrator controller, which provides vibration for the material based on the quantity and control feeding of material.



Figure 7. vibrator controller for the packing machine

Using these two controllers we measured tare value of the material that differed from the defaulted loads. Here load1 set as 70Mg and load2 set as 0Mg then it shows tare values of 568Mg and 535Mg respectively.



Figure 8. Out put of load sensor

CONCLUSION:

Semi automatic packaging machine which can perform operations of vibrating, weighing and bag filling with maximum efficiency is manufactured. The operating of this machine is simple and chances of error in weight calculation are almost negligible. The time consumption and efforts required for the manual weighing and packaging are minimized. The process is completed in 3 steps. In first step, input value is given; the amount of material of the given input value is dispensed from the hopper to the funnel. In this step, a rotating disc will act as a door and it will get on/off as per the value of input. Weight calculation is done using load cell sensor.

REFERENCES:

1. Alhade A. Algitta, et al (2015) "Automated Packing machine Using PLC" IJSET 2348-7968
2. Bipin Mashilkar et al (2016) "Automated bottle filling system". IRJET p-ISSN 2395-0072 vol.3
3. D.Kanimozhi, et al (2015) "PLC Controlled Automatic Food Packaging Machine" IJETT ISSN 2231-5381, vol. 30 4. Dipen P. Patel, et al (2016) "Automatic plastic pouch packing machine" IJDER. ISSN 2321-9939 vol. 4
4. M.R.Saraf, et al (2016) "Design and development of cost effective Automatic Machine for Powder packing". E-ISSN 2277-4106, P-ISSN 2347-5161.
5. Pritwish Das, et al (2016) "Automatic Bottle Filling System Using PLC". IRJET
6. Ranjit R Bagave, et al (2016) "Automatic Packing Machine & Material Handling Using PLC" IJIRST. ISSN 2349-6010, vol. 2
7. Shashank Lingappa M, et al (2014) "PLC Controlled Low Cost Automatic packing Machine". ISSN 2250-3234 vol. 4, Number 7, pp. 803-811.
8. 9. Tarun gupta, et al (2018) "Development of Automatic Packing system using PLC and SCADA for Industries" IJMET.
9. 10. V.B.Kumbhar, et al (2017) "Implementation of customised SCADA for Cartoner Packaging Machine for cost effective solution" IRJET.
10. 11. Xiao SUN, et al (2013) "Research of Packaging Machine on PLC". pp. 3060 ~ 3065 e-ISSN vol.11, No. 6, pp. 3060~3065, e-ISSN 2087-278X
11. 12.Yuming Lu and Yingui Liu, et al (2010) "Design and application of an automatic packing machine controller based on Atmega 128" IEEE. 7.10. Vol 4

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MAPPING AREA OF A FIELD USING AUTONOMOUS UAV

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Abstract: This paper which discuss about mapping a large area of a field. Firstly, we use a camera incorporate with the UAV which can take a clear image and with the image we can provide real time data information on crop analysis application. These types of UAV are widely applicable in aerial photography. They can provide a real time data but as a field can be huge, the UAV need to fly very high to capture the whole section. Thus sacrifice small detail that can make difference in such fields. So we can fly the drone at lower altitude which can take several images of the whole section with the help of waypoint navigation we can set the grid which can divide a field into specified number of rows and columns for the required location and capture images. We can provide a detailed result. So for mapping the images, we use pix4dmapper software to align and combine images into one without any distortion in the image and knowing where we are through the process to provide a mapped area of the field.

Key Words: mission planner, waypoint navigation, camera.

INTRODUCTION:

An unmanned aerial vehicle (UAV) is a remote pilot vehicle used for surveillance and reconnaissance or combat missions. Unmanned vehicle, which are low cost, low danger when compared to manned vehicle. Unmanned aerial vehicles (UAVs) are developed in the military field over past decade and therefore the success rate in military field which increase to determine an unmanned aircraft in non-military field also. UAVs are a component of an unmanned aircraft system (UAS) which include a UAV, a ground controller and use telemetry for two way communications between air vehicle and ground controller. A typical unmanned aircraft is formed of sunshine composite materials to scale back weight and increase maneuverability. UAV are controlled by ground control station. The UAV are operational either manually by a person or autonomously by computer board. UAV is used for digital photogrammetry which is to provide as with aerial views to the ground controller. Which UAV are also low cost, mobile and simple for implementing purpose. Gimbal is mounted to the UAV to provide digital camera more stabilization in which the operation can be done at more successful rate. The digital camera is used for capturing images to provide real time data such as cartographic data collection. High resolution images which are efficient and quality for mapping, like Digital Elevation Model and Ortho Images. Digital Elevation Model and Orthophoto quality mainly depend on resolution of camera, flight height and accuracy of Ground Control Points. They can even be used during nights with thermal camera sensors to watch continuously.

WORKING:

MANUAL OPERATION

The UAV is build using F450 frames in which many components are integrated such as flight controller, transmitter, receiver, motor, Electronic speed controller, motor, battery, propeller, ppm encoder, transmitter and receiver. The F450 frame is used for one purpose which it eliminates the need of power distribution board. The frame weight is about 282g and dimensional diagonal length of the Quad copter is 450mm. The motor used is 1000kv brushless motor to provide high efficiency for less power and low weight. The motor is used for 3s-4s battery. The propeller used is self-locking carbon fiber propeller which provides high strength compared to other propeller. The size of the propeller is 9inch. The avionic ESC(Electronic speed controller) which is the best ESC quality up-to date. PIXHAWK flight controller is the brain of the quad-copter. PIXHAWK is a circuit board with sensor which detects the orientation change in the quad-copter. PIXHAWK is capable of autonomous stabilization and two way communication using radio telemetry module. The transmitter used is a 6-channel operation. The battery is 2200Mah 3s 40C battery pack known for reliability and price. After assembling, the next step is to configure the quad-copter

using mission planner software. The mission planner software is applicable to plane, copter and rover for ground control station. The vehicle needs to be connected to the mission planner through USB but before connection check whether the baud rate and coms port are correct. To check coms port, go to device manager there it will show which port you are connected and the baud rate needs to be 115200 for USB connection. For manual operation, there are literally four calibration: Accelerometer calibration, Compass calibration, Radio calibration and ESC calibration. For accelerometer calibration, the vehicle flight controller needs to be connected to the pc through USB. The vehicle should be placed at different position for calibration. The vehicle need to placed first at level position then click OK on the mission planner then like that vehicle need to be placed at every position which are left, right, nose down, nose up and at last the vehicle need to be placed upside down after that the mission planner will show the calibration process is successful. For compass calibration, the vehicle can be connected through ground station or using telemetry module (it provide easy rotation of the vehicle). After that place the vehicle high above the ground then start the calibration process. Rotate the vehicle in all direction up to 60 seconds after the completion reboot the autopilot. For radio calibration, first receiver is connected to the PIXHAWK where the receiver red light will flash continuously (the receiver is powered) then turn on the transmitter and bind the transmitter and the receiver. After binding it shows a solid red which the transmitter and receiver are connected. RC calibration involves all the RC input channels to maximum and minimum using the transmitter. After setting the pitch, throttle, roll and yaw to max 1970 to min 1100. Click OK on the calibration. For ESC calibration. First check one motor at one time each. Connect the motor esc to the throttle pin of the receiver and turn on the transmitter after that raise the throttle stick then the motor should rotate. Likewise check all the motor. Check whether all the motor are rotating at same speed. Once the flight controller buzzers provides a musical tone then the ESC are calibrated. There is a failsafe mode where we can set altitude hold, position hold and stabilize mode. After that fix the propeller and test the vehicle at the open space. Once the UAV are controlled then check the altitude hold where the UAV will fly at same altitude.

AUTONOMOUS OPERATION:

For autonomous, we use telemetry, GPS (global positioning system) module. Connect the GPS and telemetry module to the air vehicle. Check whether the GPS module works, when the GPS is solid red it means the GPS is powered then when the GPS blinks blue it means the satellites are locked. It provides the users to track the vehicle position and location using mission planner software. There are two telemetry modules, one telemetry are connected to the vehicle and the other telemetry are connected to the ground controller station. Before the telemetry is powered on the vehicle check whether the ground telemetry work it should blink red when connected to the computer. After the vehicle telemetry is powered, both the telemetry will be in solid red it indicates whether both the telemetry is connected. While connecting the telemetry to the ground check the com port and the baud rate which is 57600 in mission planner and click the connect button in the mission planner. In mission planner, set the waypoint for the process: the home location need to be set as the vehicle exact location which is displayed on the mission planner because of the GPS which provide the location of the UAV. We can set as many waypoint command which are takeoff, landing, loiter, return to launch, etc. we can set the altitude and delay. The latitude and longitude can also been displayed on current flight plan. We can use google hybrid map which provide satellite view along with the map which gives overlays map data. After the waypoints is set in the mission planner. We can all save the waypoint in save WP file so the files can be saved. Whenever we need the files we click the load WP file where we can get the saved files. After that the write WPs is used to send the data to the vehicle. The read WPs is to erase the already existing file. The UAV is now ready to file in autonomously. Power the vehicle and set the mode to stabilize after that turn on the transmitter then arm the vehicle using the transmitter click the auto on the flight data(action) in mission planner and raise the throttle. The UAV will fly autonomously at the required waypoint. Once, the UAV is fully autonomous. Then we set the gimbal to the UAV which provide stabilization for camera which reduces the vibration from the motor. The gimbal needs to be connected to PIXHAWK. Where the gimbal pitch and roll movement can be configured using mission planner. For controlling the gimbal in airborne we set any channel in the mission planner respective of the pitch and roll movement and the gimbal can be controlled by the transmitter based on the required channel. The camera can capture images or take video which is stored in micro SD card. The images are processed using software.



Figure 1. Unmanned aerial vehicle

LITERATURE REVIEW:

WenangAnurogo and Muhammad ZainuddinLubis in [1] This paper discuss about the agricultural application. UAV with a camera is used to capture the entire crop field in aerial view at an altitude of 60m height using camera. After the images are captured and are processed using AGISOFT Photoscan for photogrammetric processing of digital images. In agisoftphotoscan, we can add numerous photo with the help of the software we can align the images and can map an area of the field. Anuar Ahmad and KhairulNizamTahar in [2] This paper discuss about a topographic map produced using aerial photogrammetry. The camera required for large format digital aerial camera is expensive so it is not affordable in mapping organization around the world. The issue can be solved using a small format digital aerial camera is less expensive and affordable. Due to this small format aerial camera, the UAV need to fly at lower altitude to capture the images. The images are processed using software to produce digital maps. Nils Gageik, Michael Strohmeier in [3] this paper discuss about the waypoint set for autonomous flight operation for unmanned aerial vehicle. The global positioning system and inertial navigation system are implemented and integrated to the flight controller to provide the location of the unmanned aerial vehicle. The parameters provide flight path accuracy but cannot be used indoors. Waypoint set on the software which deliver message from ground station to the vehicle to navigate from starting point to the destination point which is also incorporated with the digital camera for other application purpose. J. Mészáros in [4] this paper discuss about autonomous of vehicle for surveying purpose which are acquired using a low budget, low resolution camera for field measurement test of an undiscovered archaeological site. JurateSuziedelyteVisockiene in [5] this paper discuss about the design of the quadcopter using an high resolution camera for capturing the aerial images and testing using pix4d mapper and photo mod photogrammetry software. Which software produces a better ortho-mosaic and surface model.

EXPERIMENTATION:

First, the UAV is built which has been configured with the mission planner where the UAV is manual or autonomous for operational. We have mounted a 2-axis gimbal on the UAV. The camera is attached to the gimbal for the camera to rotate in 2-axis and both are integrated to the UAV. The mission planner provide position of the vehicle which can be tracked by placing GPS on the vehicle and can also set waypoint from starting point to the destination. Polygon is drawn in rectangular shape on the mission planner. Then right click on the screen there will be an auto wp option in that click survey grid it provides number of waypoints based on altitude of the vehicle. The range of the vehicle is based on the value set using mission planner. Then pixhawk is connected to the camera. For connecting pixhawk to the camera we use spark fun 5v stepup breakout board and hobby king 5v led controller. The hobby king 5v led controller is soldered to the spark fun 5v stepup board and one end of the hobby king is connected to the pixhawk channel 7 out port and other end is soldered to the spark fun 5v stepup board. The other end of the spark fun is connected to the camera through USB. After that arm the pixhawk and power up the camera check whether the camera is operational. Open the mission planner and right click on the mission planner flight data screen then select the “trigger camera now” option it will capture a image this means it can be used for mapping.

SETTING WAYPOINT FOR MISSION USING MISSION PLANNER:

The waypoint is set for the quadcopter to cover the area of the whole field. The waypoint is set in survey grid formation in the mission planner. First the home position needs to be set. Then right click on the mission planner select draw polygon and add polygon point. click four points on the mission planner map which needs to be in rectangle shape to cover the required area and then right click, there will be an auto WP option in that click survey grid. After that a number of waypoint will be set and displayed on the screen and a set of option will be displayed on the right side of the screen. In that select the camera model and altitude. The camera model has been set as 4d HD cam. The altitude of the vehicle is about 20m. After that click the advanced option, it will show grid option and camera configuration. In grid option, the overlap of the images can be set which can be 80% or below 80% but not more than 80% because the photogrammetry software which does not process the image which are more than 80% overlap. In camera configuration, we can fill the option based on the camera specification or we can load a sample photo in which it can gather information. After finishing click the accept button.



Figure 2 Setting waypoint for mission

GEOTAGGING IMAGES:

The images are captured from the camera and stored on the memory card of the camera. With the camera images, transfer the images from the memory card to the computer system. After that in the image properties check whether the detail coordinates are provided. The images with these coordinates provide error while processing in the photogrammetry software. So to prevent these issues, we need to geo-tag the images using mission planner. In mission planner which injects data from the telemetry logs into the EXIF tags. So in geo-tagging images which make work easier to photo merge the multiple images which are taken during flight mission and it is also important for this application. While flying the vehicle, the ardupilot which is placed on the vehicle can trigger a camera. The flight plan for the mission which are stored in the pixhawk which are in data flash log format where provide cam message information and the data flash log can be used in the mission planner to provide accurate geo-tag information to the images. So for geo-tagging the image, open the mission planner software on the computer. Click control+F on the mission planner this will open hidden screen. In that click the geo ref images option after clicking it will open a geo tagging tool. So in that click the browse log button and select the logs which are stored in the computer which are in the .tlog format. Then click browse directory button and select the aerial images which are taken from the camera and stored in the computer. After selecting both the option, select the time offset click the estimate offset button. This tool will calculate the time difference between the first picture and the first gps in the log then it will display a calculated offset value in the process message area. Copy the calculated offset and paste the calculated offset to the seconds offset. If the preprocessor is working correctly it will display done. After the image location are accepted and the location information to the picture in EXIF data format. If everything is done, click on the geo tag images button and wait to see the processing message. So geotagging which provide additional geographical information and with the images we get specific information about where the images was taken.

ANALYSIS:

COLMAP SOFTWARE:

It is a open source mapping software for UAV. It provide a dense point cloud. Point cloud is a set of 3D points that construct a model. Point cloud is a cluster of point which are used to assign the points of the densified point cloud in one predefined group. First, the software need to be downloaded and installed. Open a workspace on the desktop. Collect the images which have been taken during the mission and store it in another file. Open the colmap software in that click the reconstruction option on the top of the menu. There will be a automatic reconstruction option. After clicking the option a folder will open in that we need to select the folder and also select the image folder. the data type selected should be individual image and quality is average. Some of the options are default so no need to change. Then will click the run option. The data log will run on the right side of the software. The process is to Reconstruct a 3D structure from a series of image. The input images are overlapping objects in the image taken from a viewpoint. The process is divided into three stages. Which are feature detection and extraction, feature matching and geometric verification and structure reconstruction. The images need to be captured with good texture to avoid completely texture less image. The images also need to be captured at similar illumination condition to avoid dynamic range scenes. The images are captured at high visual overlap, which make sure that the objects are seen at least in three images. More the images better the reconstruction of 3D structure. It is better to have many images from similar viewpoint. In feature detection and extraction, the group of images needs to be in same intrinsic camera parameter so medication of camera can be done easily. Colmap is used to extract SIFT algorithm on the CPU. Feature matching is based on the sequential order of the images this mode is known as sequential matching. In this case, there will be consecutive of frame having visual overlap. So the captured images are matched against each other. In sparse reconstruction, The process will take a significant amount of time depending on the number of images which are processed. Colmap is used to load the extracted data from the data base into memory. The results are visualized in real time during the reconstruction process. In dense reconstruction, after spare representation and the camera input images can now recover denser scene geometry. colmap has a dense reconstruction to produce depth and normal maps for all captured images, to fuse the depth and normal maps of the images into a dense point cloud with normal information, and can estimate a dense surface from the fused point cloud using Poisson reconstruction. There will be numerous point cloud visualized on the home screen. The colmap cannot view the model. So to view the model we need another software which is mesh lab software.



Figure 3. Point cloud data

MESHLAB SOFTWARE:

Meshlab is 3 dimensional mesh processing software which also process unstructured large meshes. It provides set of tools for editing, rendering these kind of meshes. Meshlab which is used provides a geographical data of the terrain surface. The input and output formats are PLY, OBJ, COLLADA. The point cloud data from the colmap images are used in the meshlab software to provide a mapped view of the terrain surface. The point cloud images are mapped based on the iterative closest point algorithm. Which also includes an interactive direct paint on mesh system that allows the users to change the color of a mesh, can directly smooth out noise and small feature.

RESULT&DISCUSSION:

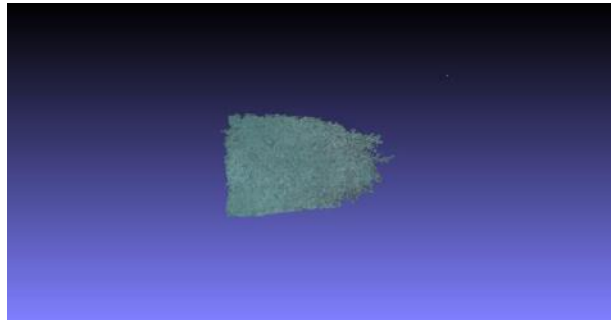


Figure 4. mapping field area

In this fig.4, with the point cloud data, a terrain surface of the field is mapped using photogrammetry software. It can be viewed by the user to gather real time data information.

CONCLUSION:

The design of the quadcopter has been done successfully. The integration of low optical sensor mounted on the quadcopter provides a mapping an area. A simple method is used to provide point cloud data from the image using free open source photogrammetry software. The data acquired are processed using meshlab software. The result shows that an area can be mapped using a open source and low cost efficient optical sensor.

REFERENCE:

1. WenangAnurogo and Muhammad ZainuddinLubis (2017) "A Simple Aerial Photogrammetric Mapping System Overview and Image Acquisition Using Unmanned Aerial Vehicles (UAVs)" Applied geospatial information, Vol 1 No 1, pp 98-105.
2. Anuar Ahmad and KhairulNizamTahar (2013) "Digital Aerial Imagery of Unmanned Aerial Vehicle for Various Applications",IEEE International Conference on Control System, Computing and Engineering, Vol 5 No 4, pp 215-222.
3. William Kress Bodin and Austin (2010) "Navigating UAVS with an on-board digital camera",Vol 2 No7, pp 107-115.
4. Maurizio Rossi, DavideBrunelli (2016) "Autonomous Gas Detection and Mapping with Unmanned Aerial Vehicles" IEEE transactions on instrumentation and measurement, Vol 1 No 2, pp 75-81.
5. William Kress Bodin and Austin (2010) "Navigating a UAV to a next waypoint" International corp (BLF)",Vol 6 No 4, pp 250-259.
6. Jong-Hyuk Kim, Stuart Wishartand Salah Sukkarieh (2014) "Real-Time Navigation, Guidance, and Control of a UAV Using Low-Cost Sensors", Australian Centre for Field Robotics, Vol 3 No 1, pp 175-181.
7. S. Nebikera and A. Annena (2008) "A light-weight multispectral sensor for micro UAV -opportunities for very high resolution airborne remote sensing" The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Vol 4 No 7, pp 588-591.
8. TejashaPatil and Shweta Mishra (2013) "Image stitching using MATLAB"International Journal of Engineering Trends and Technology, Vol.9 No.1, pp 327-335
9. Nils Gageik, Michael Strohmeier (2013) "Waypoint Flight Parameter Comparison of an Autonomous UAV" International Journal of Artificial Intelligence & Applications (IJAIA), Vol.4 No.3, pp. 98-112
10. Atheer L. Salih1 and M. Moghavvemi (2010) "Flight PID controller design for a UAV quadrotor" Centre for Research in Applied Electronics (CRAE), University Malaya Kuala Lumpur, Malaysia, Vol. 13, No 2, pp. 275-281.
11. Lange S and Sünderhauf N. Neubert P (2012) "Autonomous Corridor Flight of a UAV Using a Low-Cost and Light-Weight RGB-D Camera" Advances in Autonomous Mini Robots, IEEE International Conference on Control System, Vol.3 No.2, pp.117-121.
12. Jong-Hyuk Kim and Stuart Wishart (2014) "Real-time Navigation, Guidance, and Control of a UAV using Low-cost Sensors" International conference on Unmanned Aircraft and System, Vol 4 No 5, pp 459-463.
13. JurateSuziedelyteVisockiene, DomantasBrucas (2014)"comparison of UAV images processing software" journal measurement in engineering, VOLUME 2, ISSUE 2.
14. F. Remondino a, L. Barazzetti b, F. Nexa, M. Scaioni b, D. Sarazzi c (2011)"uav photogrammetry for mapping and 3d modeling – current status and future perspectives" Volume XXXVIII-1/C22.
15. J. Mészáros (2011)"aerial surveying uav based on open-source hardware and software" Volume XXXVIII-1/C22.

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ELIMINATION OF POSITIONING ERRORS IN THE UAVs THROUGH KALMAN FILTERS

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Abstract: This project introduces the effective way to eliminate the positional drifts occurring in the UAVs. These vehicles generally use the low cost IMU & GPS receivers to execute the mission may produce serious position errors in the navigation data. The IMU unit will undergo time based drift whose accuracy will degrade with time. On the other hand, GPS unit will have a consistent error irrespective of time. This work proposes a simple and effective methodology to eliminate the position error occurring in the low end navigation sensors with the use of Kalman filters. Kalman filter is mathematical algorithm which incorporates the past time history and based on which it estimate the current position data. The GPS and IMU measurements are given as the inputs for the Kalman filter algorithm through arduino and the Kalman filtered navigation data was compared with the GPS as well as INS positional data. Thus the result shows, that the Kalman filtered navigation data has reduced errors and dynamic drifts and it can be effectively applied for the uav for better navigation.

Key Words – UAV, GPS, IMU, Kalman Filter, Arduino.

INTRODUCTION

Generally the UAV is an aircraft design to operate with no human pilot onboard. The unmanned aerial vehicle is the component of unmanned aerial system. UAVs are remote controlled aircraft or it can be fly autonomously. A unmanned aerial vehicle (UAV) consists of two pairs of rotors and propellers, located at the square frame. This drone does not require complex mechanical linkages. Due to the simple mechanical structure, it is used for many applications. Based on size, weight, endurance, range and flying altitude the UAVs are classified into different types. There are so many problems in the unmanned aerial vehicle such as Signal loss, ground station failure, Interference, turning problem, strong wind affects the orientation, Position error. Positioning information is more importance for safety reasons. We need to know where we are (vehicle position) and we also need to locate obstacles in the nearby environment of our own vehicle. It is required to determine in real-time the vehicle's position as accurately and efficiently as possible.

Global Positioning System:

GPS is a satellite radio navigation system. It is used to determine the ground position of an object. The GPS does not require the user to transmit the data, and it can be operates independently. The GPS is based on the time and known values. GPS consist of satellites, ground stations, and receivers. The GPS concept is based on the time and the known position of the GPS value. GPS receivers have clocks as well, but they are less stable and less precise. Every GPS satellites are continuously transmit the radio signals. The speed of radio waves is constant and the satellite speed is independent. The GPS consist of three segments. That is user segment, space segment and control segment.

Inertial Navigation System:

An inertial navigation system (INS) is consist of accelerometers and gyroscopes. The gyroscope used to measure the angular velocity with respect to the inertial reference. Accelerometers are used to measure the linear acceleration of the moving object. The INS is to continuously calculate the position, the orientation, and the velocity of a moving object without the need for external references. The inertial navigation system are used in many moving objects. The IMU sensor are able to measure the position value directly.

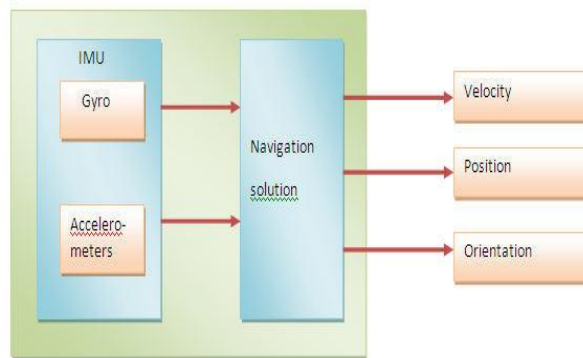


Figure 1. Schematic diagram of INS

KALMAN FILTER:

Kalman Filter is an algorithm also known as linear quadratic estimation (LQE). Kalman filter is the iterative process, its quickly estimate the true value, when the measured value contain unpredicted errors. There are different type of Kalman filter are used. That is Extended Kalman Filter, Fast Kalman Filter, Complex Kalman filter, Unscented Kalman Filter. This Kalman filter is not like a low pass filters. A low pass filter is a fixed filter just filters out frequencies above a passband. A Kalman filter can be used for state estimation, prediction of values in time and smoothing. It has a gain which changes at each time step. Kalman filters also one of the main topics in the field of robotic motion planning and control. The algorithm works in a two-step process.

- Prediction
- Estimation

RELATED WORK:

When the wind is often ignored of guidance algorithms in the small unmanned vehicles. Generally wind has a very significant nonlinear effect on the guidance algorithm, so it can be strongly affects the orientation and rates of the vehicle. The guidance algorithm is based on wind estimator. By using this guidance algorithm we can able to reduce the wind effects in the small unmanned aerial vehicle.[3] A nonlinear signal-correction observer (N-SCO) is used for signals correction and estimation this N-SCO is used to estimate the unknown velocity and also can reject the position measurement error. For this N-SCO they were used extended Kalman filter and intense stochastic non-Gaussian noise. The N-SCO is mainly developed for position and acceleration integration, and it is applied to an unmanned aerial vehicle navigation. [18] In this paper by using the relatively low cost of inertial navigation systems (INSs) has been integration with global positioning systems (GPSs) for land-vehicle applications. Inertial sensors based on micro electromechanical system (MEMS) technology have recently become commercially available at lower costs. These relatively lower cost inertial sensors have the potential to allow the development of an GPS-aided INS (INS/GPS) vehicular navigation system. The performance of MEMS-based gyroscopes and accelerometers is significantly affected by complex error characteristics that are stochastic in nature. To improve the overall performance of MEMS-based INS/GPS. [20].

METHODOLOGY:

✓ FUSION SENSOR:

The most popular sensor used for positioning is a global positioning system. However, GPS alone based systems suffer from various problems such as position error, multipath error. we usually use a complementary sensors whose measurements are fused in real time . Among the other types of sensors, 2 or 3 axis inertial measurement units (IMU). Two or more of these positioning sensing methods must be fused together to achieve the required performance at low cost.

✓ DATA FUSION ARCHITECTURE

The most basic data fusion method to find the position is based on the Kalman filter. It is a set of mathematical equations that provides the efficient computational means in the way its reduce the mean square error. This filter is more powerful it support to estimates the present, past even future values. Kalman filter is well suited to the fusion of data from different sources. Many of the filter design is equivalent to the kalman filter. But this kalaman filter involves prediction and update steps.

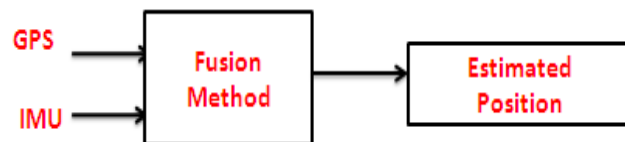


Figure 2. Data fusion architecture

✓ **CONNECT WITH DRONE:**

This setup is connected with drone. It consists of LCD display, IMU, GPS, NRF transmitter, Li-Po battery, microcontroller. The integration of IMU and GPS value fed into the microcontroller. For this setup we are taking the power from Li-Po battery. By using the Kalman filter algorithm we can reduce the noise as possible in the integration of IMU and GPS sensor. The values will be displayed by using the LCD display.

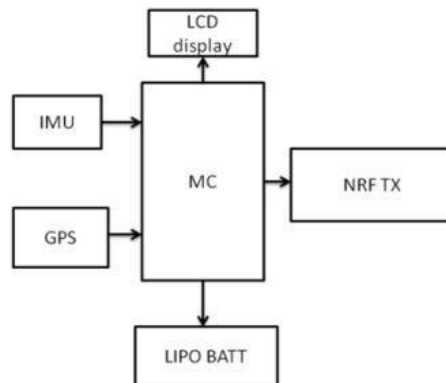


Figure 3. Connection Diagram

✓ **CONNECT WITH PC:**

This setup will be connect with computer. It consists of LCD display, microcontroller, NRF receiver. The power supply will be given to the microcontroller. NRF is uses the 2.4 GHz band and it can operate with baud rates from 250 kbps up to 2 Mbps. Its range can reach up to 100 meters. The module can use 125 different channels. By using the NRF module we can transfer the data drone from pc while flying the drone.

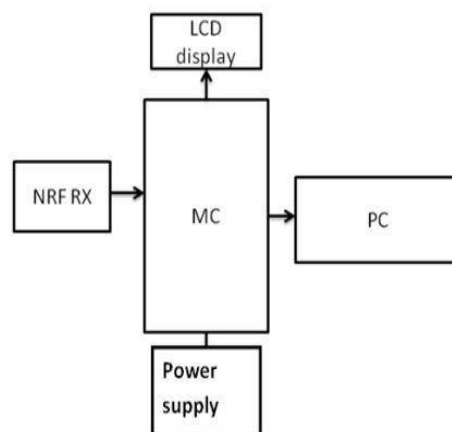


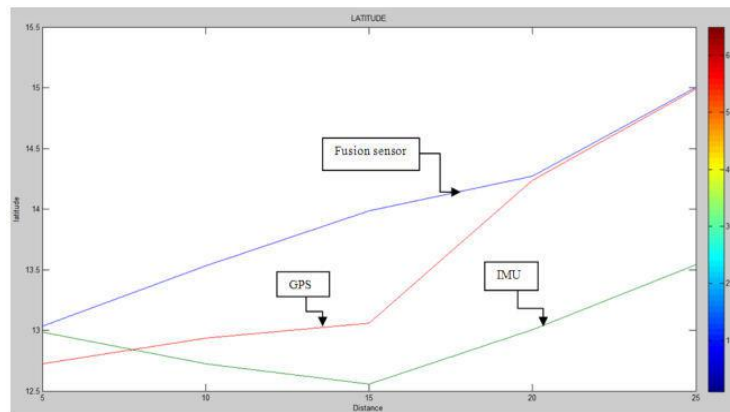
Figure 4. Connection diagram

**EXPREMENTATION:
COMPONENTS USED**

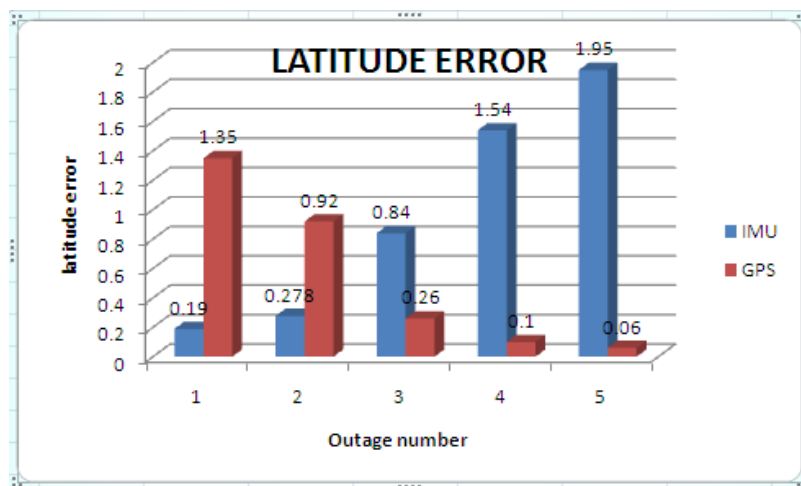
- Arduino
- LCD Display
- IMU
- GPS
- NRF
- Battery

Arduino refers to an open source electronics platform the software is used to program it. Basically the arduino is designed to make the electronics more accessible. Arduino language is a set of C/C++ function. LCD display is a flat panel display that is used the light modulating properties of liquid crystals. It is used to display the values which is shows in the arduino serial monitor. The IMU unit will undergo time based drift whose accuracy will degrade with time. It is used to find the acceleration, velocity and position. The GPS is based on the time and known values. GPS consist of satellites, ground stations, and receivers. NRF is a wireless transceiver module. This module able to send as well as receive the data. The operate frequency of 2.4 GHz.

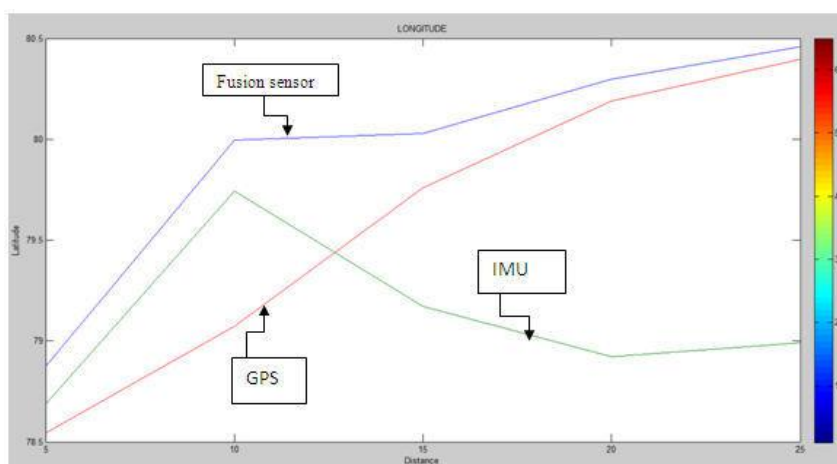
RESULT AND DISCUSSION:



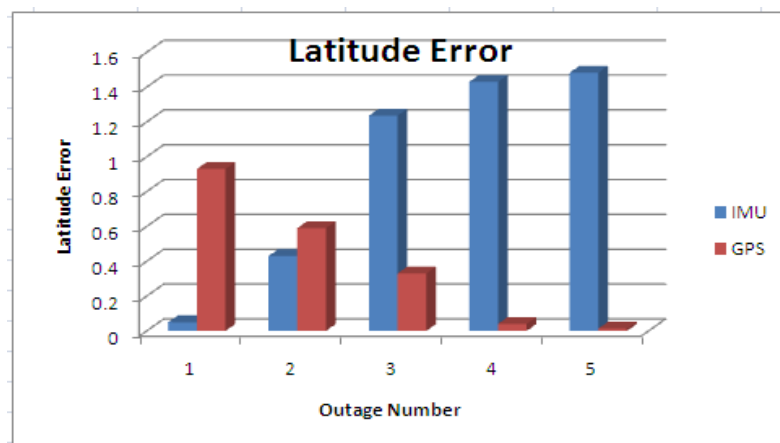
A. Comparison of GPS, IMU and Fusion sensor in latitude value.



B. Latitude error value between GPS and IMU



C. Comparison of GPS, IMU and fusion sensor in the longitude value.



D. Longitude error value between GPS and IMU.

From the simulation result it shows that correction of IMU measurement used in updating the INS navigation equations using GPS and Kalman filter. This will increase the navigation solution accuracy range up to 100 meters in position. From the testing result it shows that in the Kalman filter algorithm when we are increasing the update rate it will be increasing the accuracy. Integration of IMU/GPS using 3Hz update rates it gives (0.4 to 0.6) accuracy.

CONCLUSION:

The quadcopter was designed completely. The fusion sensor (IMU+GPS) has been developed to reject the large position error. The proposed scheme has been demonstrated by experiment and succeeded in rejecting the large measurement error in position. A simple and effective methodology was used to eliminate the position error occurring in the low end navigation sensors with the use of Kalman filter. The data acquired using the Kalman filter was then compared with the GPS as well as INS data. The result shows Kalman filter navigation data has reduced position errors and dynamic drifts and it can be effectively applied for the UAV.

REFERENCE:

1. Yu Zhenyu and Kenzo Nonami (2009) "Waypoint Navigation and Trajectory Tracking" IEEE International Conference on Robotics and Automation, Kobe, Japan, Vol. 12.No. 14, pp. 263-8522.
2. Nils Gageik and Michael Strohmeier (2013) "Waypoint Flight Parameter Comparison of an Autonomous UAV" International Journal of Artificial Intelligence & Applications, Vol.4, No.3.
3. John Osborne and Rolf Rysdyky "Waypoint Guidance for Small UAVs in Wind" Aerospace Conferences, University of Washington, Seattle, Vol.7.No.4, pp.98-115.
4. Matthias Nieuwenhuisen and David Droschel (2014) "Obstacle Detection and Navigation Planning for Autonomous Micro Aerial Vehicles" International Conference on Unmanned Aircraft Systems (ICUAS), Orlando, USA, Vol. 16.No. 8, pp.1631-1636.
5. Atheer L. Salih and M. Moghavvemi (2010) "Flight PID controller design for a UAV quadrotor" Centre for Research in Applied Electronics (CRAE), University Malaya Kuala Lumpur, Malaysia.
6. Qingqing Wu and Yong Zeng (2000) "Trajectory and Communication Design for Multi-UAV Enabled Wireless Networks" IEEE, Vol.10.No.2, pp.313-378.
7. Abbott, E. & Powell, D. (1999) "Land-Vehicle Navigation Using GPS" IEEE Proceedings of the Institute of Electrical and Electronics Engineer. (87)1, (pp. 145-162).
8. Abuhadrous, I., Nashashibi, F., Laurgeau, C. & Chinchole, M. (2004, June), "Multi-Sensor Data Fusion for Land Vehicle Localization Using MAPS TM". Paper presented at the IEEE Intelligent Vehicle Conference, Columbus, Ohio, USA.
9. Abdessamie, R. & Gingras, D. (2008) "A collaborative navigation approach in intelligent Vehicles" Paper presented at the Society of Automotive Engineering (SAE) Conference, paper no 1249 Detroit USA.
10. Abidi, M. A. & Gonzalez, R.C. (1992) "Data Fusion In Robotics And Machine Intelligence" Academic Press, NY, USA.
11. Anderson, B. & Moore, J. (1979) "Optimal Filtering" Prentice Hall, Englewood, NJ, USA.
12. Andrieu, C. & Doucet, A. (2002), "Particle filtering for partially observed Gaussian state space models," Journal Royal Statistical Society B. (64)4, (pp. 827–836).

13. Arulampalam, S., Maskell, S., Gordon N. & Clapp T. (2002), "A Tutorial on Particle Filters for Online Nonlinear/Non-Gaussian Bayesian Tracking" IEEE Transactions on Signal processing. Vol. 50, No. 2 (pp. 174-188).
14. Philippe Martin and Erwan Salaun (2009) "The Role of Propeller Aerodynamics in the Model of a Quadrotor UAV" European Control Conference, pp.421-435.
15. Gronzka S (2011) "Mapping State Estimation and Navigation for Quadrotors and Human-Worn Sensor Systems", Uni Freiburg, Vol.5. No.13, pp. 132-432.
16. Lange S and Sünderhauf N. Neubert P (2014) " Autonomous Corridor Flight of a UAV Using a Low-Cost and Light-Weight RGB-D Camera" Advances in Autonomous Mini Robots, pp.184-192.
17. Gageik N and Rothe J (2012) " Data Fusion Principles for Height Control and Autonomous Landing of a Quadrocopter" UAVweek Workshop Contrib., Vol.6.No.2.
18. Xinhua Wang, Weicheng Wang "Nonlinear signal-correction observer and application to UAV navigation" IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS.
19. Gageik N and Mueller T (2012) "Obstacle Detection and Collision Avoidance Using Ultrasonic Distance Sensors for an Autonomous Quadrocopter" International Conference on Signal Processing and Communication, pp.419-423.
20. Tareg Mahmoud and Bambang Riyanto Trilaksono(2018) "Integrated INS/GPS Navigation System" International Journal on Electrical Engineering and Informatics Volume-10.

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DEVELOPMENT OF FLIGHT CONTROLLER IN DRONES USING STM MICROCONTROLLER BOARD

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Abstract: Nowadays, drones or so-called UAV's are extensively used both in the civil sector and military sector. Flight controllers used in UAV's is the main embedded hardware electronic component where all the processing take place. It is considered to be the heart for the drones. There are several drone flight controller platforms available but they are either hardware wise or wholly proprietary and doesn't allow for much customisation. For academia it is necessary to know the functioning of the drone to customise it. So a flight controller is developed by programming a STM32 microcontroller to get a high degree of customisation. Sensors like gyro, barometer, gps, etc., are interfaced with STM32 microcontroller and the values obtained are manipulated with control algorithm to achieve the functioning of flight controller for flying. A telemetry system is also developed to get the useful flight information in real time, when the drone is flying for monitoring purpose. The aim of this project is to create a flight controller where the operation of hardware and software are well known in order to get a high customisation where the user can modify the code or hardware according to the needs for any specific purpose.

Key Words: UAV, Flight Controller, Control algorithm, Telemetry

INTRODUCTION:

Drones can be broadly classified into two namely fixed-wing and multirotor. In multirotors, quadcopter or quadrotor is a classic arrangement used widely. The quadcopter uses four propellers to produce lift and to control the dynamics of drones. Out of four propellers, two rotate clockwise while the other two rotate counterclockwise. By varying the speed in rotors, the drone is steered and the desired direction is achieved. The main components which constitute the quadrotor are flight controller, airframe, motors propellers, battery, ESC, transmitter and receiver. A flight controller has sensors onboard such as MEMS gyroscope, MEMS barometer, etc., where it gathers data and manipulate it with control methods to achieve optimal flying. In response to the input received from the receiver, the flight controller changes the rpm of the motors. The flight controller can be classified into three sections namely hardware part, software part and ground control station. The flight controller hardware consists of microcontroller, sensors and other electronic components. The flight controller software acquires data from sensors and by use of certain control algorithms, it manipulates and operates the drone. The ground control station receives data from the drone when it is on flight and displays the flight data information such as GPS coordinates, battery voltage, speed, etc. There are different flight controller platforms available for drones, in which we can mainly point out are Pixhawk, Naza, Ardupilot Mega, etc. These platforms cannot be modified according to our needs because they are hardware-wise or wholly proprietary. It is necessary to know the functioning of the flight controller to modify it. So a flight controller is developed by using STM32 microcontroller as a base along with various other sensors with the objective to get high customisation.

LITERATURE REVIEW:

The studies carried out for this project are discussed as follows. HaiYang Chao, YongCanCao, YangQuan Chen et al in [1] presented a survey on the autopilot system for small or micro unmanned aerial vehicles (UAVs). It discusses on various commercial, open source and research autopilot systems. They are explained on both the hardware and software viewpoints. Several autopilots available in the market are compared in terms of sensors and microcontroller capability. It concludes by stating that design of software is far more crucial than the hardware for flight controller. Emad Ebeid, Martin Skriver, JieJin et al in [2] discusses the components of flight controller and the UAV system. This survey paper also covers both the hardware and software of flight controller. It compares the

available open source flight controller platforms depending upon the features and concludes that on hardware side, pixhawk is best due to its flexibility and capabilities. Similarly on software side, it concludes ardupilot is full fledged and comparatively best software. Sarah Pontes Madruga, Augusto de Holanda B. M. Tavares, Alisson Vasconcelos de Brito, Tiago Pereira Nascimento et al in [3] developed a flight controller for quadcopter based on raspberry pi 3. It explains the methodologies and technicalities involved for developing a flight controller. It explains on how the motor and other sensors communicate with the flight controller through communication protocols. It concludes by saying that Implementing on open source hardwares and softwares and developing own control algorithms for drones will be a good option for better understanding. S. Sabikan, S. W. Nawawi et al in [4] proposed an open source platform for flight controllers in drones where UAV can be used for any outdoor applications. This paper experimented autopilot in outdoors and provided results on performance, stabilization, interference and vibration. It concludes that because of magnetic field interference by motors, battery and ESC's, the magnetometer may point wrong direction. High vibrations on flight controller may cause accelerometer based altitude and horizontal position estimations to drift far off from the actual values. Zhaolin Yang, Feng Lin, Ben M. Chen et al in [5] analyses various autopilot platforms available and it introduces various control methodologies to improve the robustness and performance of the flight controller. It further emphasises that for long term reliability of flight controller, Environmental Stress Screening (ESS) needs to be carried out. i.e., random vibration test and temperature cycling test.

COMPONENTS:

Basically a flight controller is a collection of sensors working together to accomplish a desired objective i.e., flying. The components used for developing this flight controller are explained as follows.

✓ **STM32 Blue Pill:**

The STM32F103C8T6 is a high-performance, ARM Cortex-M3 32-bit RISC core operating at a 72 MHz frequency. They have high speed memories (Flash memory 64 Kbytes and SRAM up to 20 Kbytes), and a range of enhanced I/O's and peripherals connected to two APB buses. It has one PWM timer, two I2Cs and SPIs, three USARTs, an CAN and USB. The operating voltage of this board is 2.0-3.6V.

✓ **MPU6050 Gyroscope Sensor:**

MPU6050 gyroscope sensor consists of three axis accelerometer and three axis gyroscope. It is used for measuring angular velocity and orientation. The working principle is based on Coriolis effect. Coriolis effect is a phenomena, i.e., When a body is moving in a specific direction at some velocity, and when angular rate is applied to that object, it will produce a perpendicular displacement. In addition to accelerometer and gyroscope, it also consists of temperature sensor integrated to it.

✓ **MS5611 Barometer Sensor:**

The MS5611 is a high precision air pressure module where it finds the altitude based upon the varying air pressure because the air pressure decreases with increasing altitude. It consists of a micro mechanical sensor chip is furnished with a pressure membrane. Changes in membrane causes the membrane to change shape. Then an electrical voltage proportional to the amount of distortion will be created. By this change in voltage created we can measure the ambient pressure.

✓ **Neo M8N GPS Module:**

Neo M8N is a high precision GPS module that includes an HMC5883L digital compass right into it. This module gives precise position outputs at 10 Hz. In order to locate the location, atleast 4 satellite signals are needed. This satellite takes around 10 seconds to locate and acquires upto 6 satellites. It gives an accuracy of around 0.9 meters.

✓ **APC220 Telemetry:**

The APC220 is a transceiver which provides a solution to wireless communications. Its operating voltage is around 3.6 – 5.0 V. It can transmit data up to a range of about 1000m. By default it operates at a baud rate of 9600 bps. It uses UART/TTL interface for communicating. Two telemetry systems will be used, one will be placed in the quadcopter while the other is placed in the ground for receiving flight data from the drone.

The block diagram of the flight controller system is shown below,

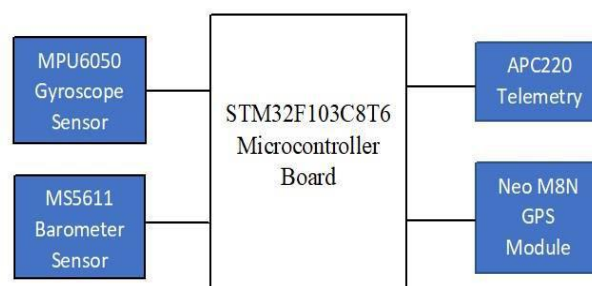


Figure.1 Flight Controller System

METHOD:

The STM32 Blue Pill can be programmed through arduino software by selecting the appropriate board, and by importing STMduino library to the arduino software for compatibility. First, the sensors gyroscope, barometer and GPS are individually tested by programming the modules. There are two types of signals in which the STM board can acquire signals from the receiver. One is by PWM and the other is PPM. Both work by sending a succession of square wave pulses from the transmitter to the receiver. The only difference is PWM uses 6 wires for 6 channels whereas the PPM uses only one wire for all the 6 channels. Since to reduce the wiring complexity, PPM signals are used for communication. The gyroscope gives pitch, roll and yaw values. When the quadcopter is armed, the initial values in the gyroscope are stored onto the EEPROM memory of the board. The stored values acts as a base for stabilizing the drone. The flight controller uses control algorithm to stabilize the drone when there are sudden disturbances. Without control algorithm, the drone cannot stabilize itself. So PID control algorithm is used for stabilization. The PID stands for Proportional Integral Derivative algorithm. Term P finds the difference between the setpoint and the process variable, i.e., error and adds a gain such that there will be no error. Term I uses past error values and integrates it over time to neglect error. Meanwhile term D estimates the current rate of change and differentiate over time to reduce error. The control algorithm takes stored gyro values as a base and tries to reduce the error. In the main program loop an interrupt will be acting, i.e., always the drone tries to stabilize by processing the PID calculations, but when the transmitter sends signals to the receiver an interrupt will start acting pausing the PID calculations. When the receiver signals are sensed, interrupt starts acting by measuring the rising edge pulse, then PID continues to resume. Immediately when falling edge pulse is detected interrupt start acting measure by the falling time and again the main program loop will be resumed.

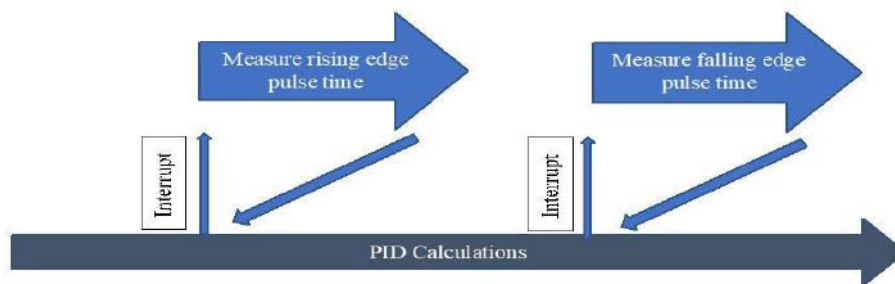


Figure.2 Program Loop Interrupt Functioning

In quadcopter it is very much important to know the battery voltage because when the battery drains during flight, drone may crash leading to components malfunction. So it is necessary to know the battery voltage. In order to find the battery voltage, a voltage divider circuit is used in the flight controller. The voltage divider converts the high voltage number to smaller one. We need to convert high voltage to smaller voltage because STM32 is 3.3V tolerant, any voltage above 3.3V connected to STM32 will damage the board. So a voltage divider circuit is used. The maximum input voltage from the battery is 12.6V. Two resistors are used to convert the max. 12.6 V to 1.1V or below. The diagram of the circuit is shown below.

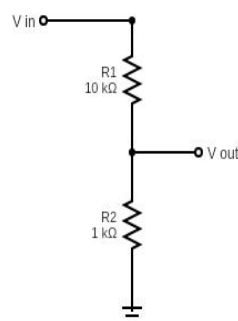


Figure 3. Voltage Divider Circuit

The Output voltage pin is connected to the analog pin of the STM32 board. The output voltage will be in the form of analog values ranging from (0 - 4095). This analog value will be converted to the original voltage by the use of formula. Theoretical formula for finding out the output voltage is,

$$V_{out} = V_{in} \frac{R2}{R1+R2}$$

The analog value in the STM board will be converted to original voltage by using the below formula in the program.

$$V_{in} = \frac{\text{Analog value}}{112.81}$$

Further the barometer, GPS and telemetry sensors are interfaced to get the altitude and position coordinates. The datas acquired during flight are sent to the ground telemetry for monitoring. The ground telemetry system is powered by Arduino UNO. LCD display is interfaced with UNO for visual monitoring of the flight.

ANALYSIS:

Although the control algorithm is used, the test flight was not stable leading to many drifts. The problem was due to the gain values. After little tuning, the drone slowly got stabilized. The gain values are fine tuned till the drone is completely stabilized. The final gain values after tuning are mentioned below.

P Gain = 1.0

I Gain = 0.02

D Gain = 10.0

The readings of the battery voltage was little error prone due to the interferences of the electronic speed controllers. In order to compensate the error a filter is used. The formula for the filter is shown below.

Battery Voltage = (Previous loop voltage * 0.92) + (analog value / 1410.1)

The MS5611 barometer is very sensitive to light. When it is exposed to light it gives an error rate of around 5%. In order to neglect this, the barometer sensor is enclosed inside the casing with holes drilled on the sides for the air to pass by. The comparison at normal condition and light exposure condition is shown in the graph below. (For reference) The test was done at an height of 20m.

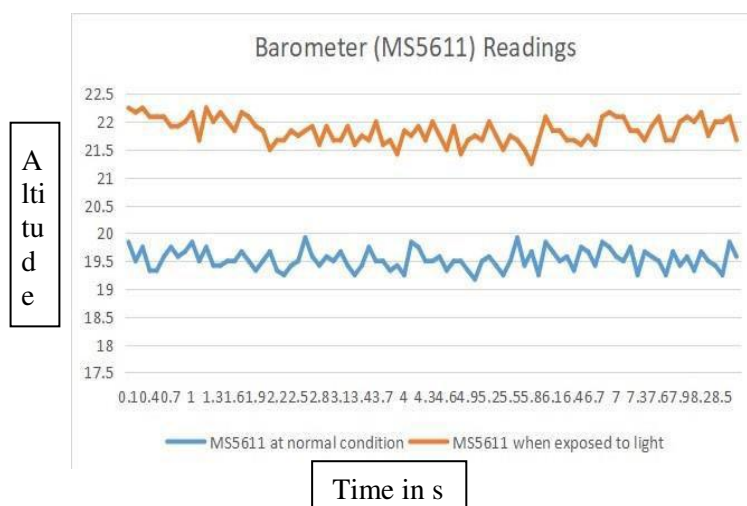


Figure 4. BarometerReadings

CONCLUSION:

The flight controller is developed by interfacing the sensors and by implementing the PID control algorithm. The telemetry system is also developed to monitor the flight datas when the drone is flying. The hardware and software operations of the flight controller are open and well known paving way for high customisation where the user can modify it according to their needs in future to accomplish any application oriented tasks.



Figure 5. Quadcopter with STM32 Flight Controller

REFERENCES:

1. HaiYang Chao, YongCan Cao, and YangQuan Chen, (2010): Autopilots for Small Unmanned Aerial Vehicles: A Survey. *International Journal of Control, Automation, and Systems*, Vol. 8, No.1, pp.36-44.
2. Emad Ebeid, Martin Skriver, JieJin, (2017): A Survey on Open-Source Flight Control Platforms of Unmanned Aerial Vehicle. *Euromicro Conference on Digital System Design*.
3. Sarah Pontes Madruga, Augusto de Holanda B. M. Tavares, Alisson Vasconcelos de Brito, Tiago Pereira Nascimento, (2018): A Project of an Embedded Control System for Autonomous Quadrotor UAVs. *Brazilian Symposium on Robotics*.
4. S. Sabikan, S. W. Nawawi, (2016): Open-Source Project (OSPs) Platform for Outdoor Quadcopter. *Journal of Advanced Research Design*, Vol. 24, No. 1, pp. 13-27.
5. Zhaolin Yang, Feng Lin, Ben M. Chen, (2016): Survey of Autopilot for Multi-rotor Unmanned Aerial Vehicles. *IECON 2016 - 42nd Annual Conference of the IEEE Industrial Electronics Society*, pp. 6122-6127.
6. H. Lim, J. Park, D. Lee, and H. J. Kim, (2012): Build your own quadrotor: Open-source projects on unmanned aerial vehicles. *IEEE Robotics & Automation Magazine*, vol. 19, no. 3, pp. 33–45.
7. Sangook Cho, Sanghyuk Park and Keeyoung Choi, (2012): Autopilot Design for a Target Drone using Rate Gyros and GPS. *International Journal of Aeronautical and Space Science*, Vol. 13, No. 4, pp. 468-473.
8. Atheer L. Salihland and M. Moghavvemi, (2010): Flight PID Controller Design for a UAV Quadrotor. *Scientific Research and Essays*, Vol. 5, No. 23, pp. 3660 – 3667.
9. C. Nam and S. Danielson, (2011): Development of a Small UAV with real-time video surveillance. in *American Society for Engineering Education. American Society Engineering Education*.
10. H. Wu, D. Sun, and Z. Zhou, (2004): Micro air vehicle: Configuration, analysis, fabrication, and test. *IEEE/ASME Trans. on Mechatronics*, vol. 9, no. 1, pp. 108-117.
11. R. Beard, D. Kingston, M. Quigley, D. Snyder, R. Christiansen, W. Johnson, T. McLain, and M. Goodrich, (2005): Autonomous vehicle technologies for small fixed wing UAVs. *AIAA J. Aerospace Computing, Information, and Communication*, vol. 2, no. 1, pp. 92-108.

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HIGHLY OPTIMIZED FFT TRANSFORMATION FOR ECG SIGNAL DIAGNOSTIC MEASUREMENT

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Abstract: Fourier transform is prominently used as one of the most influential signal processing algorithms, particularly in many biomedical applications. In ECG signal Detection and classification abnormal heartbeats are parameterized which is known as Arrhythmia. In recent years spectral features to be extracted from the ECG to carry out this process of classification and fast Fourier transform (FFT) is widely preferred for this spectrum analysis. But FFT involves computationally intensive tasks which require some optimization models to bring down the level of computational complexity. In this paper, both architecture level and application bound optimizations are proposed to effectively reduce the number of arithmetic operations required to perform the FFT of an electrocardiogram (ECG) signal.

Key Words: ECG, digital signal processing, analyse, Computational power, PR interval, QRS duration, QT interval, RR interval and PP interval.

INTRODUCTION:

Increasingly, as they are applied in real world applications, ECG recognition systems must operate in situations where it is not possible to control the acoustic environment. This may result in a serious mismatch between the training and test conditions, which often causes a dramatic degradation in performance of these systems. The aim of the work presented in this thesis is to make automatic ECG recognition systems robust to these environmental differences. ECG can be characterized by a slowly changing spectral envelope. This spectral envelope is perceived by humans and translated into words and their associated meaning. Automatic ECG recognition attempts to emulate part of this task, that of mapping the spectral envelope into a series of words. There are many problems associated with this process. Not all people speak the same. The spectral envelope will vary due to regional accents and differences in the individual, for example whether male or female and their height.

LITERATURE REVIEW:

FPGAs are best suited to integer arithmetic. Unfortunately, the vast majority of scientific codes rely heavily on 64 bit IEEE floating point arithmetic (often referred to as double precision floating point arithmetic). It is not unreasonable to suggest that in order to get the most out of FPGAs computational scientists must perform a thorough numerical analysis of their code, and ideally reemployment it using fixed point arithmetic or lower precision floating-point arithmetic. Scientists who have been used to continual performance increases provided by each new generation of processor are not easily convinced that the large amount of effort required for such an exercise will be sufficiently rewarded. That said the recent development of efficient floating point cores has gone some way towards encouraging scientists to use FPGAs. If the performance of such cores can be demonstrated by accelerating a number of real-world applications then the wider acceptance of FPGAs will move a step closer. At present there is very little performance data available for 64-bit floating-point intensive algorithms on FPGAs. To give an indication of expected performance we have therefore used data taken from the Xilinx floating-point cores (v3) datasheet.

MATERIALS:

MODE PARAMETERS:

Many people have irregular heartbeats from time to time. Some heart problems occur during certain activities, such as eating, exercise or even sleeping. Sometimes the irregular heartbeats don't influence life style and are usually harmless in normal hearts. But it is also possible that these irregular heartbeats with pre-existing illness can cause heart attacks that lead to death. A device that can record the activities of the heart is very useful in preventing heart attacks.

MULTIPLICATIVE FAST FOURIER TRANSFORM ALGORITHMS:

Let us consider a ring R with primitive n th root of unity ω where $n = pk$. Suppose that we wish to evaluate a polynomial $f \in R[x]$ of degree less than n at n points and the particular set of points used for the multipoint evaluation is not important. In this case, the number of operations needed to compute the multipoint evaluation can be significantly reduced if f is evaluated at each of the powers of ω , i.e. $\{f(1), f(\omega), f(\omega^2), f(\omega^3), \dots, f(\omega^{n-1})\}$. Each of the n points used for this computation is a root of $x^n - 1$. Mathematicians typically call an efficient algorithm for computing this particular multipoint evaluation a Fast Fourier Transform (FFT).

RADIX-2 DIT FFT ALGORITHM:

With the introduction of field programmable gate arrays (FPGAs), it is feasible to provide hardware for application specific computation design. The changes in designs in FPGA's can be accomplished within a few hours, and thus result in significant savings in cost and design cycle. FPGAs offer speed comparable to dedicated and fixed hardware systems for parallel algorithm. The radix-2 decimation in time is applied recursively to the two length $N/2$ DFT's to save computation time. The full radix-2 decimation-in-time of length 8-signals is illustrated in figure-1, using the simplified butterflies. It involves $M = \log_2 N$ stages, each with $N/2$ butterflies per stage. Each butterfly requires 1 complex multiplier [3] and two adder per butterfly. The total cost of the algorithm is thus computational cost of radix-2 DIT FFT

METHOD:

PROPOSED LOW-POWER FFT DESIGN TECHNIQUE:

As shown in Fig. 2, an OFDM transmitter determines the usability of frequency bands through spectrum sensing techniques. If a frequency band is used by the incumbent user, '0' is assigned to the FFT input corresponding to the used frequency band. In this section, based on the fact that there are many '0' input signals to IFFT, a low-power IFFT design method for OFDM is proposed. Notice that the block inside the dotted box shows the conventional FFT with single path delay feedback (SDF) architecture.

RADIX -2^K ALGORITHM

The N -point DFT is formulated as

$$X(k) = \sum_{n=0}^{N-1} x(n)W_N^{nk}, k = 0, 1, \dots, N-1 \quad (1)$$

Where the twiddle factors are defined as $W_N^{nk} = e^{-j\frac{2\pi nk}{N}}$. The n denotes the time index and the k denotes the frequency index. The radix 2^k algorithm can be derived by integrating twiddle factor decomposition through a divide and conquer approach.

RADIX -2² ALGORITHM

Consider the first two steps of decomposition in radix-2 DIF FFT together. Applying a 3-dimensional linear index map as follows where, $T_{N/8}^{k_1 k_2 k_3}(n_5)$ denotes the third butterfly unit.

$$T_{N/8}^{k_1 k_2 k_3}(n_5) = H_{N/4}^{k_1, k_2}(n_5) + (-1)^{k_3} W_8^{(k_1 + 2k_2)} H_{N/4}^{k_1, k_2}(n_5 + \frac{N}{8}) \quad (18)$$

DISCUSSION:

ADDITION, SUBTRACTION AND MULTIPLICATION OPERATIONS:

Multiplication is an important fundamental function in arithmetic operations. Multiplication-based operations such as Multiply and Accumulate (MAC) and inner product are among some of the frequently used Computation-Intensive Arithmetic Functions (CIAF) currently implemented in many Digital Signal Processing (DSP) applications such as convolution, Fast Fourier Transform (FFT), filtering and in microprocessors in its arithmetic and logic unit [1].

PRE-PROCESSING:

To enhance the accuracy and efficiency of the extraction processes, ECG signals are normally pre-processed before features are extracted. ECG signal pre-processing covers digital filtering and ECG signal detection.

PROPOSED ARCHITECTURE:

Traditional hardware implementation of FFT/IFFT processors usually employs a ROM to look up the wanted twiddle factors, and then wordlength complex multipliers to perform FFT computing. However, this introduces more hardware cost, thus a bit-parallel complex constant multiplication scheme [8]-[11], [14]-[18] is used to improve the foregoing issue. Besides, since the twiddle factors have a symmetric property, the complex multiplications used in FFT computation can be one of the following three operation types:

$$\text{Type 1: } W_N^k \cdot (a + jb) = W_N^{k-(N/4)} \cdot (b - ja), \quad N/4 < k < N/2,$$

$$\text{Type 2: } W_N^k \cdot (a + jb) = -W_N^{k-(N/2)} \cdot (a + jb), \quad N/2 < k < 3N/4,$$

$$\text{Type 3: } W_N^k \cdot (a + jb) = -W_N^{k-(3N/4)} \cdot (b - ja), \quad 3N/4 < k < N.$$

ANALYSIS:

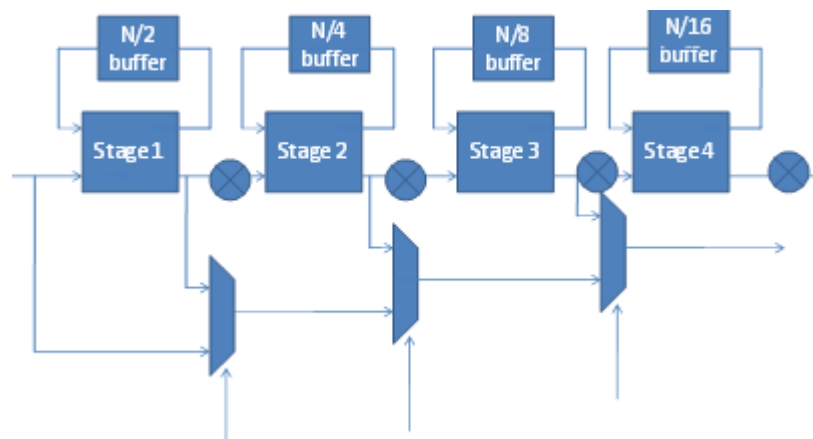


Figure 1. Proposed radix- 2^k reconfigurable pipeline FFT/IFFT processor.

The divided-by-64 module can be substituted with a barrel shifter. In addition, for a complex constant multiplier in Fig. 2, we propose a novel reconfigurable complex constant multiplier to eliminate the twiddle-factor ROM. This new multiplication structure thus becomes the key component in reducing the chip area and power consumption of our proposed FFT/IFFT processor. The detailed functions of these modules appeared in Fig. 2 are described in the following subsections.

FINDINGS:

FPGA PERFORMANCE:

While the headline performance increase offered by FPGAs is often very large (>100 times for some algorithms) it is important to consider a number of factors when assessing their usefulness for accelerating a particular application.

FPGA TO ASIC COMPARISONS:

There have been a small number of past attempts to quantify the gap between FPGAs and ASICs which we will review here. One of the earliest statements quantifying the gap between FPGAs and pre-fabricated media was by Brown. That work reported the logic density gap between FPGAs and Mask-programmable Gate Arrays (MPGAs) to be between 8 to 12 times, and the circuit performance gap to be approximately a factor of 3.

VHDL & VERILOG:

Both VHDL and Verilog are well established hardware description languages. They have the advantage that the user can define high-level algorithms and low-level optimizations (gate-level and switch-level) in the same language.

Altera DE0 Board:

The DE0 board has many features that allow the user to implement a wide range of designed circuits, from simple circuits to various multimedia projects. The following hardware is provided on the DE0 board:

MODEL SIM:

High Performance and Capacity Mixed HDL Simulation – Model Sim Mentor Graphics was the first to combine single kernel simulator (SKS) technology with a unified debug environment for Verilog, VHDL, and SystemC. The combination of industry-leading, native SKS performance with the best integrated debug and analysis environment make ModelSim the simulator of choice for both ASIC and FPGA design. The best standards and platform support in the industry make it easy to adopt in the majority of process and tool flows.

Quartus II Web Edition:

The Web Edition is a free version of Quartus II that can be downloaded or delivered by mail for free. This edition provided compilation and programming for a limited number of Altera devices. The low-cost Cyclone family of FPGAs is fully supported by this edition, as well as the MAX family of CPLDs, meaning small developers and educational institutions have no overheads from the cost of development software.

MATLAB:

MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. MATLAB features a family of application-specific solutions called toolboxes. Very important to most users of MATLAB, toolboxes allow you to learn and apply specialized technology. Toolboxes are comprehensive collections of MATLAB functions (M-files) that extend the MATLAB environment to solve particular classes of problems. Areas in which toolboxes are available include signal processing, control systems, neural networks, fuzzy logic, wavelets, simulation, and many others.

RESULT:

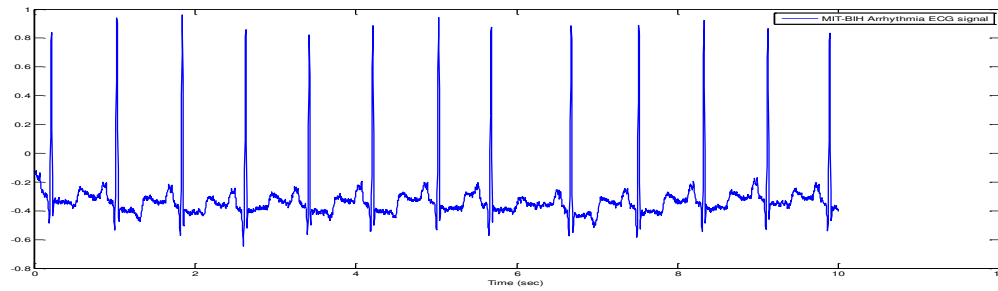


Figure 2 ECG input signal.

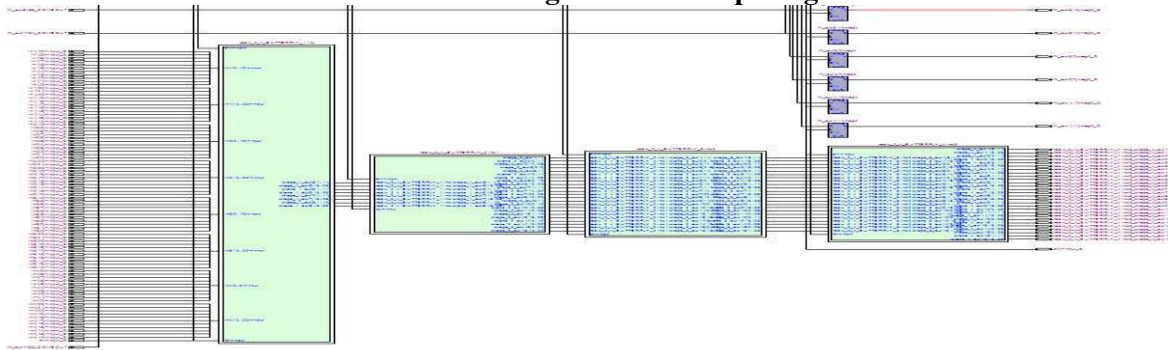


Figure 3. Technology map viewer

CONCLUSION:

Feature extraction is the first crucial component in automatic ECG processing. Generally speaking, successful front-end features should carry enough discriminative information for diagnostic measurements, and it should fit well with the back-end modeling. Here FFT based transformation model is proposed for ECG extraction with respect to the changes of signal conditions. As a part of the project work the LUT based hardware optimization were analyzed for FFT computation. The performances of proposed system were simulated in detail and their performances were evaluated using hardware synthesis.

REFERENCES:

1. Bergland, Glenn D. A Radix-Eight Fast Fourier Transform Subroutine for Real-Valued Series. IEEE Transactions on audio and electroacoustics, 17(2):138-44, 1969.
2. Bernstein, D. Multidigit Multiplication for mathematicians. Preprint. Available at: <<http://cr.yp.to/papers.html#m3>>. Bernstein, D. Fast Multiplication and its applications. Preprint. Available at: <<http://cr.yp.to/papers.html#multapps>>. Bernstein, D. The Tangent FFT. Preprint. Available at: <<http://cr.yp.to/papers.html#tangentfft>>. Bittinger, Marvin L. Intermediate Algebra, 9th Edition, Pearson Education (2003).
3. Bouguezal, Saad, M. Omair Ahmad, and M.N.S. Swamy. An Improved Radix- 16 FFT Algorithm, Canadian Conference on Electrical and Computer Engineering, 2: 1089-92, 2004.
4. Bouguezal, Saad, M. Omair Ahmad, and M.N.S. Swamy. Arithmetic Complexity of the Split-Radix FFT Algorithms, International Conference on Acoustics, Speech, and Signal Processing, 5: 137-40, 2005.
5. Brent, Richard P., Fred G. Gustavson, and David Y. Y. Yun. Fast Solution of To eplitz Systems of Equations and Computation of Pade Approximants. Journal of Algorithms, 1: 259-295, 1980.
6. Brigham, E. Oran. The Fast Fourier Transform and its Applications, Prentice Hall (1988).
7. Buneman, Oscar. Inversion of the Helmholtz (or Laplace-Poisson) Operator for Slab Geometry, Journal of Computational Physics, 12: 124-30, 1973.
8. Burden, Richard L. and J. Douglas Faires. Numerical Analysis, Fifth Edition, PWS Publishing Company (1993).

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Fast Energy Efficient Radix-1 Sequential Multiplier

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Abstract: We propose a new sequential multiplier design that generates the radix-16 partial products (e.g., P) as two high (H) and low (L) components, such that $P = 4H + L$, $H, L \in \{0, 1, 2, 3\} \times X$, where X denotes the multiplicand. The required hard $3X$ multiple is generated in a preliminary cycle to the advantage of reducing the cycle time of the main iteration. Two radix-16 carry-save adders are used to generate the radix-16 accumulated partial product. The synthesis results show improved latency, power dissipation, and energy consumption over the previous relevant designs at the cost of additional silicon area, while however, the energy-area product is also lowered.

Keywords: Radix-16 Sequential Multiplier, Radix-16 carry- save Adder, Power, Latency, Energy.

INTRODUCTION:

A fast and energy efficient multiplier is always needed in electronics industry especially DSP, image processing and arithmetic units in microprocessors. Multiplier is such as important element which contributes substantially to the total power consumption of the system. On VLSI level, the area also becomes quite important as more area means more system cost. Speed is another key parameter while designing a multiplier for a specific application. Now-a-days the power consumption is the major problem for the electronic devices. So, to design the integrated circuit, to perform the low power, less occupation area and high speed simultaneously. Many microprocessors and digital signal processors now have fast multipliers in them. There are several types of multipliers with different speeds, areas, and configurations. For the details of multipliers and multiplication methods.

LITERATURE REVIEW:

Over the past few decades, low power design solution has steadily geared up the list of researcher's design concerns for low power and low noise digital circuits to introduce new methods to the design of low power VLSI circuits. Moore's law describes the requirement of the transistors for VLSI design. Transistor count is a primary concern which largely affects the design complexity of many function units such as multiplier and arithmetic logic unit (ALU). The multipliers play a significant role in arithmetic operations in DSP applications. Recent developments in processor designs also focus on low power multiplier architecture usage in their circuits. Two significant yet often conflicting design criteria are power consumption and speed. Conventional schemes for fast multiplication accumulate the partial products in redundant form (carry-save or signed-digit) and convert the result to conventional representation in the last step. This step requires a carry-propagate adder which is comparatively slow and occupies a significant area of the chip in a VLSI implementation. A report is presented on a multiplication scheme (left-to-right, carry-free, LRCF) that does not require this carry-propagate step. The LRCF scheme performs the multiplication most-significant bit first and produces a conventional sign-and-magnitude product (most significant n bits) by means of an on-the-fly conversion. The resulting implementation is fast and regular and is very well suited for VLSI. The LRCF scheme for general radix r and a radix-4 signed- digit implementation are presented Fast Multiplication Without Carry-Propagate Addition

MATERIALS:

The internal structure of the proposed radix-16 sequential multiplier is depicted, both in block diagram and dot notation representations, where each black circle represents a weighted bit, and component names (i.e., S , C , W , T , H , and L) establish the correspondence. The preprocessing cycle, produces the $3X$ multiple via n -bit adder (not shown in the b part). The main iterative body is composed of two 4:1 multiplexers, whose inputs come from X , and $3X$ registers with the appropriate wiring shifts. Each partial product is produced as $P = 4H + L$, where $H, L \in \{0, 1, 2, 3\} \times X$. The bits of a multiplier digit such as $[3: 0]$ are routed to the selector entries of the multiplexers. The two most

significant bits [3: 2] select one of the multiples of the left one (i.e., the H component), and [1: 0] is similarly used for the right multiplexer that selects the L component.

METHOD:

EXISTING

ARRAY MULTIPLIERS:

Array multiplier is well known due to its regular structure. Multiplier circuit is based on add and shift algorithm. Each partial product is generated by the multiplication of the multiplicand with one multiplier bit. The partial product are shifted according to their bit orders and then added. The addition can be performed with normal carry propagate adder. $N-1$ adders are required where N is the multiplier length.

WALLACE TREE MULTIPLIER:

A multiplier plays a vital role in any digital signal processors. There are different methods and architectures for designing a multiplier. Designing a multiplier by using wallace tree architecture is superior over other architectures in terms of performance characteristics. A multiplier designed by using wallace tree architecture is known as a wallace multiplier.

DADDA MULTIPLIER:

The Dadda multiplier is a hardware multiplier design invented by computer scientist Luigi Dadda in 1965. It is similar to the Wallace multiplier, but it is slightly faster (for all operand sizes) and requires fewer gates (for all but the smallest operand sizes). In fact, Dadda and Wallace multipliers have the same 3 steps for two bit strings w_1 and w_2 of lengths L_1 and L_2 respectively:

PROPOSED:

The internal structure of the proposed radix-16 sequential multiplier is depicted in Fig. 2, both in block diagram (a) and dot notation (b) representations, where each black circle represents a weighted bit [1], and component names (i.e., S, C, W, T, H , and L) establish the correspondence. The preprocessing cycle, produces the $3X$ multiple via an n -bit adder (not shown in the b part). The main iterative body is composed of two 4:1 multiplexers, whose inputs come from X , and $3X$ registers with the appropriate wiring shifts (neither shown in part b). Each partial product is produced as $P = 4H + L$, where $H, L \in \{0, 1, 2, 3\} \times X$. The bits of a multiplier digit such as [3: 0] are routed to the selector entries of the multiplexers. The two most significant bits [3: 2] select one of the multiples of the left one (i.e., the H component), and $Y[1: 0]$ is similarly used for the right multiplexer that selects the L component.

DISCUSSION:

There are many cases where it is desired to add more than two numbers together. The straightforward way of adding together m numbers (all n bits wide) is to add the first two, then add that sum to the next, and so on. This requires a total of $m - 1$ additions, for a total gate delay of $O(m \lg n)$ (assuming lookahead carry adders). Instead, a tree of adders can be formed, taking only $O(\lg m \cdot \lg n)$ gate delays. To add three numbers by hand, we typically align the three operands, and then proceed column by column in the same fashion that we perform addition with two numbers. The three digits in a row are added, and any overflow goes into the next column. Observe that when there is some non-zero carry, we are really adding four digits (the digits of x, y and z , plus the carry). This is illustrated There are $m-2$ CSA blocks (each block in the figure actually represents many one-bit CSA blocks in parallel) that we have to go through, and then the final LCA. Note that every time we pass through a CSA block, our number increases in size by one bit. Therefore, the numbers that go to the LCA will be at most $n + m - 2$ bits long.

ANALYSIS:

Note that the CSA block in bit position zero generates c_1 , not c_0 . Similar to the least significant column when adding numbers by hand (the “blank”), c_0 is equal to zero. Note that all of the CSA blocks are independent, thus the entire circuit takes only $O(1)$ time. To get the final sum, we still need a LCA, which will cost us $O(\lg(n))$ delay.

FINDINGS:

The asymptotic gate delay to add three n -bit numbers is thus the same as adding only two n -bit numbers. So how long does it take us to add m different n -bit numbers together? The simple approach is just to repeat this trick approximately m times over.

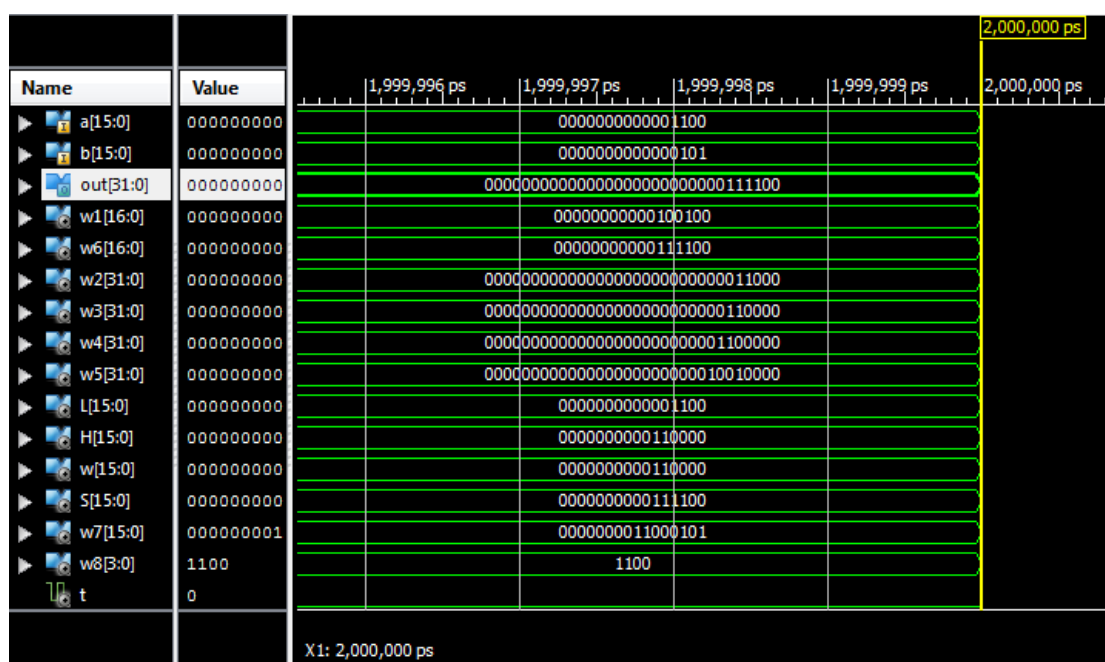


Figure 1. shows the Simulation Result

AREA REPORT

In a sequential multiplier, the multiplication process is divided into some sequential steps. In each step some partial products will be generated, added to an accumulated partial sum and partial sum will be shifted to align the accumulated sum with partial product of next steps. Sequential multipliers can take a number of clock cycles to produce a result.

Device Utilization Summary (estimated values)			
Logic Utilization	Used	Available	Utilization
Number of Slice LUTs	78	204000	0%
Number of fully used LUT-FF pairs	0	78	0%
Number of bonded IOBs	52	600	8%

DELAY REPORT

The only difference of this sequential multiplier from the manual multiplication is the repeated addition of each multiplicand-multiple, instead of one-time addition of all multiplicand-multiples at the end. The longstanding practice of utilizing redundant-digit representation of APP contributes to additional speed for partial product reduction (PPR). It also reduces the power dissipations via avoiding ripple-carry addition. Carry-save and signed-digit number systems are commonly used for this purpose. Also the corresponding high-radix alternatives the available cycle time.

```

Delay:          7.215ns (Levels of Logic = 15)
Source:         a<2> (PAD)
Destination:    out<12> (PAD)

Data Path: a<2> to out<12>
    
```

RESULT:

Therefore the total gate delay is $O(M + \lg(n+m))$. Instead of arranging the CSA blocks in a chain, a tree formation can actually be used. This is slightly awkward because of the odd ratio of 3 to 2.

CONCLUSION:

The 3X multiple is recognized as a hard multiple and thus undesirable in the practice of multiplier design, since it takes up one whole cycle to generate. The modified Booth multipliers remove such multiples for radix-4 multipliers. On the other hand, to reduce the total number of cycles, higher radix multiplication schemes are common, where higher radix Booth encoding cannot avoid the 3X multiples. However, we showed that allocation of a preliminary cycle for generation of 3X multiple can be advantageous.

REFERENCES:

1. BehoorzParhami, Computer Arithmetic: Algorithms and Hardware Design, Oxford University, USA 1999.
2. C.S.Wallace, "A Suggestionfor a Fast Multiplier ," IEEE Transactions on Electronic computers, vol.EC-13,no.1,pp.14-17, 1964.
3. Cortus.Com , "Cortus Processors", 2016 . [Online].Available : <http://www.cortus.com/index.php>.
4. D.Baran ,M.Aktan and V.G. Oklobdzijia, "Multiplier Structure for Low PoweAppllication in Deep-CMOS," IEEE International symposium on Circuits and System (ISCAS), 2011,PP. 1061-1064.
5. M.D. Ercegovacand T.Lang, Digital Arithmetic ,Morgan Kaufman, 2004.
6. Mi Lu, Arithmatic and Logic in Computer Systems, Wiley , 2004.

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FAULT DETECTION IN TRANSFORMER USING GSM AND RFID TECHNOLOGY

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Abstract: A smart GSM and IoT based fault detection and location system was used to indicate and locate the exact spot where fault had occurred. It will provide a shorter response time for technical crew to rectify these faults and thus help to save transformers from damage and crash. These systems use a current transformer, a voltage transformer, PIC 16F877A Microcontroller, ESP8266 module, and a GSM modem. This system automatically finds faults, analyses and classifies these faults and then, calculates the fault distance from the control room using impedance-based algorithm method. Definitely the fault information is transmitted to the control room. In conclusion, the time required to locate a fault is desperately reduced, as the system automatically and exactly provides accurate fault location information.

Key Words: Internet Of Things, Real Time Operating System, Global Standards Initiative, Liquid Crystal Display, Advanced Mobile Phone System

INTRODUCTION:

As its name suggests, Embedded means something that is attached to another thing. An embedded system can be an independent system or it can be a part of a large system. An embedded system is a micro-controller or microprocessor based system which is designed to perform a specific task. For example, a fire alarm is an embedded smoke. An embedded system has three components: It has hardware. It has application software. It has Real Time Operating system (RTOS) that supervises the application software and provide mechanism to let the processor run a process as per scheduling by following a plan to control the latencies. RTOS defines the way the system works. It sets the rules during the execution of application program. A small scale embedded system may not have RTOS. So we can define an embedded system as a Micro-controller based, software driven and reliable, real-time control system.

LITERATURE REVIEW:

Abnormal detection is an essential task to the security and stability of power grid networking operation. Besides the status of power grid itself, the environment information is also necessary to the abnormal detection, such as temperature, humidity, dust and etc. Therefore, we apply the Internet of Things (IOT) technology to monitor the real time status of power grid and its related environment. The experiment results indicate that the proposed method can integrate the data from multiple resources and perform an accuracy analysis of the abnormality of the given IOT data. The overall accuracy improves from 64% with tradition threshold based method to 92% according to the test data set. In the storage rooms of industries we need a good environment for the products to be healthy for use. Here we develop a monitoring system with the help of IoT. The Internet of Things entrance is used as a part of this system. In this strategy we use several access methods such as Wi-Fi, GPRS, Ethernet etc. and also the data collected can be stored. In this IOT gateway we use ATmega 328 as the Microcontroller unit and µC/OS-III as the implanted OS. The application authenticates that the entrance is reliable. In this paper we try to develop an arrangement encompassing Arduino wireless sensor networks and cloud and then extend our work to develop a method for the transmission of data between them which can be of great use in monitoring the temperature and humidity.

MATERIALS:

ARDUINO The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P micro-controller and developed by Arduino.cc. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O

pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.

LED: There is a built-in LED driven by digital pin 13. When the pin is high value, the LED is on, when the pin is low, it is off.

VIN: The input voltage to the Arduino/Genuino board when it is using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.

IOREF: This pin on the Arduino/Genuino board provides the voltage reference with which the microcontroller operates.

ESP8266 ESP8266 is Wi-Fi enabled system on chip (SoC) module developed by Espressif system. It is mostly used for development of IoT (Internet of Things) embedded applications.

TEMPERATURE SENSOR Temperature is the most-measured process variable in industrial automation. Most commonly, a temperature sensor is used to convert temperature value to an electrical value. Temperature Sensors are the key to read temperatures correctly and to control temperature in industrial applications.

LIQUID SENSOR Integral to process control in many industries, liquid level sensors fall into two main types. Point level measurement sensors are used to mark a single discrete liquid height—a preset level condition.

VOLTAGE SENSOR General description The Voltage Sensor block represents an ideal voltage sensor, that is, a device that converts voltage measured between two points of an electrical circuit into a physical signal proportional to the voltage. Connections + and – are electrical conserving ports through which the sensor is connected to the circuit.

METHOD:

PROPOSED SYSTEM:

Sensor based intelligent fault detection system is mainly conceptualized in such a way that the time required to identify the fault is reduced. The proposed system is intended to automatically detect faults when they occur, analyze the fault to determine the type and then send information based on the fault type and fault location to the control room via GSM. Sensor based intelligent fault detection system is mainly conceptualized in such a way that the time required to identify the fault is reduced. By programming, the micro-controller is made to perform these functions.

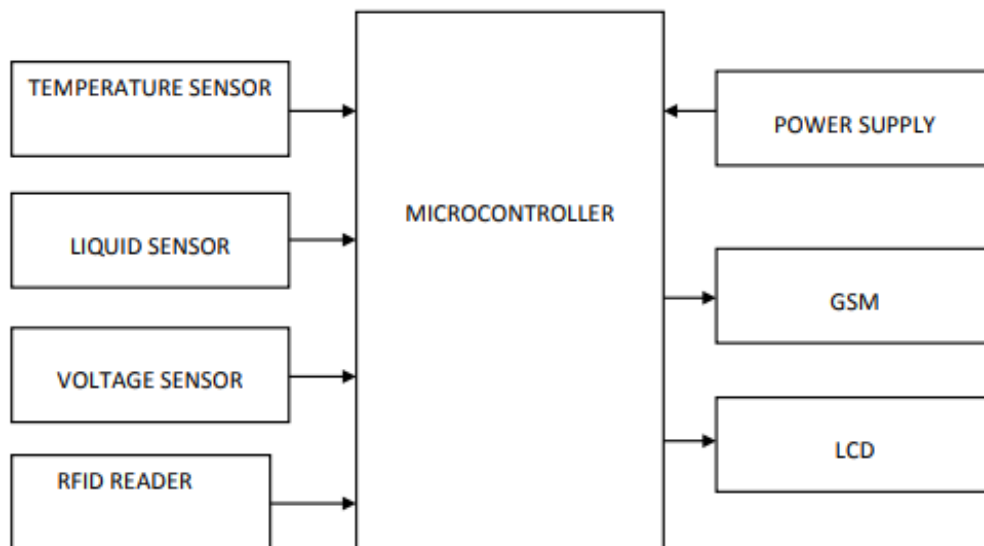


Figure 1. Shows the block diagram of the proposed system

EXISTING SYSTEM:

EMBEDDED SYSTEM In this existing system the worker has to find the fault manually, they made use of a water flow sensor to calculate the amount of water dispatched in the field. The paper talked about the webpage style storing of the data which can be reviewed when required. Along with this, the paper discusses the Raspberry Pi2 and Arduino integration so that communication can be made easy. Arduino communicates with the sensors and get the data. Zigbee module is used to send data to Raspberry Pi from Arduino for further processing.

DISCUSSION:

The project houses a GSM modem and a smart electronic monitoring device attached to the transformer. Many parameters of the transformer such as temperature, Oil level, voltage output are monitored continuously by the

electronic device. If there is fault in any of the parameters the system acts immediately and forms a message that is automatically transmitted via a GSM modem to the authorized persons (ex.: Line man, EB office, Power house etc.). It can be made to send to more than one person if necessary. The modem communicates with the embedded system in a unique way. The embedded system consists of an advanced microcontroller that can communicate with the GSM modem. This immediate transfer of information will result in faster response time by the authorities and the power shut off time will also be reduced drastically. In our system a soil moisture sensor would provide measurement of the presence of the water level in soil. The temperature and the humidity sensor are used to measure the temperature and the humidity of the agricultural field respectively. If the moisture level of the soil is less than that of the threshold value, then the micro-controller will turn on the pump motor. The micro-controller will send the soil moisture level, temperature and the humidity value to the concerned person of the field as an SMS using GSM technology. The sensor data are continuously updated to the cloud through ESP8266 wifi module using IOT technology for future references.

ANALYSIS:

LCD: (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. LEDs have a large and varying set of use cases for consumers and businesses, as they can be commonly found in smart phones, televisions, computer monitors and instrument panels. A display is made up of millions of pixels. The quality of a display commonly refers to the number of pixels; for example, a 4K display is made up of 3840 x 2160 or 4096x2160 pixels. A pixel is made up of three sub pixels; a red, blue and green—commonly called RGB. When the sub pixels in a pixel change color combinations, a different color can be produced. With all the pixels on a display working together, the display can make millions of different colors. When the pixels are rapidly switched on and off, a picture is created.

GSM MODEM: A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.

The Base Station System (BSS): All radio-related functions are performed in the BSS, which consists of base station controllers (BSCs) and the base transceiver stations (BTSs).

The Operation and Support System: The operations and maintenance center (OMC) is connected to all equipment in the switching system and to the BSC. The implementation of OMC is called the operation and support system (OSS). The OSS is the functional entity from which the network operator monitors and controls the system.

FINDINGS:

GSM NETWORK AREAS:

The GSM network is made up of geographic areas. As shown, these areas include cells, location areas (LAs), MSC/VLR service areas, and public land mobile network (PLMN) areas.

NETWORK AREAS:

The cell is the area given radio coverage by one base transceiver station. The GSM network identifies each cell via the cell global identity (CGI) number assigned to each cell. The location area is a group of cells.

LOCATION AREAS:

An MSC/VLR service area represents the part of the GSM network that is covered by one MSC and which is reachable, as it is registered in the VLR of the MSC.

RFID READER AND TAG:

An RFID reader is a device that is used to interrogate an RFID tag. The reader has an antenna that emits radio waves; the tag responds by sending back its data. An RFID tag is a microchip combined with an antenna in a compact package; the packaging is structured to allow the RFID tag to be attached to an object to be tracked. "RFID" stands for Radio Frequency Identification. The tag's antenna picks up signals from an RFID reader or scanner and then returns the signal, usually with some additional data (like a unique serial number or other customized information). A passive tag is an RFID tag that does not contain a battery; the power is supplied by the reader. When radio waves from the reader are encountered by a passive RFID tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it, energizing the circuits in the tag. The tag then sends the information encoded in the tag's memory.

EMBEDDED SYSTEM SOFTWARE:

A typical industrial micro-controller is quite unsophisticated compared to a typical enterprise desktop computer and generally depends on a simpler, less-memory-intensive program environment. The simplest devices run on bare metal and are programmed directly using the chip CPU's machine code language. Often, however, embedded systems use operating systems or language platforms tailored to embedded use, particularly where real-time operating environments must be served.

MCU:

ESP8266EX is embedded with Ten silica L106 32-bit micro controller (MCU), which features extra low power consumption and 16-bit RSIC. The CPU clock speed is 80MHz. It can also reach a maximum value of

160MHz. ESP8266EX is often integrated with external sensors and other specific devices through its GPIOs; codes for such applications are provided in examples in the SDK.

RESULT:

As the telecommunication sector is becoming more extensive and efficient, broadband internet is widely available. With technological advancement it is now much cheaper to produce necessary sensors with built-in wifi capabilities making connecting devices less costly.

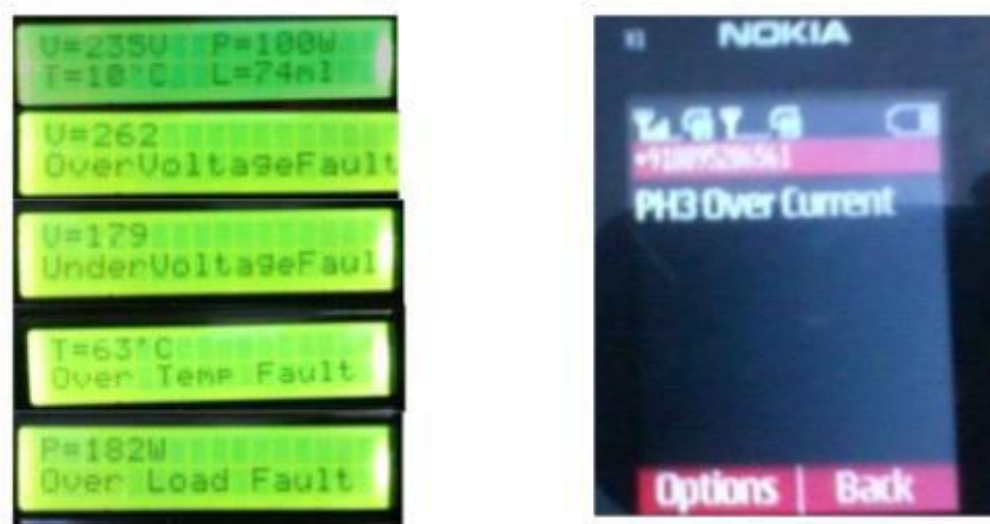


Figure 2. Shows the output screen of the application

CONCLUSION:

In Results the proposed system will provide a reduction in the time required in the time required to locate a fault by automatically providing accurate fault location information especially in the transformer how to detect and prevent, which passes through center from Spiro center. This is the technique of increasing the life of a transformer of a decreased cost of power system operation. When using the downloading tools, please remember to select the right crystal oscillator type. In circuit design, capacitors C1 and C2, which are connected to the earth, are added to the input and output terminals of the crystal oscillator respectively. The values of the two capacitors can be flexible, ranging from 6pF to 22 pF; however, the specific capacitive values of C1 and C2 depend on further testing and adjustment on the overall performance of the whole circuit. Normally, the capacitive values of C1 and C2 are within 10pF if the crystal oscillator frequency is 26MHz, while the values of C1 and C2 are $10\text{pF} < C1, C2 < 22\text{pF}$ if the crystal oscillator frequency is 40MHz.

REFERENCES:

1. A. Abdulla, "A Wavelet Entropy Approach For Detecting Lightning Faults On Transmission Lines" In Proc.2016 IEEE Power Eng.Soc.Transm.Distrib.Conf.Expo., May 2016 ,pp.1-5.
2. Anandakumar and K. Umamaheswari, "Supervised machine learning techniques in cognitive radio networks during cooperative spectrum handovers," Cluster Computing, vol. 20, no. 2, pp. 1505–1515, Mar. 2017.
3. M. Kezunovic , "Smart Fault Location For Smart Grids", IEEE Trans.Smart Grid, Vol.2, No.1, pp.11-22,mar.2011.
4. N. Perera And A. Rajapakse, "Recognition Of Fault Transients Using A Probabilistic Neural-network Classifier" IEEE Trans.Power Del., Vol.26,no 1, pp410-419, Jan.2011
5. Pmu Based Fault Location ForDoubler Circuit Transmission Lines In Modal Domain by snehalv,unde and sanjay s, damhare 2016.
6. N. Perera And A. Rajapakse, "Recognition Of Fault Transients Using A Probabilistic Neural-network Classifier" IEEE Trans.Power Del., Vol.26,no 1, pp410-419, Jan.2011

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FIRE DETECTION AND NOTIFICATION SYSTEM

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Abstract: Recently, most consumer grade fire detection systems relied solely on smoke detectors. The protection provided by these have been established to be limited by the type of fire present and the detection technology at use. The problem is further compounded by the lack of adequate alert and notification mechanisms. A project relies on the physical presence of a human being to act on the alert. In developing countries, poor planning and addressing negatively affects the fire and rescue crew's response time. To address this problem, a fuzzy logic system was implemented using an Arduino development board with inputs from an smoke sensor, a temperature sensor and a flame sensor.

Key Words: Analog To Digital Converter, Double Tone Multi-Frequency Function, Electromechanical & Volume, Engine Control Module, Embedded Fuzzy Logic Library

INTRODUCTION:

Forest fires often start unnoticed and spread very quickly, causing millions of dollars in damage and claiming many human lives every year in the many countries. Early detection of hot spots and the initiation of appropriate measures can prevent, or, at least minimize damage and casualties. Common causes of forest fires are lightning, extreme hot and arid weather, severe drought, and human unawareness. Current satellite-imagery-based forest fire detection systems cannot detect forest fires with high precision and accuracy. A Wireless sensor network-based forest fire detection system has the potential to achieve the high detection resolution and accuracy that is required for early detection of forest fires. The microcontrollers which have communication and data transfer capabilities through methods such as GSM and Bluetooth together with other devices such as sensors have made system a reality today. These capabilities can be extended to solving other problem areas in the world today one being that of accidental residential fire outbreaks.

LITERATURE REVIEW:

This paper presents the development of a wireless sensor network system for early forest detection. The proposed application is based on the Low-Rate Wireless Personal Area Network communications standard IEEE 802.15.4. The core hardware and software components of the developed node prototype network for this domain are described: sensor node hardware, microcontroller programming methodologies and networking. Within the implementation strategies, special attention has been paid to reach an appropriate energy handling, essential to achieve long battery life. As the human technology moved further, the risk of natural and man induced catastrophes increase exponentially. One of the most dangerous disasters is fires. In addition to its direct danger on human's lives, fire consumes forests where trees that provide humans with oxygen are destroyed. The risk of fire has increased due to the problem of global warming which appeared in the 1980s. Forest fires represent a constant threat to ecological systems, infrastructure and environmental aspects of a community. This gives rise to the urgent need to detect forest fires as fast as possible. This paper highlights the powerful feature of wireless sensor networks as a potential solution to the challenge of early detection of forest fires. The device presented makes use of various sensors attached, solar recharging mechanism, and wireless data transmission, to fulfill the task in question. This website is accessible by the specific authorities in order to take early actions in case of any alert. It is worth mentioning that this system is efficient and green; thus, enforcing the need for its creation.

MATERIALS:

System Requirements, Analysis and Specifications:

The Fire Notification System is a GSM based application used for remote monitoring and management of the fire detection devices. To increase the response time of the fire and rescue crew and house owners, real-time delivery

of fire alerts was done using SMS. To eliminate the navigational problems experienced by the fire and rescue crew in reaching fire scenes, the *fire* module offers a map assisted navigation interface to aid the fire and rescue crew.

Design Considerations and Selection:

An Arduino development board was used for the device because of its relative ease of programming and its suitability for rapid prototyping. The detection software for the device was programmed using Arduino. To ensure modularity, the system was divided into a detection module (fuzzy logic algorithm) and a communication module which interacts with the GSM module onboard. The detection module only interacts with the GSM module when an alert event is detected.

ARDUINO:

The Arduino microcontroller is an easy to use yet powerful single board computer that has gained considerable traction in the hobby and professional market. The Arduino is open-source, which means hardware is reasonably priced and development software is free. This guide is for students in ME 2011, or students anywhere who are confronting the Arduino for the first time.

METHOD:

EXISTING SYSTEM:

FUZZY SYSTEM: The reliability of a fire detection system greatly depends on the sensors used and their ability to register accurately the fire signatures being monitored. The decision to use more than one sensor is informed by the numerous benefits presented by multi-sensor fire detection systems over the traditional single signature based system.

GAS DETECTORS: Gas detectors measure and indicate the concentration of certain gases in an air via different technologies. Typically employed to prevent toxic exposure and fire, gas detectors are often battery operated devices used for safety purposes. They are manufactured as portable or stationary (fixed) units and work by signifying high levels of gases through a series of audible or visible indicators, such as alarms, lights or a combination of signals. While many of the older, standard gas detector units were originally fabricated to detect one gas, modern multifunctional or multi-gas devices are capable of detecting several gases at once. Some detectors may be utilized as individual units to monitor small workspace areas, or units can be combined or linked together to create a protection system.

ARCHITECTURE OF MULTI SENSOR: Based on the output of the system, a fire event is either dispatched to the web-based notification system and house owner(s) or no action is taken. To establish a communication channel between the fire detection system and the web-based notification system an SMS over GSM network was used. In most developing countries, the data network coverage provided by most mobile network operators is limited to urban areas. This makes SMS a better choice. Figure. 3.7 shows an overview system indicating the flow of information

DISCUSSION:

The measurement of temperature is one of the fundamental requirements for environmental control, as well as certain chemical, electrical and mechanical controls. Many different types of temperature sensors are commercially available, and the type of temperature sensor that will be used in any particular application will depend on several factors. For example, cost, space constraints, durability, and accuracy of the temperature sensor are all considerations that typically need to be taken into account. Various types of temperature sensors are known including liquid-in-glass (LIG) thermometers, bimetallic thermometers, resistance thermometers, thermocouples, and radiometers. Depending upon the temperature to be measured, the required accuracy of the measurement, and other factors such as durability or cost, one type of temperature sensor may be preferable over another. Some temperature sensors provide a wide range of temperature measurement, whereas other temperature sensors may only provide temperature information for a small temperature range. In addition to the temperature range sensed, the sensitivity and the accuracy of temperature sensors may also vary widely. Additionally, some temperature sensors work at high voltages while others only work at low voltages.

There're many types of devices that can be employed as temperature sensors. They include integrated circuits (ICs), pyrometers, resistance temperature detectors (RTDs), thermistors, thermocouples, electromechanical & volume (EMV). LM35 is a precision IC temperature sensor with its output proportional to the temperature (in °C). The sensor circuitry is sealed and therefore it is not subjected to oxidation and other processes. With LM35, temperature can be measured more accurately than with a thermistor. It also possess low self-heating and does not cause more than 0.1 °C temperature rise in still air. The operating temperature range is from -55°C to 150°C. The output voltage varies by 10mV in response to every °C rise/fall in ambient temperature, *i.e.*, its scale factor is 0.01V/°C.

ANALYSIS:

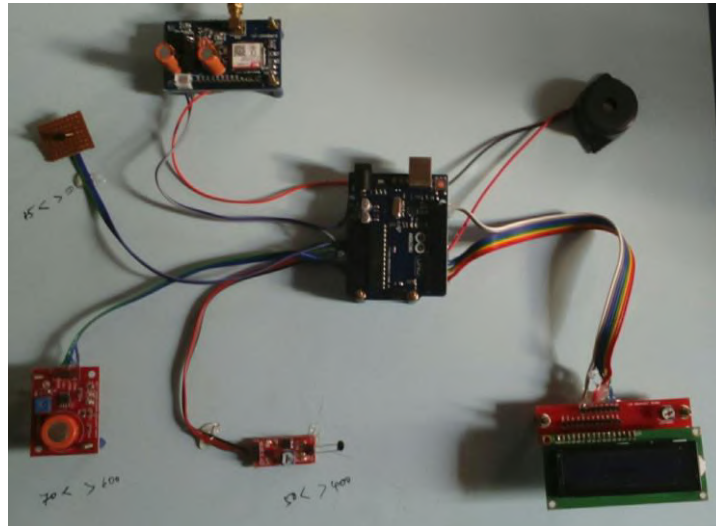


Figure.1 Fire Detection Device incorporating all developed subsystems

The steps involved in testing the various subsystems and their components are outlined below. The GSM network was used to facilitate relaying of alerts in real time. When a fire occurs, an alert is sent from the device to the fire notification system which is designed to be accessible at the fire station. The system is made up of following components: Dashboard Fire device management interface, Alerts Summary .The dashboard component receives fire alerts in real-time and shows the location of the fire using identity number. It also allows for audible alerts for an incoming alert. The fire device management interface allows the system to login to the fire notification system and manage the fire information devices. With the correct privileges, a user can log in to the system and add, delete and update fire detection device information to the fire and rescue team.

FINDINGS:

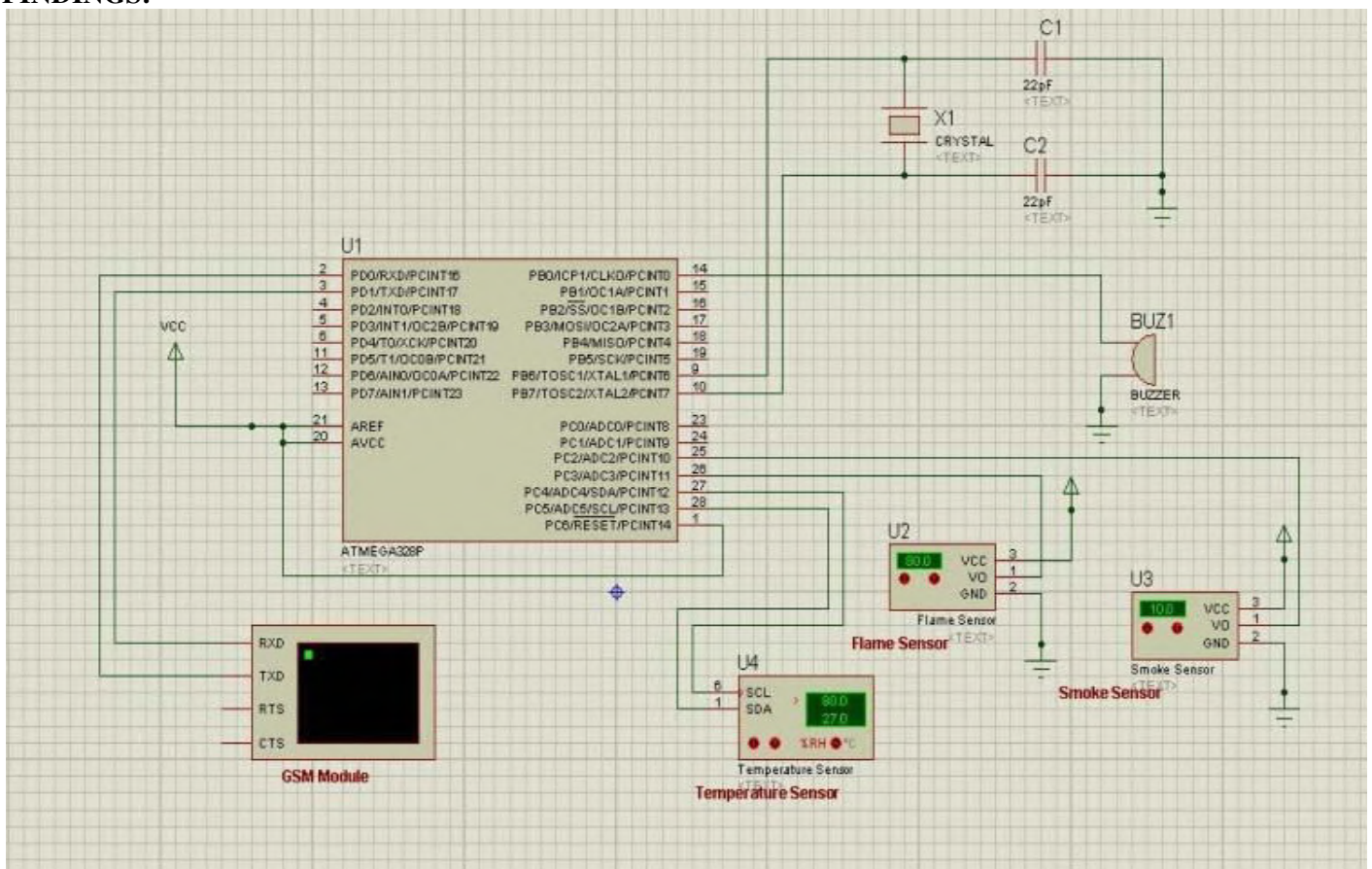


Figure 2. Fire detection subsystem schematic diagram

RESULT:

The sensor units tests conducted were intended to ensure the accuracy of each sensor. From the result obtained from the temperature sensor, an error margin of $+5^{\circ}\text{C}$ for each reading was observed. It was observed that in a fully air conditioned room at 16°C , the sensor output was at about 23°C . On the other hand, in fairly ventilated room with ceiling fan the sensor recorded about 33°C . With this problem being confirmed by other users of the same model, temperature readings were compensated to account for this error margin.



Figure 3. : Fire alert SMS on users mobile phone

CONCLUSION:

With three output states of the fuzzy logic algorithm, fire alerts only get activated when either the potential fire state or fire state pertinence is high. Unlike a single signature based detection system which operates by comparing the sensor output to a set threshold, our multi-sensor approach makes a decision based on weight of each input. This implies that the system is able to operate without necessarily relying on all signatures. This implies the system is able to detect a flaming fire which produces flame and heat with little or no smoke. This property of the system allows for potential fire warning to be issued. Sample simulation results from the fuzzy logic algorithm are shown in Table 4.. Due to the analog nature of both the smoke and flame sensors, the ADC outputs are used. For the smoke and flame sensors, the higher the sensor output, the higher the smoke density/flame intensity and vice versa. The temperature values are given in degree. Test with a burning candle showed that when the candle which primarily produces flame was drawn closer to the system, the potential fire alerts get activated. This means that the system which is supposed to be ceiling mounted will not trigger false alerts to burning candles under normal use but nonetheless remains sensitive. On the other hand, adding smoke and increasing the ambient temperature using a hair dryer result in a fire alert being triggered. From these tests, it was observed that the algorithm detects real fires most of the time.

REFERENCES:

1. Bodrozic, L., Stipanicev, D., and Stula, M., "Agent based data collecting in a forest fire monitoring system", International Conference on Software in Telecommunications and Computer Networks, 2006, IEEE CONFERENCE PUBLICATIONS, pp. 326-330, 2006.
2. Cappellini, V., Mattii, L., and Mecocci, A., "An intelligent system for automatic fire detection in forests", Image Processing and its Applications, IET CONFERENCE PUBLICATIONS, pp. 563–570, 1989.
3. "Detection of Forest Fires", IEEE International Conference on Mobile Adhoc and Sensor Systems, 2007, IEEE CONFERENCE PUBLICATIONS, pp. 1-6, 2007
4. Hefeeda, M., and Bagheri, M., "Wireless Sensor Networks for Early (ICCIT 2010), IEEE CONFERENCE PUBLICATIONS pp. 193-197, 2010
5. Junguo, Z., Wenbin, L., Zhongxing, Y., Shengbo, L., and Xiaolin, G., "Forest fire detection system based on wireless sensor network", 5th International Conference on Wireless Communications, Networking and Mobile Computing, 2009, IEEE CONFERENCE PUBLICATIONS Industrial Electronics and Applications, pp. 520-523, 2009
6. Mal-Sarkar, S., Sikder, I.U., and Konangi, V.K., "Application of wireless sensor networks in forest fire detection under uncertainty", Proceedings of 13th International Conference on Computer and Information Technology

SMART WATER MANAGEMENT IN AGRICULTURAL LAND USING IOT AND RAIN DETECTION

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Abstract: A “Smart Water Management in Agricultural Land Using IOT And Rain Detection” makes a major development in the agricultural domain. An issue concerned with agriculture hinders a country’s development. Modernizing the current traditional methods will provide a solution to the existing problems. Hence an ARDUINO based smart agriculture aims at improvising the production with the art of making use of automation and Internet of Things. This enables monitoring, selection and irrigation decision support. A crop development for managing water to the field in an efficient manner and less complexity in the circuit. Implementation of Precised Agriculture will optimize the field’s water usage and special features that focuses on the security mechanisms of the field using cloud computing technologies. The optimal temperature range is also concentrated for the better yield.

Key Words: Single-functioned, Tightly constrained, Reactive and Real time, Microprocessors based, Memory, Connected.

INTRODUCTION:

As its name suggests, Embedded means something that is attached to another thing. An embedded system can be thought of as a computer hardware system having software embedded in it. An embedded system can be an independent system or it can be a part of a large system. An embedded system is a microcontroller or microprocessor based system which is designed to perform a specific task. For example, a fire alarm is an embedded smoke.

An embedded system has three components: It has hardware. It has application software. It has Real Time Operating system (RTOS) that supervises the application software and provide mechanism to let the processor run a process as per scheduling by following a plan to control the latencies. RTOS defines the way the system works. It sets the rules during the execution of application program. A small scale embedded system may not have RTOS. So we can define an embedded system as a Microcontroller based, software driven and reliable, real-time control system.

LITERATURE REVIEW:

To overcome this challenge, this paper proposes an automated control system of a farm using a cloud based IOT solution to monitor and control multiple areas of the farm which play crucial role in the entire farming process. The system uses a network of several Node MCUs (ESP8266) micro-controllers to monitor and control multiple systems over the cloud. The Node MCUs constantly monitor the respective states of various elements of the farm and report the data to the central control unit. The user can then take appropriate actions from analyzing this data, i.e. assign their desired tasks to each of the microcontrollers separately.

The water level sensor is deployed in the overhead tank and connected to the Arduino Board. The sensor provides the Arduino with the information about the level of water in the tank. The Arduino updates the database in the server with the level of water in the tank through HTTP requests by implementing GET and POST APIs. This information stored in the server is displayed in the mobile interface on the mobile phone. If the water level falls below 15%, the server sends a notification to the interface, instructing the user to turn on the motor. The user does so by clicking the “ON” button present in the interface to turn on the motor. After which the water is filled in the tank. When the level of water crosses 85%, the server immediately sends another notification to the interface instructing the user to turn off the motor. The user does so by clicking the “OFF” button present in the interface to turn off the motor.

MATERIALS:

Internet of Things (IOT) is an environment in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. Data may be updated to a specific site or a social network by which the user can able to access the data.

Internal SRAM and ROM ESP8266EX Wifi SoC is embedded with memory controller, including SRAM and ROM. MCU can visit the memory units through iBus, dBus, and AHB interfaces. All memory units can be visited upon request, while a memory arbiter will decide the running sequence according to the time when these requests are received by the processor.

External SPI Flash This module is mounted with an 4 MB external SPI flash to store user programs. If larger definable storage space is required, a SPI flash with larger memory size is preferred. Theoretically speaking, up to 16 MB memory capacity can be supported.

Crystal

Currently, the frequency of crystal oscillators supported includes 40MHz, 26MHz and 24MHz. The accuracy of crystal oscillators applied should be $\pm 10\text{PPM}$, and the operating temperature range should be between -20°C and 85°C .

METHOD:

EXISTING SYSTEM

EMBEDDED SYSTEM In this system, they made use of a water flow sensor to calculate the amount of water dispatched in the field. The paper talked about the webpage style storing of the data which can be reviewed when required. Along with this, the paper discusses the Raspberry Pi2 and Arduino integration so that communication can be made easy. Arduino communicates with the sensors and get the data. Zigbee module is used to send data to Raspberry Pi from Arduino for further processing.

Agriculture which is considered as one of the prime occupation of human being has 64% of the total available land occupied by agriculture out of which it consumes 85% of available fresh water. The problems faced by the traditional instrumentation based on discrete and wired method has been solved through the implementation of wireless method which provides with a low-cost wireless controlled irrigation solution and a real-time monitoring of the field.

PROPOSED SYSTEM

The project mainly aims in water conversation, In order to achieve water reuse recycling module is added to the system. The system executes its aim in two stages. Arduino based irrigation prevents excessive use of water and auto recycling supports reuse of water. This method uses Arduino has its central unit which fetches data like moisture, Temperature and humidity from the soil and governs the activity based on information obtained from sensors.

Sensors are placed on soils core which updates microcontroller with Real-time data. The water that gets drained from the steep land is collected, filtered and processed using automatic recycling. Automatic recycling uses sucking motor, recycling module, and storage reservoir. This recycled water will be stored and used for the next set of irrigation. Thus at the end of the process, the system provides an efficient way in conserving water and has high efficiency in preventing excess utilization and also paves a way for reuse of water resource.

DISCUSSION:

In our system a soil moisture sensor would provide measurement of the presence of the water level in soil. The temperature and the humidity sensor are used to measure the temperature and the humidity of the agricultural field respectively. If the moisture level of the soil is less than that of the threshold value, then the microcontroller will turn on the pump motor. The microcontroller will send the soil moisture level, temperature and the humidity value to the concerned person of the field as an SMS using GSM technology. The sensor data are continuously updated to the cloud through ESP8266 wifi module using IOT technology for future references.

The soil moisture sensor is one kind of sensor used to gauge the volumetric content of water within the soil. As the straight gravimetric dimension of soil moisture needs eliminating, drying, as well as sample weighting. These sensors measure the volumetric water content not directly with the help of some other rules of soil like dielectric constant, electrical resistance, otherwise interaction with neutrons, and replacement of the moisture content. The relation among the calculated property as well as moisture of soil should be adjusted & may change based on ecological factors like temperature, type of soil, otherwise electric conductivity. The microwave emission which is reflected can be influenced by the moisture of soil as well as mainly used in agriculture and remote sensing within hydrology. These sensors normally used to check volumetric water content, and another group of sensors calculates a new property of moisture within soils named water potential.

The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermostat to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). It's fairly simple to use, but requires careful timing to grab data.

ANALYSIS:

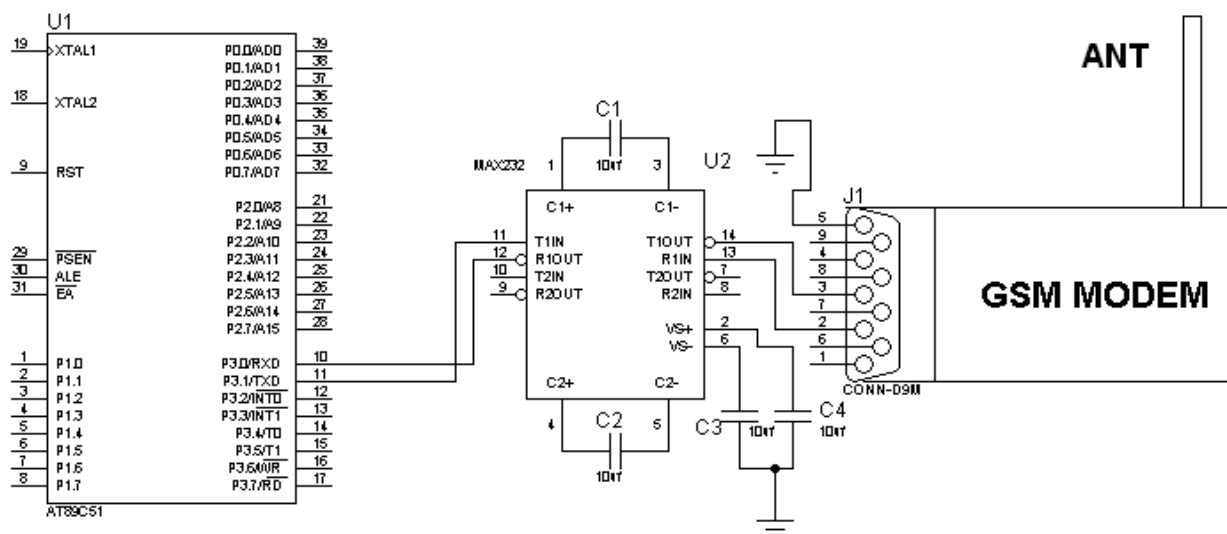


Fig 1: Circuit diagram of GSM Modem

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. The working of GSM modem is based on commands, the commands always start with AT (which means Attention) and finish with a <CR> character. For example, the dialing command is ATD<number>; ATD3314629080; here the dialing command ends with semicolon.

The AT commands are given to the GSM modem with the help of PC or controller. The GSM modem is serially interfaced with the controller with the help of MAX 232. Here max 232 acts as driver which converts TTL levels to the RS 232 levels. For serial interface GSM modem requires the signal based on RS 232 levels. The T1_OUT and R1_IN pin of MAX 232 is connected to the TX and RX pin of GSM modem.

FINDINGS:

The rain sensor module is an easy tool for rain detection. It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity. The module features, a rain board and the control board that is separate for more convenience, power indicator LED and an adjustable sensitivity through a potentiometer. The analog output is used in detection of drops in the amount of rainfall. Connected to 5V power supply, the LED will turn on when induction board has no rain drop, and DO output is high. When dropping a little amount water, DO output is low, the switch indicator will turn on. Brush off the water droplets, and when restored to the initial state, outputs high level. Connect the components based on the figure shown in the wiring diagram using pin connectors. VCC pin is connected to the 5V power supply, GND pin is connected to the GND, DO pin is connected to a digital I/O pin and the AO pin is connected to the analog output pin. Pin number will be based on the actual program code.



Fig 2 :The Rain Sensor

RESULT:

The serial monitor shows the results when the raining module was soaked with water. Based on the amount of water, the analog output can read different levels of amount of water drop.

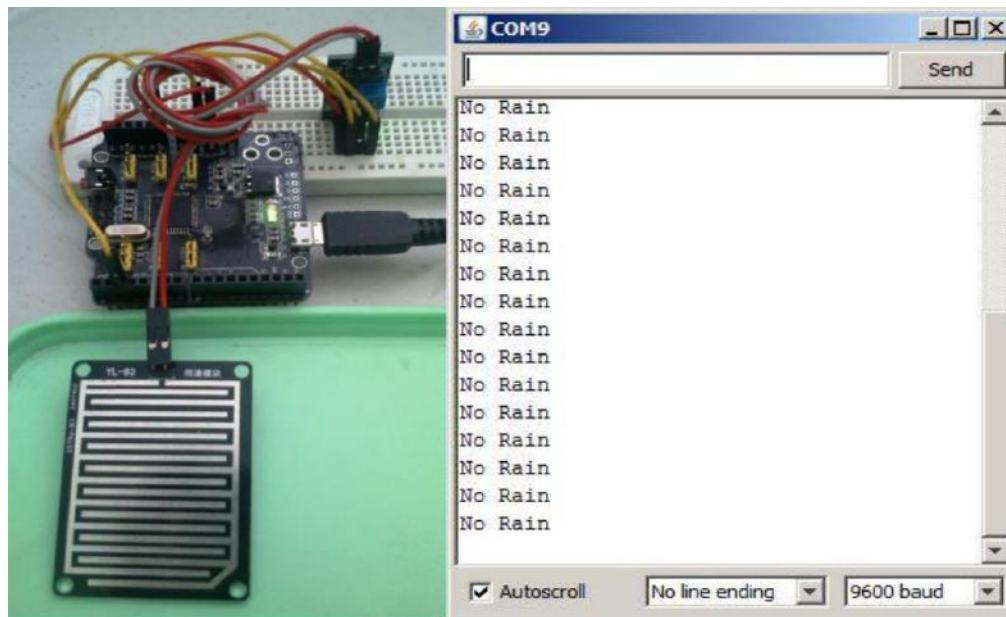


Fig 3: Shows the Output of the Application

CONCLUSION:

The design and implementation of a system based on IoT was carried out to monitor climatic variables and irrigation in the agricultural farm. The system has sensors for measuring humidity, temperature and moisture content of the farm and allows the user to monitor the garden in real time through a web interface. This system, being self-sustaining, minimizes energy consumption. The design has a decision making algorithm that performs intelligent irrigation reducing the consumption of water resources. . Hence, based on the results and experiments conducted this module is found to serve its purpose of water management resourcefully.

REFERENCES:

1. Anandakumar, "Energy Efficient Network Selection Using 802.16g Based Gsm Technology," Journal of Computer Science, vol. 10, no. 5, pp. 745–754, May 2014.
2. H. Anandakumar and K. Umamaheswari, "An Efficient Optimized Handover in Cognitive Radio Networks using Cooperative Spectrum Sensing," Intelligent Automation & Soft Computing, pp. 1–8, Sep. 2017.
3. F. Kastanek, "Research digest 1980, institute for land and water management research," Agricultural Water Management, vol. 5, no. 3, pp. 281–283, Oct. 1982.
4. F. J. M. Riquelme and A. B. Ramos, "Land and water use management in vine growing by using geographic information systems in Castilla-La Mancha, Spain," Agricultural Water Management, vol. 77, no. 1–3, pp. 82–95, Aug. 2005.
5. Roshini and H. Anandakumar, "Hierarchical cost effective leach for heterogeneous wireless sensor networks," 2015 International Conference on Advanced Computing and Communication Systems, Jan. 2015.
6. Md Shadman Tajwar, Haque, Khaza Abdur Rouf, Zobair Ahmed Khan, Al Emran and Md. Saniat Rahman Zishan, "Design and Implementation of an IoT based Automated Agricultural Monitoring and Control System" 2019.
7. M. Suganya and H. Anandakumar, "Handover based spectrum allocation in cognitive radio networks," 2013 International Conference on Green Computing, Communication and Conservation of Energy (ICGCE), Dec. 2013.

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Logic Synthesis in Reversible PLA

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Abstract: The main objective of the paper is to design and synthesize a Programmable Logic Array (PLA) using reversible logic with minimum quantum cost. ... The PLA which contains programmable AND array and programmable OR array. This algorithm makes the design with improvement 9.05% in number of gates, 25.5% in garbage count and 14.5% in quantum cost.

Key Words: Reversible logic; RPLA; ESOP; Quantum cost

INTRODUCTION:

The PLDs are the combinational circuits mainly used to realize Boolean functions on our interest. An n input and k output Boolean function $f(a_1, a_2, a_3, \dots, a_n)$ (referred as (n, k)) is said to be logically reversible if and only if, the number of inputs are equal to the number of outputs i.e., ' n ' equals ' k ' and the input pattern maps uniquely maps the output pattern. The reversible logic must run both forward and backward in such a way that the inputs can also be retrieved from outputs. There are many reversible logic gates in literature like NOT gate, Feynman Gate, Double Feynman Gate, Peres Gate and many more. Fan-out and Feedback are not allowed in Logical Reversibility. To overcome the Fan out limitation, the signals from required output lines are duplicated to desired lines using additional reversible combinational circuits.

LITERATURE REVIEW:

In this paper, we have proposed a cost effective design of RPLAs which is able to realize multi-output ESOP functions by using a cost effective 3×3 reversible gate, called MG (MUX Gate). Also a new algorithm has been proposed for the calculation of critical path delay of reversible PLAs. The minimization processes consist of algorithms for ordering of output functions followed by the ordering of products. Five lower bounds on the numbers of gates, garbages and quantum costs of reversible PLAs are also proposed. In this paper, the authors show the design of a cost effective reversible programmable logic array using VHDL. It is simulated on Xilinx ISE 8.2i and results are shown. The proposed reversible Programming logic array called RPLA is designed by MUX gate & Feynman gate for 3- inputs, which is able to perform any reversible 3- input logic function or Boolean function. The result shows improvement in the quantum cost and total logical calculation in proposed RPLA.

MATERIALS:

QUANTUM COST : This refers the cost of circuit in terms of logic gates used.

GARBAGE OUTPUT : This refers unused outputs present in a reversible logic circuit. It cannot be avoided because it is used to achieve reversibility.

FAN-OUT : It is defined as Maximum Number of input(load) can be connected to output of a gate without affecting normal operation.

METHOD:

EXISTING:

Basic Logic Gates like NOT, AND, OR and NAND Gates etc .are used .So that Time Delay, Garbage Count and Quantum Cost is high. PLA allows large number of logic functions to synthesis.

PROPOSED

Multiple output ESOP functions using NMG Gate. A 3×3 reversible gate namely New Mux Gate gate or NMG is used. The NMG gate can be defined as $I_v = (A, B, C)$ and $Q_v = (P = A \oplus B, Q = B' C \oplus AC', R = BC \oplus AC')$ Where I_v and O_v are the input and output vectors respectively.

DISCUSSION:

Feynman gate is a 2×2 reversible gate. The input vector is $I(A, B)$ and the output vector is $O(P, Q)$. The outputs are defined by $P=A$, $Q=A \oplus B$. Feynman Gate (FG) can be used as a copying gate. Since a fan-out is not allowed in reversible logic, this gate is useful for duplication of the required outputs. 3×3 Double Feynman gate is used. The input vector is $I(A, B, C)$ and the output vector is $O(P, Q, R)$. The outputs are defined by $P = A$, $Q=A \oplus B$, $R=AC$. The design of Reversible PLA was first proposed in [1], which has used Feynman and Toffoli gates to realize Reversible PLA for multi-output ESOP operation where Toffoli gate is used for AND operation and Feynman gate is used for Ex-OR operation which used Conventional Architecture (Complement and non-complement lines for copying input variables). In Fredkin gate is used in AND plane of reversible PLA for AND operation which costs 5 for each gate resulting higher quantum cost. Whereas, in [2], MUX gate has been used for AND operation. But all the designs suffer from extra overhead in terms of gate counting, garbage and quantum cost metrics.

ANALYSIS:

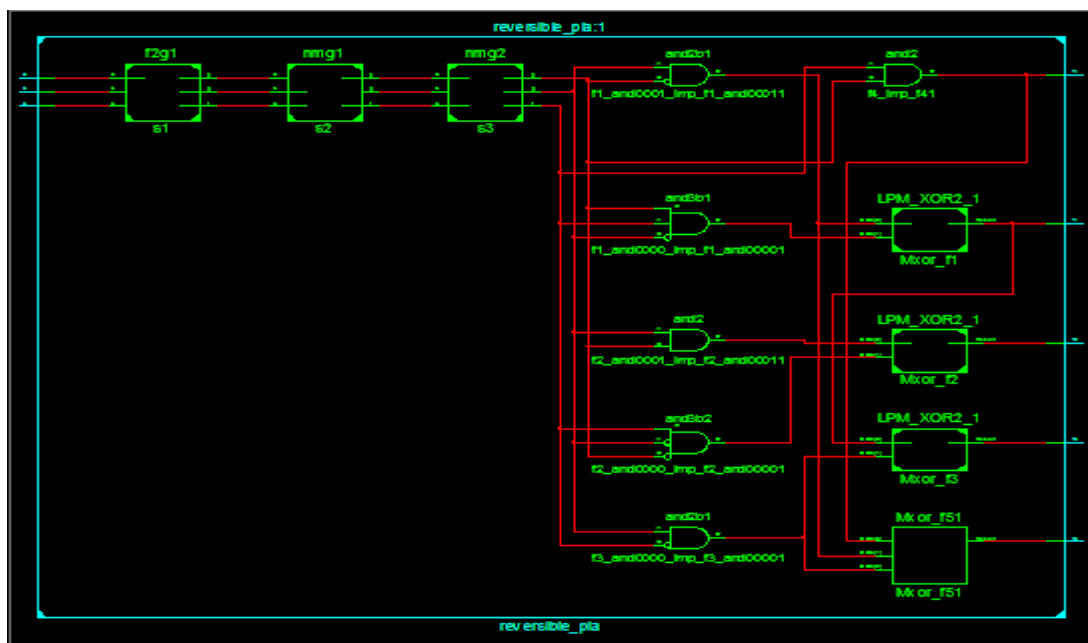


Figure 1. Shows the RTL SCHEMATIC

In multi-output ESOP, some products may be common among different output functions. We will also take the advantage of those terms like as irreversible PLA. The main constraint is that the fan-out of all signals in a reversible gate is one. Therefore, a single wire for a single product, having several cross points like those that irreversible PLA is not allowed in the proposed design. So, the appropriate copy in each product should be ensured to handle fan-out problem. In the synthesis method for multi-output ESOP using the RPLA, it is assumed that the multi-output circuit has been already minimized and is available in an ESOP format. For convenience we will denote different modes of operation of NMG, Feynman and Feynman Double gate

FINDINGS:

Now we will present the algorithms to realize the RPLA circuit of multi-output ESOP functions. When we describe the algorithms, we used two special terms. One is the Frequency of a product term, which is the number of output functions that share the product term. And the term DOT, that denotes the cross point in RPLA, in which no gate is used.

In multi-output ESOP, some products may be common among different output functions. We will also take the advantage of those terms like as irreversible PLA. The main constraint is that the fan-out of all signals in a reversible gate is one. Therefore, a single wire for a single product, having several cross points like those that irreversible PLA is not allowed in the proposed design. So, the appropriate copy in each product should be ensured to handle fan-out problem. In the synthesis method for multi-output ESOP using the RPLA, it is assumed that the multi-output circuit has been already minimized and is available in an ESOP format. For convenience we will denote different modes of operation of NMG, Feynman and Feynman Double gate as shown. Our algorithms for realization and minimization of RPLA have been written using language C and have tested extensively on windows microcomputer. Several experimental results are given below using an Intel core i5 Desktop CPU 2.3 GHz under Microsoft Windows 7 edition with 2 GB RAM. During the execution it was ensured that no other application is running. Fig.9. shows the simulation result of NMG by using Microwind DSCH2 [14]. Table III shows the experimental results comparing the

proposed methods with the methods presented in] in terms of the number of garbage outputs and the number of gates for ESOPs given in Equation Comparisons are also given in Table for corresponding benchmark functions.

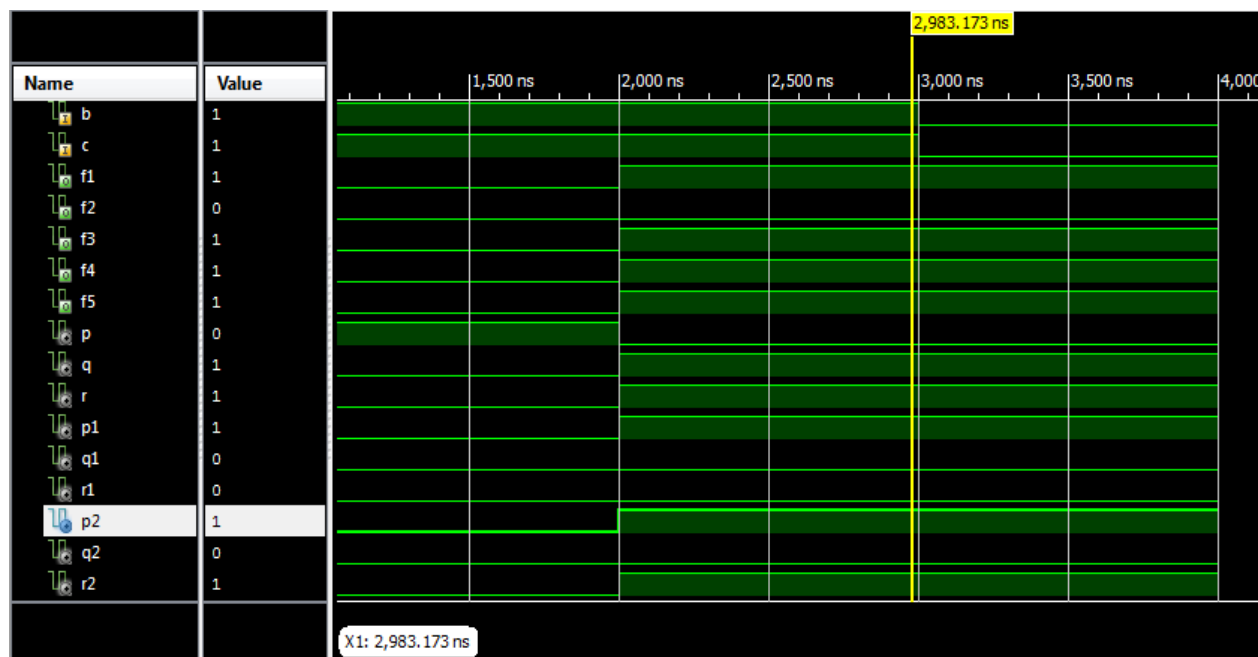


Figure 2. Shows the Simulation Result

Complementary forms of input literals are unnecessary for the proposed AND plane because NMG and F2G are used together to generate all the products of two variables without having any dedicated lines of complemented forms of input variables. The realization of AND plane generates the order of Products illustrated in Algorithm I and EX-OR plane will be constructed according to this order by using Algorithm II. By using Algorithms I and II, the realization of the proposed reversible PLA

RESULT:

Every gate's output, that is not used as input to other gates or as a primary output is known as **Garbage**. For example, for an Ex-OR operation, P output of Feynman gate is a garbage output. Every quantum circuit is built from 1×1 and 2×2 quantum primitives and its cost is calculated as a total sum of 2×2 gates used since 1×1 gate costs nothing i.e. zero. Basically the quantum primitives are matrix operation which is applied on qubits state. All the gates of the form 2×2 has equal **Quantum cost** and the cost is unity i.e. 1 Since every reversible gate is a combination of 1×1 or 2×2 quantum

CONCLUSION:

In this paper, compact structure of Reversible Programmable Logic Array (RPLA) is presented. A reversible gate with low cost is proposed to generate the AND terms of RPLA which can produce two different AND terms at the same time. Using this property we can ensure the reduction of gate count. Two algorithms are proposed to minimize the previous architecture of RPLA that can realize any multi-output ESOP (Exclusive-OR Sum of Product) function. In addition, simulation of the proposed gate has shown that it works correctly. Finally, benchmark analysis proves the optimization of all the parameters. This design methodology improved 14.9%, 2.29% and 9.96% than respectively in terms of number of gates. It produced 39% and 12% less

REFERENCES:

1. C.H. Bennett, "Logical reversibility of computation". IBM J. Res. Dev., vol.17, no. 6, pp. 525-532, 1973
2. A R. Chowdhury, R. Nazmul, and H. M. H. Babu. A new approach to synthesize multiple-output functions using reversible programmable logic arrays. In IEEE 19rd International Conf. on VLSI Design, pages 311–316, Hyderabad, India, 2006.
3. H. Fleisher and L. I. Maissel. An introduction to array logic. IBM J. of Research and Development, 19, 1975
4. R. Landauer, "Irreversibility and heat generation in the computing process." IBM J. Res. Dev., vol.5, no. 3, pp. 183-191, 1961.
5. D. Maslov and G. Dueck. Reversible cascades with minimal garbage. IEEE Transactions on CAD, 23(11):1497–1509, November 2004
6. R. C. Merkle. Two types of mechanical reversible logic. Nanotechnology, 4(2):114–131, January 1993.

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A LOW POWER RECONFIGURABLE LFSR

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Abstract: Low power has become an essential design imperative in the era nanotechnology. we propose the Key Distribution Server based Data Security Scheme for RFID system by using Linear Feedback Shift Register (LFSR). This improves the applicability of the design for security applications in portable embedded systems. The LFSR building blocks are presented in this paper. The design implementation and analysis were performed using Xilinx 14.7 simulation tools and virtex-7 FPGA board for real time verification of its functionality.

Key Words: Linear Feedback Shift Registers, Xilinx, Built In Self Test design.

INTRODUCTION:

Low power has become an essential design imperative in the era of nanotechnology. In this paper, we propose a new design of energy efficient reconfigurable Linear Feedback Shift Registers (LFSRs). The reconfigurable LFSR design allows an increase in the randomness at the output. Furthermore, several low power design techniques are utilized to help achieve energy savings. This improves the applicability of the design for security applications in portable embedded systems. The LFSR building blocks are presented in this paper. The design implementation and analysis were performed using xilinx. Simulation results show reduction in the energy consumed by the circuit.

LITERATURE REVIEW:

LFSR reseeding techniques are often applied in BIST due to their ability to considerably improve the fault coverage and test application time by embedding specific vectors into the pseudorandom sequence. The efficiency of a typical reseeding scheme to a large extent depends on the seed selection and consequent test sequence optimization algorithms. The proposed approach relies on the branch-and-bound search technique, which can provide the optimal test set compaction solution for a given test setup. LFSRs represent the simplest and most commonly used pseudo-random TPG hardware, the efficiency of an LFSR is far from optimum in terms of fault coverage and testing runtimes. A test generated by an LFSR is usually up to several orders of magnitude longer than the test that would be calculated externally by a model-based automated test pattern generator (ATPG).

MATERIALS:

Also, the directional movement of the data through a shift register can be either to the left, (left shifting) to the right, (right shifting) left-in but right-out, (rotation) or both left and right shifting within the same register thereby making it *bidirectional*. In this tutorial it is assumed that all the data shifts to the right, (right shifting). The operation is as follows. Let's assume that all the flip-flops (FFA to FFD) have just been RESET (CLEAR input) and that all the outputs Q_A to Q_D are at logic level "0" i.e., no parallel data output. If a logic "1" is connected to the DATA input pin of FFA then on the first clock pulse the output of FFA and therefore the resulting Q_A will be set HIGH to logic "1" with all the other outputs still remaining LOW at logic "0". Assume now that the DATA input pin of FFA has returned LOW again to logic "0" giving us one data pulse or 0-1-0. These applications require low power dissipation for circuit implementation. The power dissipation during test mode is 200% more than the normal mode. Hence it is an important aspect to optimize power during testing. Power optimization is one of the main challenges.

METHOD:

Existing Method:

The main challenging area in VLSI area performance, cost, test, area, reliability and power. In this power consumption is a major challenge. The power consumption increased due to the power dissipation in the circuits. Most of the power dissipation occurs due to dynamic power. In normal LFSR consumes large dynamic power dissipation. In

this major drawback is power dissipation, it occurs due to continuous clock pulse is given whether the data is toggle or not to the next state.

Proposed Method:

In this paper, we propose an energy efficient reconfigurable LFSR design. We make the LFSR reconfigurable by relying on multiplexers. The addition of multiplexers with the select signals will allow the LFSR to be more random because the select signals are more variable. We make the LFSR reconfigurable by relying on multiplexers. Also, we investigated different low power techniques to be applied to the LFSR implementation.

DISCUSSION:

The initial value of the LFSR is called the seed, and because the operation of the register is deterministic, the stream of values produced by the register is completely determined by its current (or previous) state. Likewise, because the register has a finite number of possible states, it must eventually enter a repeating cycle. However, an LFSR with a well-chosen feedback function can produce a sequence of bits that appears random and has a very long cycle.

Applications of LFSRs include generating pseudo-random numbers, pseudo-noise sequences, fast digital counters, and whitening sequences. Both hardware and software implementations of LFSRs are common. A linear feedback shift register sequence is a pseudo-random sequence of numbers that is often created in a hardware implementation of a linear feedback shift register. The extra power consumption creates problems such as increase in production cost, circuit reliability is reduced verification of performance will be difficult, portable systems will be dependent, and overall performance is reduced. Therefore different methods are presented in the literature to control the overall consumption of power. The novelty of our design is Ex-ORing the pattern generated by BF LFSR and SIC generator, we achieved significant reduction in transitions compared to conventional methods. The rest of the paper is structured as follows. In section II, Prior work applicable to minimizing the power are discussed, it mostly concentrates to lower the power consumption.

ANALYSIS:

When a LFSR is implemented in hardware, a LFSR sequence is recursively generated by taking the output from the last stage of a given LFSR to compute the next stage. An example of a LFSR implemented in hardware is included in Figure. This LFSR is of length L, and each state cell's current state is used as the input to the mod 2 adder. This adder is implemented in hardware with an exclusive-or function. Since this is a shift register, each iteration of the register causes the state of each state cell to shift to the next cell (in this case, to the right). We use the output of the last state cell to provide the next term of the sequence after each iteration.

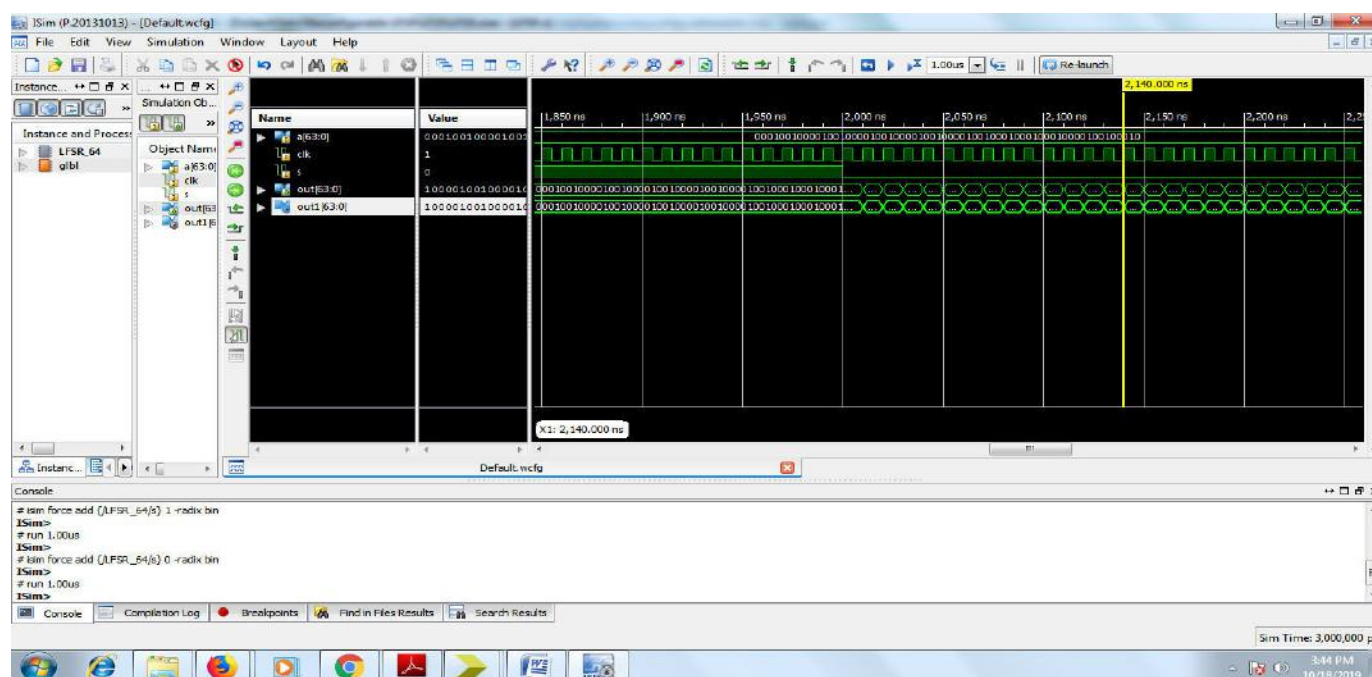


Figure 1. Simulation result

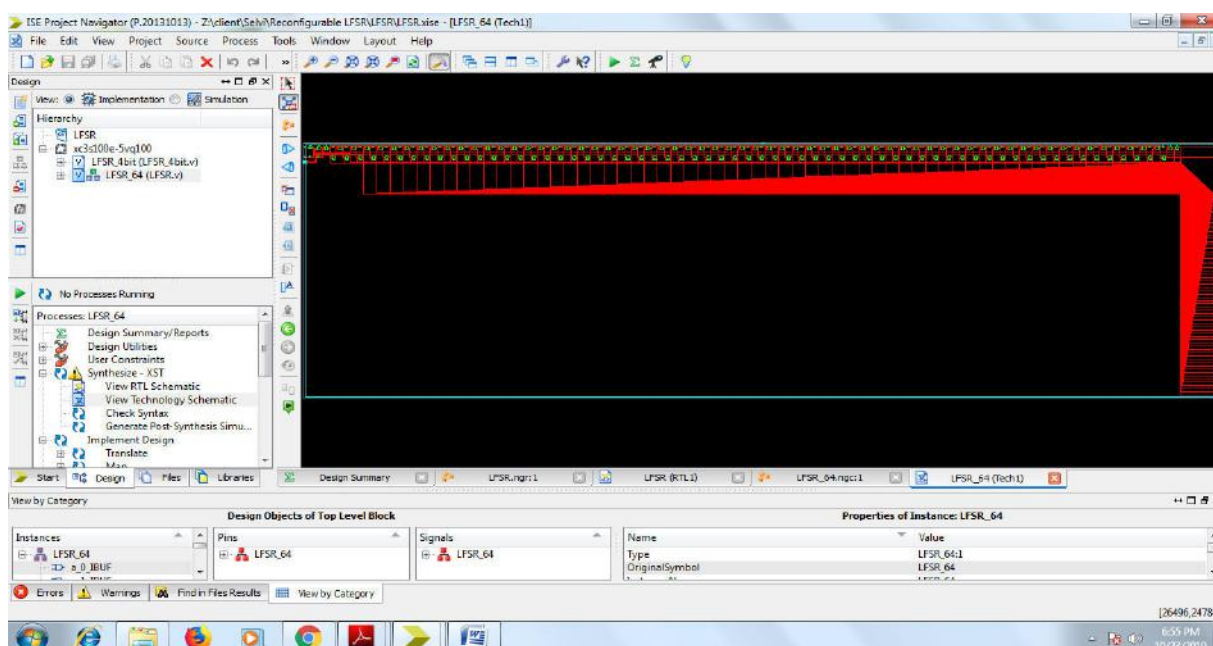


Figure 2. Technology schematic

FINDINGS:

In our design, we are targeting a simple LFSR that can be easily reconfigurable. An example of the proposed LFSR with 4 flipflops is shown in Figure. This LFSR uses D flipflops, XORs, and multiplexers (MUXes). In contrast to the traditional scheme with D flip-flops and XORs only, this structure uses a MUX at the output of the XOR gate. The presence of the XORs in all positions with the presence of the MUXes would make the select signals of the MUXes be variable coefficients of the characteristic equation. Hence, inserting the multiplexers makes the LFSR reconfigurable.

You may think what the point of a SISO shift register is if the output data is exactly the same as the input data. Well this type of **Shift Register** also acts as a temporary storage device or it can act as a time delay device for the data, with the amount of time delay being controlled by the number of stages in the register, 4, 8, 16 etc or by varying the application of the clock pulses. Commonly available IC's include the 74HC595 8-bit Serial-in to Serial-out Shift Register all with 3-state outputs. Parallel-in to Serial-out (PISO) Shift Register The Parallel-in to Serial-out shift register acts in the opposite way to the serial-in to parallel-out one above. The data is loaded into the register in a parallel format in which all the data bits enter their inputs simultaneously, to the parallel input pins P_A to P_D of the register. The data is then read out sequentially in the normal shift-right mode from the register at Q representing the data present at P_A to P_D. This data is outputted one bit at a time on each clock cycle in a serial format. It is important to note that with this type of data register a clock pulse is not required to parallel load the register as it is already present, but four clock pulses are required to unload the data. 4-bit Parallel-in to Serial-out Shift Register

RESULT:

The PIPO shift register is the simplest of the four configurations as it has only three connections, the parallel input (PI) which determines what enters the flip-flop, the parallel output (PO) and the sequencing clock signal (Clk). Similar to the Serial-in to Serial-out shift register, this type of register also acts as a temporary storage device or as a time delay device, with the amount of time delay being varied by the frequency of the clock pulses. Also, in this type of register there are no interconnections between the individual flip-flops since no serial shifting of the data is required. Universal Shift Register Today, there are many high speed bi-directional "universal" type **Shift Registers** available such as the TTL 74LS194, 74LS195 or the CMOS 4035 which are available as 4-bit multi-function devices that can be used in either serial-to-serial, left shifting, right shifting, serial-to-parallel, parallel-to-serial, or as a parallel-to-parallel multifunction data register, hence the name "Universal".

These universal shift registers can perform any combination of parallel and serial input to output operations but require additional inputs to specify desired function and to pre-load and reset the device. A commonly used universal shift register is the TTL 74LS194 as shown below. 4-bit Universal Shift Register 74LS194. Universal shift registers are very useful digital devices. They can be configured to respond to operations that require some form of temporary memory storage or for the delay of information such as the SISO or PIPO configuration modes or transfer data from one point to another in either a serial or parallel format. Universal shift registers are frequently used in arithmetic operations to shift data to the left or right for multiplication or division.

CONCLUSION:

The "one" in the polynomial does not correspond to a tap – it corresponds to the input to the first bit (i.e. x^0 , which is equivalent to 1). The powers of the terms represent the tapped bits, counting from the left. The first and last bits are always connected as an input and output tap respectively. The LFSR is maximal-length if and only if the corresponding feedback polynomial is primitive. This means that the following conditions are necessary (but not sufficient): The number of taps should be even. The set of taps – taken all together, not pair wise (i.e., as pairs of elements) – must be relatively prime. In other words, there must be no divisor other than 1 common to all taps. From the ip"template" file, we can get all code.Ok, we add the constraint Ok, let's set the clock pins, the XC3S100e-5vq 100 ip use k3 pinIt is in bank 3, the voltage of bank 3 is 3.3v.Next, for the camera clock pin So set it as following Now we can try to generate the pin file. Ok, now we got some errors, Let's take a look this errors. You will tool suggest us to use "CODR2" in Xilinx document ug381. We know that $L = 4$ since the length of vectors c and s is 4. This sequence satisfies Golomb's three randomness conditions given in §2.2. Fortunately, this process can be easily automated and a function has been written for the computer algebra system SAGE which will quickly generate terms of a LFSR sequence of any length dened by the user. The inputs for this function are two vectors representing the key and the initial ll and an integer $n > L$ representing the desired number of terms in the output.

REFERENCES:

1. Aeksejev, I.; Jutman, A.; Raik, J.; Ubar, R., "Application of Sequential test Set Compaction to LFSR Reseeding," NORCHIP, vol., no., pp.102,10 16-17 Nov.2008.
2. Chen, Sin-Yu; Rung-Bin Lin; Hui-Hsiang Tung; Kuen- Wey Lin, "Power gating design for standard-cell-like structured ASICs," Design, Automation & Test in Europe Conference & Exhibition (DATE), pp. 514-519, 8-12 March 2010.
3. S.W. Golomb, "Shift Register Sequence", Aegean Park Press, Laguna Hills, California, 1982.
4. Hosseini-Khayat, S., "A lightweight security protocol for ultra-low power ASIC implementation for wireless Implantable Medical Devices," 5TH International Symposium on Medical information & Communication Technology (ISMICT), pp. 6-9, 27-30 March 2011.
5. Kitsos, P.; Sklavos, N.; Zervas, N.; Koufopavlou, O., "A reconfigurable linear feedback shift register (LFSR) for the Bluetooth system, ", The 8th IEEE International Conference on Electronics, Circuits and Systems, pp.991- 994, 2001.
6. Laung-Terng, Wang, Nur A. Touba, Richard P. Brent, Hui Xu, and Hui Wang "On Designing Transformed Linear Feedback Shift Registers with Minimum Hardware Cost," Technical Report, November 8, 2011.
7. Meng Zhang; Raghunathan, A.; Jha, N.K., "Towards trustworthy medical devices and body area networks, " Design Automation Conference(DAC), 2013 50th ACM/ EDAC/ IEEE, vol.,no,pp.1,6, May 29 2013- June 7 2013
8. Mosin. S.G; Chebykina, N.V.; Serina, M.S, "Technique of LFSR based test generator synthesis for deterministic and pseudorandom testing, 11th International Conference on the Experience of Designing and Application, pp.128-131, 23- 25 Feb. 2011.

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**SCALABLE CONSTRUCTION OF APPROXIMATE MULTIPLIERS
WITH FORMALLYN GUARANTEED WORST CASE ERROR**

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Abstract: Approximate computing exploits the fact that many applications are inherently error resilient. In order to reduce power consumption, approximate circuits such as multipliers have been employed in these applications. However, most current approximate multipliers are based on ad hoc circuit structures and, for automated circuit approximation methods, large efficient designs are difficult to find due to the increased search space. Moreover, existing design methods do not typically provide sufficient formal guarantees in terms of error if large approximate multipliers are constructed. To address these challenges, this brief introduces a general and efficient method for constructing large high-quality approximate multipliers with respect to the objectives formulated in terms of the power-delay product and a provable error bound.

Key Words: Approximate computing circuits and systems, circuit synthesis, circuits, computers and information processing

INTRODUCTION:

Energy efficiency is a major challenge for current computer systems. Among various techniques, approximate computing exploits the fact that many applications are inherently error resilient and energy requirements can be traded off for the quality of results. Much attention has been paid to the design of approximate arithmetic circuits and, in particular, approximate multipliers, as multiplication is a key operation in many applications. Approximate implementations of multipliers are based on various design principles. The major weakness of the manual circuit design approach, which is clearly dominating in this area, lies in providing only a few different circuit implementations for a given bit width. Many interesting and useful design points thus remain unexplored. Hence, the automated search-based design methods have been developed to provide many approximate designs showing high-quality tradeoffs between key design parameters. We are primarily interested in approximate circuits belonging to the Pareto set that contains the so-called non dominated solutions. Consider three objectives to be minimized, for example, the power delay product (PDP), the worst case error (WCE), and the area. Circuit C1 dominates another circuit C2 if: 1) C1 is no worse than C2 in all objectives and 2) C1 is strictly better than C2 in at least one objective.

LITERATURE REVIEW:

Often as the most important arithmetic modules in a processor, adders, multipliers and dividers determine the performance and the energy efficiency of many computing tasks. The demand of higher speed and power efficiency, as well as the feature of error resilience in many applications (e.g., multimedia, recognition and data analytics), have driven the development of approximate arithmetic design. In this article, a review and classification are presented for the current designs of approximate arithmetic circuits including adders, multipliers and dividers. A comprehensive and comparative evaluation of their error and circuit characteristics is performed for understanding the features of various designs. By using approximate multipliers and adders, the circuit for an image processing application consumes as little as 47% of the power and 36% of the power-delay product of an accurate design while achieving a similar image processing quality. Improvements in delay, power and area are obtained for the detection of differences in images by using approximate dividers.

MATERIALS:

XILINX AND VERILOG HDL: Verilog was once began in the 365 days 1984 by the use of Gateway Design Automation Inc as a proprietary hardware modeling language. It can be rumored that the usual language used to be

designed via utilizing taking elements from essentially the most preferred HDL language of the time, referred to as HiLo, as well as from typical computer languages similar to C. At that time, Verilog used to be no longer standardized and the language modified itself in almost all the revisions that got here out inside of 1984 to 1990. In 1990, Cadence organized the Open Verilog global (OVI), and in 1991 gave it the documentation for the Verilog Hardware Description Language. This was once the occasion which "opened" the language.

VERILOG INTRODUCTION: Verilog HDL is a Hardware Description Language (HDL). A Hardware Description Language is a language used to describe a digital procedure; one may describe a digital system at a few levels. An HDL could describe the design of the wires, resistors and transistors on an constructed-in Circuit (IC) chip, i.E., the swap level.

FUNCTIONAL VERIFICATION & TESTING: Evaluating the coding with the requisites, trying out the procedure of coding with corresponding inputs and outputs. If trying out fails – as soon as again determine the RTL Description. Simulation: Modelsim, VCS, Verilog-XL, Xilinx.

METHOD:

EXISTING SYSTEM:

Array multiplier is well known due to its regular structure. Multiplier circuit is based on add and shift algorithm. Each partial product is generated by the multiplication of the multiplicand with one multiplier bit. The partial product are shifted according to their bit orders and then added. The addition can be performed with normal carry propagate adder. N-1 adders are required where N is the multiplier length.

DADDA MULTIPLIER:

The **Dadda multiplier** is a hardware multiplier design invented by computer scientist Luigi Dadda in 1965. It is similar to the Wallace multiplier, but it is slightly faster (for all operand sizes) and requires fewer gates (for all but the smallest operand sizes).

PROPOSED SYSTEM:

APPROXIMATE MULTIPLIERS:

Various error metrics have been developed to evaluate the quality of approximate circuits [2], for example, the WCE, sometimes denoted as the maximum error distance, the worst case relative error (WCRE), the average-case error, also known as the mean absolute error (MAE), and the mean relative error (MRE). The WCE of an n -bit approximate multiplier \tilde{M} is defined as the maximum difference between the outputs of \tilde{M} and a precise multiplier M

$$WCE_{\tilde{M}} = \max_{\forall a, b} |\tilde{M}(a, b) - M(a, b)|$$

where $0 \leq a, b < 2^n$ and $M(a, b) = a \times b$. The WCE can be important in time-critical and dependable systems on the one hand, but also in image and signal processing on the other, where low average error but excessive WCE can produce unacceptable results. The WCRE is defined as

$$WCRE_{\tilde{M}} = \max_{\forall a, b} \frac{|\tilde{M}(a, b) - M(a, b)|}{M(a, b)}.$$

DISCUSSION:

Three stages can be identified in a multiplier: partial product generation, partial product reduction, and final addition. Four main methods are used for the design of approximate multipliers: 1) approximation in generating partial products based on a simpler structure; 2) approximation in the partial product tree by ignoring some partial products (truncation), dividing the partial products into several modules and applying an approximation in the less significant modules, or composing complex approximate multipliers from simple approximate multipliers; 3) using approximate adders, counters, or compressors in the partial product tree to reduce partial products; and 4) using search-based methods to perform approximation on the gate level or in more complex cells. In the sequel, we briefly introduce the state-of-the-art approximate multipliers that provide the best tradeoff between quality and other design parameters such as power, delay, and area. For truncated multipliers (TMs), the key idea is to remove k least significant bits of the input operands. As a result, a smaller $(n - k)$ -bit multiplier is utilized instead of an accurate n -bit multiplier. A 5-bit approximate multiplier is implemented as a truncated carry save adder array in Fig. 1(a). In general, an array multiplier consists of $n \times n$ cells (i.e., the carry-save adder array) used to reduce partial products, followed by a single n -bit merging adder (a ripple carry adder in our example) for the final summation.

ANALYSIS:

To put into effect the design, double click on the enforce design substitute inside the strategies window. It will go via steps like Translate, Map and role & Route. If any of these steps would now not be completed or executed with blunders, it is going to location a X mark in front of that, or else a tick mark can be positioned after each of them to

indicate the optimistic completion. If the entire factor is finished effectually, a tick mark will also be put before the put in force Design substitute.

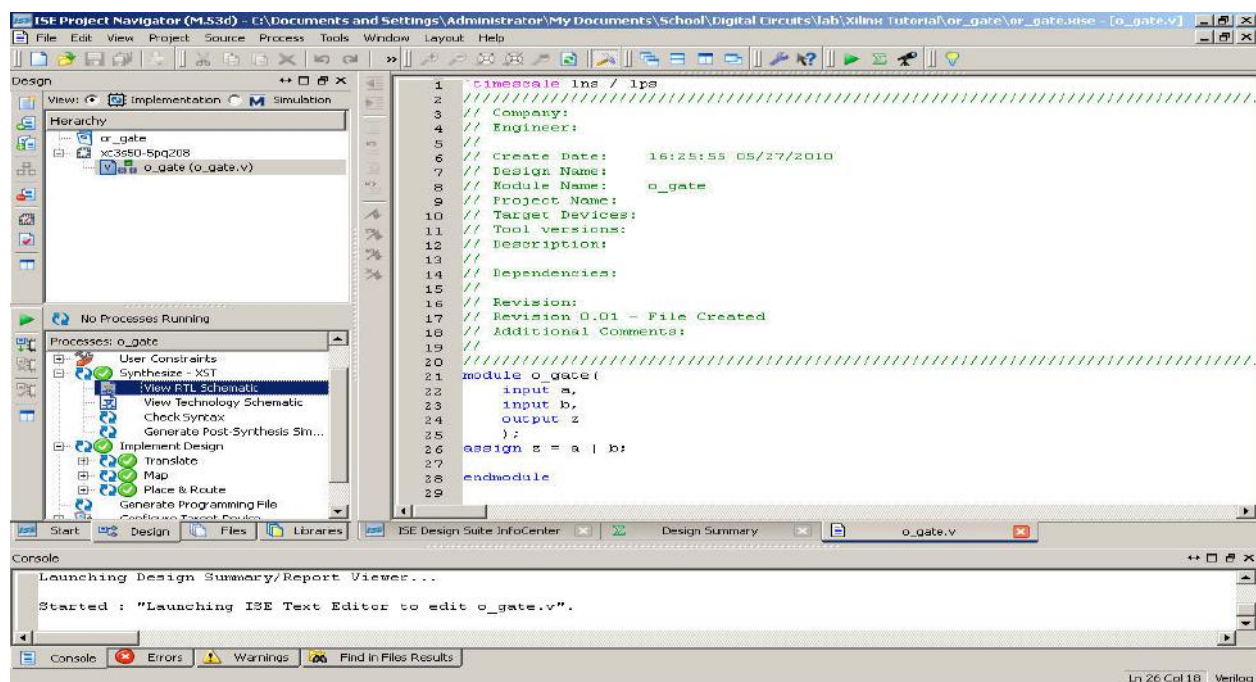


Figure 1. Implementing the Design (snapshot from Xilinx ISE software)

FINDINGS:

The schematic diagram of the synthesized verilog code can be considered by means of double clicking View RTL Schematic below Synthesize-XST menu in the approach Window. This is competent to be a useful procedure to debug the code if the output just isn't assembly our requirements inside the proto kind board. Via utilising double clicking it opens the easiest stage module displaying handiest input(s) and output(s) as proven under.

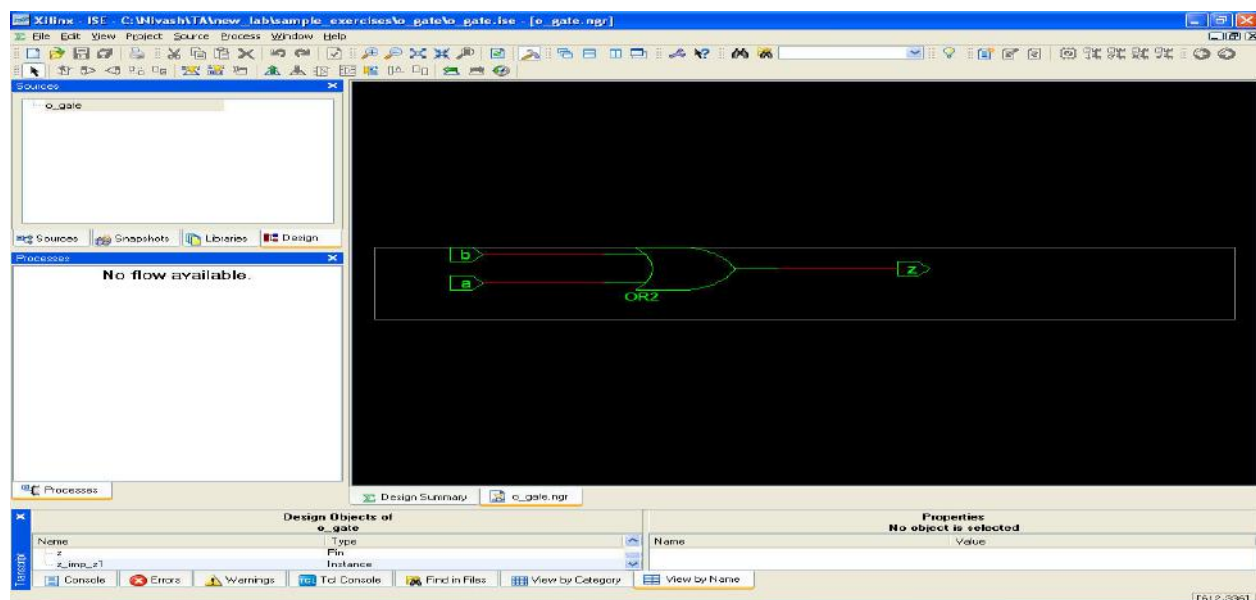


Figure 2. Realized logic by the Xilinx ISE for the verilog code

RESULT:

The design wants to be synthesized and utilized earlier than it could be checked for correctness, by means of going for walks practical simulation or downloaded onto the prototyping board. With the highest-measure Verilog file opened (can also be completed through double-clicking that file) inside the HDL editor window inside the correct half of ofof the task Navigator, and the view of the venture being within the Module view , the put into effect design option will also be obvious within the procedure view. Design entry utilities and Generate Programming File options can also be seen inside the strategy view. The former can be utilized to include person constraints, if any and the latter may also be mentioned later. The source file will now be displayed in the task Navigator window. The supply file window

can be utilized as a textual content editor to make any vital alterations to the supply file. The entire input/output pins will likely be displayed. Save your Verilog application periodically through settling on the File->save from the menu. You can also edit Verilog applications in any textual content editor and add them to the undertaking directory utilizing “Add replica source”.

CONCLUSION:

In this brief, a scalable recursive method for the construction of large approximate multipliers with guaranteed WCE was proposed. We demonstrated how to relatively quickly construct a high-quality Pareto set of non dominated $2n$ -bit approximate multipliers provided that we have a reasonable database of n -bit approximate multipliers. We show that it is sufficient to construct a $2n$ -bit multiplier using three different n -bit multipliers (in the architecture A5) without sacrificing much quality of the obtained $2n$ -bit multipliers. This method enables to reduce the design time to nearly one half of the A6 architecture, in which four different 8-bit multipliers are selected. The constructed designs show WCEs limited by a maximum error bound that can be analytically obtained due to the proposed design approach.

REFERENCES:

1. [1].A. Chandrasekharan, M. Soeken, D. Große, and R. Drechsler, “Approximation-aware rewriting of AIGs for error tolerant applications,” in *Proc. ICCAD*, Nov. 2016, pp. 1–8.
2. K. Bhardwaj, P. S. Mane, and J. Henkel, “Power- and area-efficient approximate wallace tree multiplier for error-resilient systems,” in *Proc. 15th Int. Symp. Quality Electron. Design (ISQED)*, Mar. 2014, pp. 263–269.
3. H. Jiang, C. Liu, L. Liu, F. Lombardi, and J. Han, “A review, classification, and comparative evaluation of approximate arithmetic circuits,” *J. Emerg. Technol. Comput. Syst.*, vol. 13, no. 4, 2017, Art. no. 60.
4. H. R. Mahdiani, A. Ahmadi, S. M. Fakhraie, and C. Lucas, “Bio-inspired imprecise computational blocks for efficient VLSI implementation of soft-computing applications,” *IEEE Trans. Circuits Syst. I, Reg. Papers*, vol. 57, no. 4, pp. 850–862, Apr. 2010.
5. V. Mrazek, R. Hrbacek, Z. Vasicek, and L. Sekanina, “EvoApproxSb: Library of approximate adders and multipliers for circuit design and benchmarking of approximation methods,” in *Proc. DATE*, Mar. 2017, pp. 258–261.
6. M. Shafique, W. Ahmad, R. Hafiz, and J. Henkel, “A low latency generic accuracy configurable adder,” in *Proc. DAC*, Jun. 2015, pp. 1–6.
7. Z. Vasicek, V. Mrazek, and L. S. Brno, “Towards low power approximate DCT architecture for HEVC standard,” in *Proc. DATE*, Mar. 2017, pp. 1576–1581.
8. R. Venkatesan, A. Agarwal, K. Roy, and A. Raghunathan, “MACACO: Modeling and analysis of circuits for approximate computing,” in *Proc. ICCAD*, Nov. 2011, pp. 667–673.
9. C. Yu and M. Ciesielski, “Analyzing imprecise adders using BDDs—A case study,” in *Proc. ISVLSI*, Jul. 2016, pp. 152–157.

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DESIGN OF A WASTE WATER AND GARBAGE MANAGEMENT SYSTEM FOR SMART CITIES USING IOT

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Abstract: Efficient waste collection is a necessary service in the application of Smart Cities. The use of emerging technology may lead to significant improvement in the waste management process. In this work, we propose an IoT- based architecture that targets two elements. The first is monitoring the waste volume and content in a waste bin, as well as the bin's surroundings. The second entails dynamic scheduling and routing of waste collection vehicles based on the relayed information from the bins. The waste bin design detects any obstacles around the bin and monitors illegal dumping in the vicinity of the bin.

Key Words: Internet of Things (IOT), Arduino, lattep, waste management system, smart-waste bin.

INTRODUCTION:

Proper waste management is an integral aspect of city management. Continuous development efforts lead to employing novel technology to reduce operational cost while maintaining consistent levels of service. Current waste collection efforts utilize static route planning with fixed scheduling, which indicates there still exists areas for continued development and improvement in this field.. Such an approach is costly and generates a high-carbon footprint. The slow adoption of recycling in some cities also continues to result in monetary losses. The lack of recycling in Saudi cities, for example, is estimated to result in 40 billion SAR (~\$10.6 billion) per year in losses.

Meanwhile, the absence of waste monitoring and limited waste-bin allocation per household may lead the public to overfill their bins or discard waste in non-designated areas. The city may thereby incur additional costs for the added demand for waste removal and management. The latter is most pronounced in areas with strained infrastructure, such as restaurant clusters or narrow pathways between houses. Bursts in waste generation, such as those following national holidays, can also generate a widespread high demand for waste collection. Our interest in this work is to motivate the use of the Internet of Things (IOT) in order to address the problems in waste management.

LITERATURE REVIEW:

In the present day scenario, many times we see that the garbage bins or Dust bin are placed at public places in the cities are overflowing due to increase in the waste every day. It creates unhygienic condition for the people and creates bad smell around the surroundings this leads in spreading some deadly diseases & human illness, to avoid such a situation we are planning to design "IOT Based Waste Management for Smart Cities".

In this proposed System there are multiple dustbins located throughout the city or the Campus, these dustbins are provided with low cost embedded device which helps in tracking the level of the garbage bins and a unique ID will be provided for every dustbin in the city so that it is easy to identify which garbage bin is full. When the level reaches the threshold limit, the device will transmit the level along with the unique ID provided. These details can be accessed by the concern authorities from their place with the help of Internet and an immediate action can be made to clean the dustbins.

MATERIALS:

POWER SUPPLY: Power supply is the circuit from which we get a desired dc voltage to run the other circuits. The voltage we get from the main line is 230V AC but the other components of our circuit require 5V DC. Hence a step-down transformer is used to get 12V AC which is later converted to 12V DC using a rectifier.

TRANSFORMER: Transformer is the electrical device that converts one voltage to another with little loss of power. Transformers work only with AC. There are two types of transformers as Step-up and Step-down transformer. Step-up

transformers steps up voltage, step-down transformers steps down voltage.

RECTIFIERS: A rectifier is a circuit that converts AC signals to DC. A rectifier circuit is made using diodes. There are two types of rectifier circuits as Half-wave rectifier and Full-wave rectifier depending upon the DC signal generated

SMOOTHING: Smoothing is performed by a large value electrolytic capacitor connected across the DC supply to act as reservoir, supplying current to the output when the varying DC voltage from the rectifier is decreasing. The diagram shows the unsmoothed varying DC and the smoothed DC.

METHOD:

EXISTING SYSTEM

The existing system is presented an Arduino based smart dustbin monitoring system which can be operated using GSM. The Arduino Uno controller is used to read the dustbin levels with the help of Ultrasonic sensor. After entire filling of dust and waste items, vehicle is sent to that area to collect the garbage deposited. Arduino Uno contains Atmega328p-PU IC. Arduino Ethernet shield is used to send the data to server in order to monitor the dustbin level.

PROPOSED METHOD

The proposed system architecture based on IOT with the objective of improving waste management systems. Our approach is a holistic review of the waste management system, starting from smartening-up the waste-bin to optimize waste collection times and anticipating the nature of collect waste to considerations of the collection vehicles, their route planning and scheduling.

DISCUSSION:

There are 20,000 pull-up resistors built into the Atmega chip that can be accessed from software. These built-in pull-up resistors are accessed by setting the `pinMode()` as `INPUT_PULLUP`. This effectively inverts the behavior of the INPUT mode, where HIGH means the sensor is OFF and LOW means the sensor is ON. The value of this pull-up depends on the microcontroller used. On most AVR-based boards, the value is guaranteed to be between 20k Ω and 50k Ω . On the AURDINO Due, it is between 50k Ω and 150k Ω . For the exact value, consult the datasheet of the microcontroller on your board. When connecting a sensor to a pin configured with `INPUT_PULLUP`, the other end should be connected to the ground. In case of a simple switch, this causes the pin to read HIGH when the switch is open and LOW when the switch is pressed. The pull-up resistors provide enough current to light an LED dimly connected to a pin configured as an input. If LEDs in a project seem to be working, but very dimly, this is likely what is going on. Same registers (internal chip memory locations) that control whether a pin is HIGH or LOW control the pull-up resistors. Consequently, a pin that is configured to have pull-up resistors turned on when the pin is in INPUT mode, will have the pin configured as HIGH if the pin is then switched to an OUTPUT mode.

ANALYSIS:

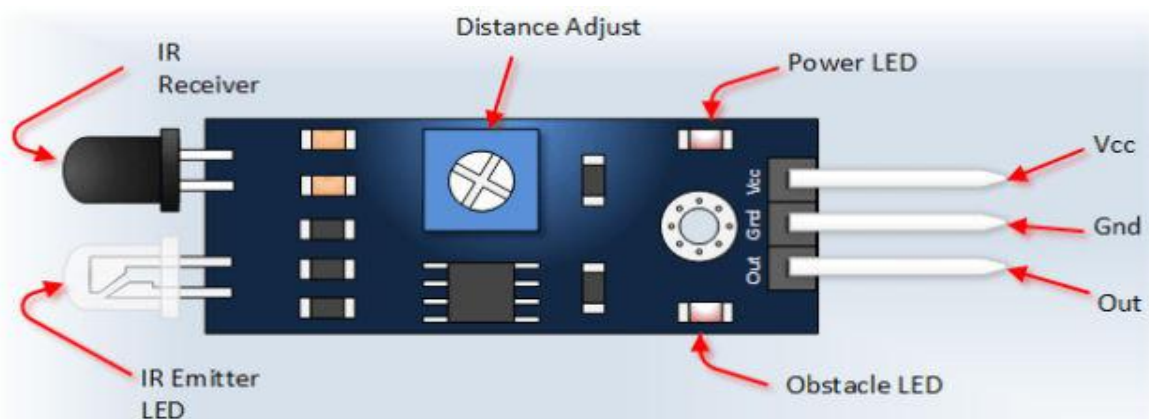


Figure.1.IR SENSOR

Infrared technology addresses a wide variety of wireless applications. The main areas are sensing and remote controls. In the electromagnetic spectrum, the infrared portion is divided into three regions: near infrared region, mid infrared region and far infrared region. The frequency range of infrared is higher than microwave and lesser than visible light. For optical sensing and optical communication, photo optics technologies are used in the near infrared region as the light is less complex than RF when implemented as a source of signal. Optical wireless communication is done with IR data transmission for short range applications.

FINDINGS:

Servo Motor Background: In the most generic sense, a “servomechanism” (servo for short) is a device that uses feedback to achieve the desired result. Feedback control is used in many different disciplines, including speed, position, and temperature.

Working of a Servo Motor: The servo motor has some control circuits and a potentiometer (a variable resistor, aka pot) connected to the output shaft. In the picture above, the pot can be seen on the right side of the circuit board. This pot allows the control circuitry to monitor the current angle of the servo motor.

Control signal: The third pin of the servo connector carries the control signal, used to tell the motor where to go. This control signal is a specific type of pulse train.

Powering Servos: In RC vehicles, the nominal battery voltage is 4.8V. It will be somewhat higher after a charge, and it will droop as the batteries discharge. As the voltage drops, the available torque also drops

Wireless Underground Sensor Networks: Wireless Underground Sensor Networks (WUSNs) constitute one of the promising application areas of the recently developed wireless sensor networking techniques. WUSN is a specialized kind of WSN that mainly focuses on the use of sensors at the subsurface region of the soil. For a long time, this region has been used to bury sensors, usually targeting irrigation and environment monitoring applications, although without wireless communication capability.

Normally Closed: In the normally closed configuration, a HIGH signal opens the switch and interrupts the 120-240V current. A LOW signal closes the switch and allows current to flow from the C terminal to the NC terminal. Therefore, if you want the HIGH signal to turn OFF the 120-240V current, use the normally closed terminal. Normally Open In the normally open configuration, when the relay receives a HIGH signal the 120-240V switch closes and allows current to flow from the C terminal to the NO terminal.

RESULT:



Figure 2.

CONCLUSION:

This paper presents an architecture based on IOT with the objective of improving waste management systems. Our approach is a holistic review of the waste management system, starting from smartening-up the waste-bin to optimize waste collection time and anticipating the nature of collected waste to considerations of the collection vehicles, their route planning and scheduling. The presented architecture depended on a cloud-based implementation for the processing and computation core. The system offers great flexibility in terms of implementation, especially given its complete dependence on off-the-shelf technology. It also allows for varied waste-collection objectives. The architecture is currently undergoing prototyping of its different components, and future work will offer further elaboration on their implementation and testing.

REFERENCES:

1. S. Bharadwaj, R. Rego, and A. Chowdhury, "IOT based solid waste management system: A conceptual approach with an architectural solution as a smart city application," in 2016 IEE Annual India Conference (INDICON), 2016, pp. 1–6.
2. V. Catania, D. Ventura, "An approach for monitoring and smartplanning of urban solid waste management using smart-M3platform", in: Proceedings of 15th conference of open innovations association FRUCT, 2014, pp. 24-31.
3. J. Kokila, K. Gayathri Devi, M. Dhivya and C. Haritha Jose. "Design and Implementation of IOT Based Waste Management System", Middle-East Journal of Scientific Research 25 (5): 995-1000, 2017.
4. Prof. S.A. Mahajan, Akshay Kokane, Apoorva Shewale, Mrunaya Shinde , Shivani Ingale, "Smart Waste Management System using IOT", International Journal of Advanced Engineering Research and Science (IJAERS), Vol-4, Issue-4, Apr- 2017.
5. S.S.Navghane, M.S.Killedar, Dr.V.M.Rohokale, "IOT Based Smart Garbage and Waste Collection Bin", International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE), Volume 5, Issue 5, May 2016.

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ROBUST AND FAST DECODING OF HIGH CAPACITY COLOR QR CODES FOR MOBILE APPLICATIONS

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Abstract: The use of color in QR codes brings extra capacity, but also inflicts tremendous challenges on the decoding process due to chromatic distortion cross-channel color interference and illumination variation. Particularly, we further discover a new type of chromatic distortion bin high density color QR codes cross module color interference caused by the high density which also makes the geometric distortion correction more challenging. To address these problems, we propose two approaches, LSVM-CMI and QDA-CMI, which jointly model these different types of chromatic distortion. Furthermore, a robust geometric transformation method and several pipeline refinements are proposed to boost the decoding performance for mobile application.

Key Words: 2D BARCODES, Linear Barcode, Barcode Symbology, Quick Response (QR)

INTRODUCTION:

As the significant increase of mobile device users, more wireless information services and mobile commerce applications are needed. In the past decade, various barcodes have been used as a very effective means in many traditional e-commerce systems, supply chain management, retail sale-and-buy, as well as tracking and monitoring of products and goods. Today, many people believe digital barcodes provides an effective means for mobile commerce application systems due to the following reasons: By Using digital barcodes provides a simple and inexpensive method to present diverse commerce data in electronic commerce and m-commerce, including product id and the detailed product information, advertisements, and purchasing and payment information. As more mobile digital cameras are deployed on mobile devices, using digital barcodes is becoming an effective way to reduce the mobile inputs from mobile users. Therefore, mobile user experience can be improved and enriched. To meet the increasing needs of mobile-based barcode applications in m-commerce, more research work and technology study are needed to understand 2D-Barcodes, required supporting technologies, standards, and applications in m-commerce mobile and services.

LITERATURE REVIEW:

The turning recognition is a major subject of a large body of research, there are few works that explicitly address turning movement (TM) analysis at intersections. TM analysis is a fundamental measurement used for a variety of intersection analyses including traffic operations analysis, signal design and transportation planning applications. The system uses a camera viewed from the tail of the vehicles appearing in a distance from the viewed span of the camera to the stop line of the cross-roads, which is denoted by L for the case of one-way street. Based on the roadway area found in the captured traffic video which is occupied by the vehicles, the traffic flow will be estimated and then the traffic light timing update will be available accordingly.

MATERIALS:

QR Code is a form of 2D bar codes. A sample is shown in Figure 1. It was developed by Denso-Wave, a Japanese automatic data capture equipment company (Denso, 2009), in 1994. "QR" stands for "Quick Response." It is readable by moderately equipped mobile phones with cameras and QR scanners. Information such as URL, SMS, contact information and plain text can be embedded into the two dimensional matrix.

Pattern Image Creation To transforms a message M into a character message image, the proposed method transforms M into a code pattern image similar in appearance to a pre-selected target image. Specifically, the message M is

transformed into a bit stream, which is then encoded by binary code patterns in the form of image blocks. Such pattern blocks finally are composed to form the code pattern image. Each pattern block T consists of several unit blocks F_i , with each F_i representing a bit of the code pattern C which T represents.

Block Luminance Modulation After the pattern image IP is created, it is “injected” into the target image IT under the constraint that the resulting image retains the visual appearance of IT . For this, we utilize a characteristic of the YCbCr color model \square the luminance component Y is independent of the others [16] \square to embed IP into the Y -channel of IT . This will solve a problem of illumination variation encountered in the later stage of message extraction.

METHOD:

2D BARCODES

The concept of barcodes appeared decades ago. Traditionally, the barcodes stored data in the form of parallel lines in different widths, and they are known as 1D barcodes, and could only encode numbers [10]. About 30 years ago, the first linear barcodes were used for railway transportation and tracking of the goods in USA. Since then, barcodes have been used almost everywhere, including manufacturing, postal, transportation, government, health care, retail business, trade show, and automotive business. Barcodes, as machine-readable representation of information in a visual format, can be easily stored, transferred, processed, and validated.

LINEAR BARCODE

A linear barcode refers a way of encoding numbers and letters in a sequence of varying width bars and spaces so that it can be read, retrieved, processed, and validated using a computer. Using barcodes provides a simple and inexpensive method of encoding text information that is easily read using electronic readers.

BARCODE SYMBOLOGY

The barcode symbology refers to the protocol that defines a standard for arranging the bars and spaces that comprise a particular type of barcode, such as UPC-A and EAN. It defines the technical details of a particular barcode type, linear barcodes were not capable of encoding letters, 2-D barcodes were invented to meet the needs of encoding alphanumeric data, including letters, numbers, and punctuation marks.

PROPOSED METHOD

Includes two main phases of works as illustrated in signal-rich-art code image generation; and message extraction. In the first phase, given a target image IT and a message M , a signal-rich-art code image IC is created by four major steps:

DISCUSSION:

Step 1.1 — transform message M into a bit stream B of codes;

Step 1.2 — transform every three bits of B into four bits and represent them by a binary pattern block, resulting in a pattern image IP ;

Step 1.3 — modulate each pattern block T_i of IP by two representative values calculated from the Y -channel values of the corresponding block B_i of target image IT , yielding a modulated pattern image IP' ;

Step 1.4 — replace the Y -channel of target image IT with IP' to get a signal-rich-art code image IC as the output. In the second phase, given a camera-captured version IC' of a paper or display copy of the signal-rich-art code image IC , a message M' , which is supposed to be identical to M , is extracted from IC' by four major steps:

Step 2.1 — localize the region IC'' of the original part of the signal-rich-art code image IC in IC' ;

Step 2.2 — correct the geometric distortion in IC'' incurred in the image acquisition process, yielding a corrected image IC''' ;

Step 2.3 — identify the unit blocks in IC''' automatically and divide IC''' accordingly into pattern blocks, each with 2×2 unit blocks;

Step 2.4 — binarize each pattern block of IC''' , recognize the result to extract the bits embedded in it, compose all the extracted bits to form a bit stream B , and transform B reversely to get a message M' .

Localized Inverse Perspective Transform

Here Assume that the signal-rich-art code image IC is printed and posted or displayed against a white background, and that the captured image Id contains only the original image of IC and the background. The first assumption here may be removed simply by adding a white surrounding zone to IC . To extract the message from Id , we must localize the region of IC in Id .

Stage 1 — Transforming the message into a bit stream.

Transform message M into a bit stream B .

Stage 2 — Generating the pattern image.

ANALYSIS:

The encoder shown above encodes the $K = 3$, (7, 5) convolutional code. The octal numbers 7 and 5 represent the code generator polynomials, which when read in binary (1112 and 1012) correspond to the shift register connections to the upper and lower modulo-two adders, respectively. This code has been determined to be the "best" code for rate 1/2, $K = 3$. It is the code I will use for the remaining discussion and examples, for reasons that will become readily apparent when we get into the Viterbi decoder algorithm.

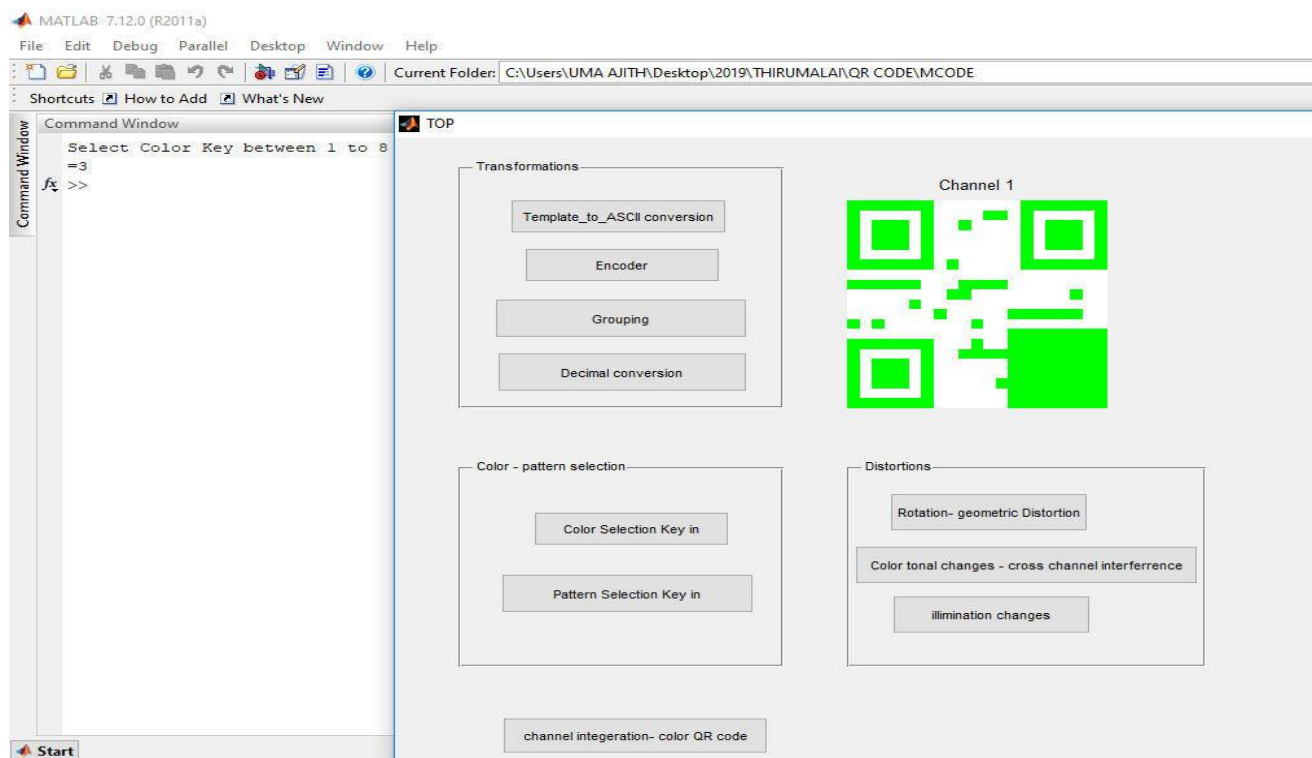


Fig 1 shows the input color key component

FINDINGS:

Repetition codes A repetition code is a coding scheme that repeats the bits across a channel to achieve error-free communication. Given a stream of data to be transmitted, the data is divided into blocks of bits. Each block is transmitted some predetermined number of times. For example, to send the bit pattern "1011", the four-bit block can be repeated three times, thus producing "1011 1011 1011". However, if this twelve-bit pattern was received as "1010 1011 1011" – where the first block is unlike the other two – it can be determined that an error has occurred.

Parity bit A parity bit is a bit that is added to a group of source bits to ensure that the number of set bits (i.e., bits with value 1) in the outcome is even or odd. It is a very simple scheme that can be used to detect single or any other odd number (i.e., three, five, etc.) of errors in the output. An even number of flipped bits will make the parity bit appear correct even though the data is erroneous.

Checksums A checksum of a message is a modular arithmetic sum of message code words of a fixed word length (e.g., byte values). The sum may be negated by means of a ones'-complement operation prior to transmission to detect errors resulting in all-zero messages.

Cyclic Redundancy Checks (Crcs) A cyclic redundancy check (CRC) is a single-burst-error-detecting cyclic code and non-secure hash function designed to detect accidental changes to digital data in computer networks. It is characterized by specification of a so-called *generator polynomial*, which is used as the divisor in a polynomial long division over a finite field, taking the input data as the dividend, and where the remainder becomes the result.

Convolutionally encoding the data is accomplished using a shift register and associated combinatorial logic that performs modulo-two addition. (A shift register is merely a chain of flip-flops wherein the output of the n th flip-flop is tied to the input of the $(n+1)$ th flip-flop. Every time the active edge of the clock occurs, the input to the flip-flop is clocked through to the output, and thus the data are shifted over one stage.) The combinatorial logic is often in the form of cascaded exclusive-or gates. As a reminder, exclusive-or gates are two-input, one-output gates often represented by the logic symbol shown below,

RESULT:



Fig 2 shows the Color Pattern

CONCLUSION :

Here we analyzed the performance of type of signal-rich-QR image for applications of data transfer, called signal-rich-art code image which act as a carrier of a given message. The target image is kept in the created image, achieving the signal-rich-art effect. Here we use configurable color set selection with QR code pattern design, unit block segmentation are proposed for message data extraction. The output image visual appearance of pre-selected target image and acquired versions of the with screen blurring is proved with MATLAB simulation.

To introduce the concept of color QR images, an automatic method to embed this QR codes into color images with tonal based color distortion. These embeddings are compatible with standard decoding applications and can be applied to any color image with full area coverage. The QR information bits are encoded into the different pattern of the image, taking advantage of the uncorrelated disturbances. To mitigate the visual distortion of the QR image, the algorithm utilizes halftoning masks for the selection of modified pixels and nonlinear programming techniques to locally optimize luminance levels.

REFERENCES:

1. B. Davis, "Signal rich art: enabling the vision of ubiquitous computing," Proc.SPIE 7880: Media Watermarking, Security, and Forensics III, N. D. Memon, J. Dittmann, A. M. Alattar, and E. J. Delp III, Eds., vol. 788002, Feb. 2011.
2. S. Poslad, Ubiquitous Computing: Smart Devices, Environments and Interactions, John Wiley & Sons, Chichester, UK, 2009.
3. E. Ouaviani, A. Pavan, M. Bottazzi, E. Brunelli, F. Caselli, and M. Guerrero, "A common image processing framework for 2D barcode reading," in 7th Int. Conf. on Image Process. and Its Appl., vol. 2, no. 465, pp. 652–655, Jul. 1999.
4. C. Zhang, J. Wang, S. Han, M. Yi and Z. Zhang, "Automatic real-time barcode localization in complex scenes," in IEEE Int. Conf. on Image Processing, pp. 497-500, 2006.
5. H. Yang, A. C. Kot, and X. Jiang, "Accurate localization of four extreme corners for barcode images captured by mobile phones," Proc. IEEE Int. Conf. on Image Processing, pp. 3897-3900, 2010.

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DESIGN AND ANALYSIS OF STEERING KNUCKLE FOR WEIGHT OPTIMIZATION BY USING FEA

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Abstract: Steering knuckle is the major component of a vehicle, which, connects the suspensions systems, braking system and the steering system to the chassis of the vehicle. The steering knuckle provides motion to the desired directions with the help of the steering system. A steering knuckle should have high Precision, durability and less weight. The purpose of this paper is to design a knuckle which is less in weight and has a better performance and comfort steering effort. First step, the steering knuckle is designed with the help of Auto CAD (by using reverse engineering method to convert the passenger vehicle knuckle into 3D model) design and estimating the actual loads, which are acting on the component, material (Grey cast-iron) properties, boundary conditions and loading conditions.

Key Words: Steering knuckle Design (Auto CAD), static structural analysis (Ansys.14.0), FEA.

INTRODUCTION:

Steering knuckle is the critical component of the vehicle which is linked with suspension system, braking system and steering system. It allows steering arm to turn the front wheel and it also supports the vertical weight of the vehicle. The steering knuckle is the connection between control arms, tie rod or steering arm and braking callipers and these are also connected at the suspension system in this, wheel hub is fixed with steering knuckle with the help of bearing. The main function of steering knuckle is to convert linear motion of the tie rod into the angular motion of the stub axle in the automobile industry. The requirement of properties of steering knuckle that must be strong, inflexible and light as well as possible. When steering is turned by drivers. Half portion of the steering knuckle is turned by drivers. Half portion of the steering knuckle component is subjected to tensile load and another half portion of steering knuckle component is subjected to compressive load and due to this rotation of wheel. Steering knuckle is subjected to torsion load. steering knuckle is that structure on the wheel hub, to which the tie rod ends of the track rod transfer motion to the wheels.

LITERATURE REVIEW:

It is variously called a steering knuckle, spindle, upright or hub, as well. Tie rod ends and the track rod are the links of the steering system of the vehicle, which are designed according to a particular steering geometry among the off-road vehicle structural components, the steering knuckle is one of important & non-standard component which is connected to steering, suspension and brake to the chassis of vehicle. It plays a crucial role in minimizing the vertical and roll motion of the vehicle body, which implies a poor passenger experience, when a vehicle is driven on a rough road. The steering knuckle accounts for maximum amount of weight of all suspension components, which requires high necessity of weight reduction. Under operating condition, it is subjected to dynamic forces transmitted from strut and wheel on cars with MacPherson strut suspension systems, the steering knuckle has an opening to allow connection of the axle shaft to the wheel hub and bearing assembly.

MATERIALS:

PARTS OF THE STEERING KNUCKLE:

The part of the steering knuckle component are given below,

- Upper control arm
- Lower control arm
- Steering arm
- Brake caliper

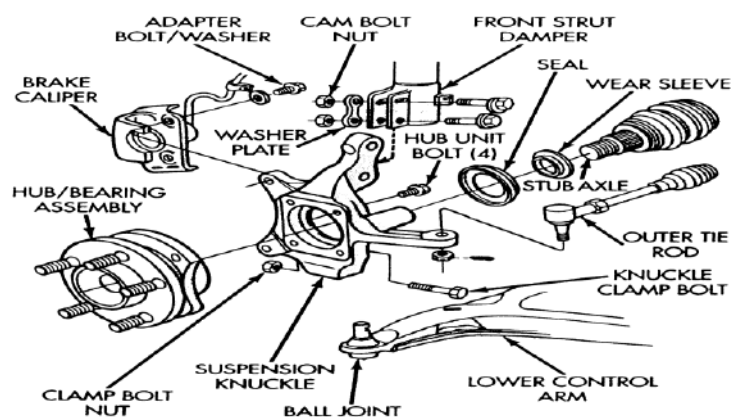


Figure 1 Structure of the steering knuckle component



Figure 2 Parts of steering knuckle component

METHOD:

The shape and size of steering knuckle component depends upon the vehicle because vertical load of the vehicle is directly act on it and component subjected to power thrust from tie rod to the stub axle and hence it must be strong and inflexible in nature. The steering knuckle in the automobile industry can be made either by forging or casting.

STATIC STRUCTURAL ANALYSIS OF STEERING KNUCKLE:

To observe maximum stresses and deformation of steering knuckle when different forces such as braking load, acceleration load and cornering loads are combinedly applied on its static structural analysis is performed.

SHAPE OPTIMIZATION:

All manufacturing enterprises strive to develop the optimized product commonly by reducing the weight, while ensuring they produce cost effective products that meet their design functionality and reliability. Structural optimization tools like topology and shape optimization along with manufacturing simulation are becoming attractive tools in product design process. These tools also help to reduce product development time. Shape optimization gives the optimum fillets and the optimum outer dimensions. This paper focuses of static analysis and shape optimization. Finite element analysis has been used to implement optimization and maintaining stress and deformation levels and achieving high stiffness. Reduction of weight has been one of the critical aspects of any design. It has substantial impact on vehicle performance, fuel efficiency and in turn reduces the emissions.

METHODOLOGY:

This process has been followed in two phases. The phase1 study includes modelling of steering and analysis of it's original condition. phase2 where shape optimization study and FEA involves.

DESIGN OF STEERING KNUCKLE:

The modelling of the steering knuckle is designed in 3D by using Auto CAD 2015 software. It consists of all the necessary dimensions and points like calliper mounting points, stub hole, steering tie rod mounts, and upper and lower- control arms mounting points, design of the steering knuckle dimensions are taken by the reverse engineering method from a passenger car vehicle.

DISCUSSION:

MATERIAL SELECTION:

Here the ASTM grade 40 grey iron is used for this project as material. The corresponding properties are listed below. Grey cast iron is the least expensive and the most common type of cast iron. It is an alloy of carbon and silicon with iron.

MICROSTRUCTURE OF THE GREY CAST IRON:

It consists of graphite flakes which resemble a number of potato crisps glued together at a single location. Graphite flakes are surrounded by ferrite or pearlite matrix. The fractured surface appears in a grey color. That's why this cast iron is described as a grey cast iron.

CHARACTERISTICS OF GREY CAST IRON:

It does have an excellent compressive strength compare to the tensile strength three to four times also it doesn't propagate crack while compression. It also has good torsion and shear strengths. It has good corrosion resistance and it exhibits excellent machinability. It possess good wear resistance is adhesive wear conditions.

Physical parameter	Equivalent value
Density	7200 kg/cm ³

Mechanical parameter	Equivalent value
Compressive strength	970Mpa
Tensile strength	310Mpa
Young's modulus	180Gpa
Poisson's ratio	0.29
Fatigue strength	130Mpa
BHN	230
Yield strength	170Mpa
Thermal conductivity	46W/m ^k

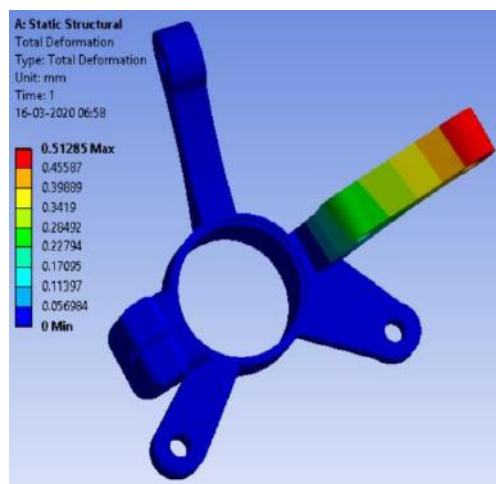
PHYSICAL PROPERTIES & MECHANICAL PROPERTIES

ANALYSIS:

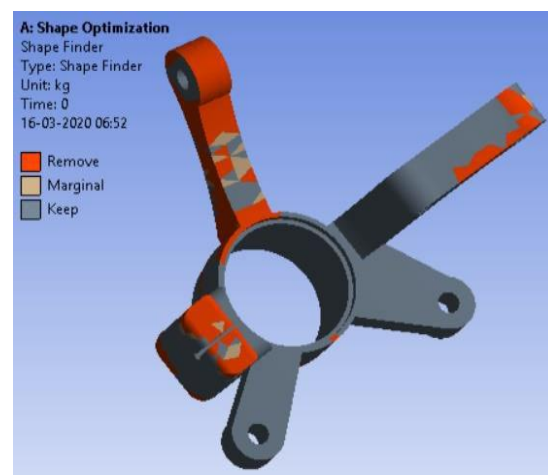
ANAYSIS RESULTS:

INITIAL MODEL ANALYSIS RESULTS

A knuckle was designed for the calculated loads, The weight of the knuckle was 3.843kg. Stress and Displacement Analysis is performed on the knuckle by applying the various loads calculated. Loads are applied in singular as well as in combination to simulate real-time road conditions. The analysis was done using ANSYS 14.0.



Total deformation of initial model



Shape optimization

FINDINGS:

As per the Newton's second law,

$$\text{Force (F)} = ma \text{ (or) } F = mg$$

Here, F = force acting on the knuckle.

m = mass acting the knuckle.

a = acceleration.

g = gravitational acceleration (9.81 m/s as standard value for G force)

By static analysis of knuckle under above conditions, There are two types of load acting on knuckle i.e. force and moment

Therefore, the mass acting on the steering knuckle component is, $m = 360\text{kg}$. (calculated mass)

$$\begin{aligned}\text{Braking force} &= 1.5mg \\ &= 1.5 \times 360 \times 9.81 \\ &= 5297.4 \text{ kg m/s (or) N}\end{aligned}$$

$$\begin{aligned}\text{Moment} &= \text{braking force} \times \text{perpendicular distance} \\ &= 5297.4 \times 94 \text{ mm (as consider from vehicle design)} \\ &= 497955.6 \text{ N-mm (for one wheel)}\end{aligned}$$

RESULT:

OPTIMIZED MODEL ANALYSS RESULTS:

Optimization for Weight Reduction study was done. The software used for shape optimization is ANSYS 14.0. Keeping the same magnitude of loads and identical loading conditions the result obtained shows the parts of the knuckle from where the material can be removed without disturbance of internal stress flow patterns within the material. Hence the Max Stress was 74.60 MPa. which gives a factor of safety of 3.21.

Results	Initial model	Optimize d model	% of reduction
Total (mm) deformation	0.512	0.523	
Equivalent stress(Mpa)	70.54	74.60	
Mass (or) Weight	3.84	3.38	12 %

Hence even though there is significant weight reduction the design is safe. The maximum displacement was 0.523 mm.

CONCLUSION:

By using the Shape optimization technique we have obtained weight optimization of about 12 % when compared to conventional knuckles which are available in present day without any change in the material properties and load constraints which ultimately lead us in the reduction in the cost of manufacturing cost, as well as, improving in the steering effort, vehicle stability, and ultimately lead to decrease in the fuel consumption.

REFERENCES:

1. S. J. Deshmukh, P. J. Bhadange, "Optimization of Steering Knuckle for All Terrain Vehicle", International Conference on Recent Trends in Engineering Science and Technology (ICRTEST-2017), Darapur, India. ISSN: 2321-8169 Volume: 5 Issue: 1 (Special Issue 21-22 January 2017).
2. Vishnu Vardhan Y, D. Vijay Reddy, K. Siva Sankar Reddy, E. Bhargav Sai, "design and optimization of passenger atv knuckle" Imperial International Journal of Eco-friendly Technologies (IIJET) vijayavada, India. Vol. - 1, Issue-1 (2016), pp.183-187.
3. B. Babu1, M. Prabhu2, P. Dharmaraj3, R. Sampath4, "stress analysis on steering knuckle of the automobile steering system" International Journal of Research in Engineering and Technology, Coimbatore, India. eISSN: 2319-1163 (pISSN: 2321-7308)
4. Mahesh P. Sharma1, Denish S. Mevawala2, Harsh Joshi3, Devendra A. Patel, "Static Analysis of Steering Knuckle and Its Shape Optimization". IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE). e-ISSN: (2278-1684), p-ISSN: 2320-334X, (PP 34-38).
5. Viraj Rajendra Kulkarni, Amey Gangaram Tambe, "Optimization and Finite Element Analysis of Steering Knuckle" Altair technology conference (2013), Pune, India.
6. Purushottam Dumbre, A. K. Mishra, V. S. Aher, "Structural Analysis of Steering Knuckle for Weight Reduction" International Journal of Emerging Technology and Advanced Engineering, Sangamner, India. (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 4, Issue 6, June 2014).
7. R. Prem Raj, K. Palpandi, "Static Analysis and Topology Optimization of Steering Knuckle by Using Finite Element Method" International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Vol. 4, Special Issue 13, December 2015.

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Design and Fabrication of Sheet Metal Cutting Using Geneva Mechanism

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Abstract: *The Geneva drive or Maltese cross is a gear mechanism that translates a continuous rotation into an intermittent rotary motion. In the most common arrangement, the driven wheel has four slots and thus advances for each rotation of the drive wheel by one step of 90°*

INTRODUCTION

The design and fabrication of sheet metal cutting using Geneva mechanism is useful to cut sheet metal in equal and accurate dimension. Geneva drive is an indexing Mechanism that converts continues motion to intermittent motion, Due to which sheet moved between the intervals of cutting period. Now days, there is lot of competition in the market. So there is need of developing a new method or process for effective manufacturing. That process or methods should fulfill the requirement about accuracy Productivity. This metal represents the automatic metal cutting machine by using Geneva mechanism. This equipment is very accurate to cut the metal. This concept will be mainly used in the metal manufacturing industry to cut the metal in huge numbers. The equipment is fabricated in less cost and good efficient. The aim of this concept is to reduce the human fatigue and time savings in industries by eliminating the metal making time. Here it has analyzed to use Geneva Mechanism. This is the mechanism used to

Get intermittent motions. This mechanism consists of the following parts like Geneva wheel, rotating disc, bearing, frame and DC motor. In industries the metal cutting machines go through a time taking process of metal marking which is required to cut the metal of required dimensions, so this model is designed by using Geneva mechanism which eliminates the metal marking time and feeds the metal of equal length in each rotation. Geneva mechanism is used as a mechanism for transforming rotary motion into intermittent motion running with acceleration jumps at the beginning and the end of the active phases. The rotating drive wheel has the pin that reaches into a slot of the driven wheel advancing into it by one step. The drive wheel also has a raised circular blocking disc that locks the driven wheel in position between steps. The Geneva drive or Maltese cross is a gear mechanism that translates a continuous rotation into an intermittent rotary motion. The rotating drive wheel has a pin that reaches into a slot of the driven wheel advancing it by one step. The drive wheel also has a raised circular blocking disc that locks the driven wheel in position between steps. In the most common arrangement, the driven wheel has four slots and thus advances by one step of 90 degrees for each rotation of the drive wheel. If the driven wheel has n slots, it advances by $360^\circ/n$ per full wheel rotation of the drive wheel. A four bar mechanism is a basic 1 degree of freedom mechanism. A 4 bar is created by selecting four link lengths and joining the links with revolute joints to form a loop. A wide variety of paths are possible by arbitrarily choosing a point on the coupler curve. These different curves can be obtained by constructing a physical model of the mechanism and viewing the path of various points without detailed mathematical analysis. It is also possible to develop a mathematical model of the mechanism in terms of its four link lengths. The analytical expressions for these paths are algebraic and require many computations to determine the coordinates for points on the path. A procedure to determine the link lengths of a 4-bar mechanism that will guide its coupler curve in a prescribed manner. The mathematical formulation of this procedure for designing a 4-bar mechanism. The use of a computer for the design of 4-bar mechanisms. This activity precipitated much interest in creating additional analytical approaches to specify mechanisms capable of satisfying a desired task. Interestingly, the number of points is usually three, four or five. This methodology of path generation is referred to as an exact method

LITERATURE SURVEY

The design and analysis of paper cutting machine based on Geneva was analyzed by Vijay et al. [1], they presented a comparison of the position, velocity, acceleration, and jerk between the classical Geneva wheel mechanism and the proposed mechanism. This analysis presents a kinematic study of a mechanism incorporating a Geneva wheel and a gear train to achieve intermittent motion and was declared as a designated analysis and succeeded largely due to its positive economic factors. The design and fabrication of paper cutting machine using Geneva mechanism is useful to cut papers in equal and accurate dimension.

WORKINGING

This model parts are Geneva mechanism, motor, chain sprocket, roller, cutter and spring. Two rollers are mounted according to the required distance the belt is mounted on the rollers on which the paper is placed. The rollers shaft is coupled with the Geneva drive. The Geneva drives shaft is coupled with the motor shaft hence when power is supplied to the motor rollers rotate with a certain time delay according to the Geneva drive and the chain drive moves along the rollers. Motor connecting to the chain sprocket and sprocket connecting to the Geneva mechanism. Motor has been on to rolling the Geneva so that start to the paper roll. One roller has fixed on the try another roller connecting in Geneva wheel. Cutter fixed to the spring connecting to cutter. Motor shaft connect to cutter wire motor has been rotating cutter is upon down motion then cutting to the paper this is the automatic paper cutting machine by using Geneva mechanism. The following steps are followed for conduction. When cam pin is in extreme right position i.e. engage position, the crank shaft will be at extreme bottom position. Hence the cutter is in full open position. When cam pin is in extreme bottom position i.e. disengaging position, the crank shaft will be at extreme left position. Hence the cutter is in partial cutting position. When cam pin is in extreme left position i.e. disengage position, the crank shaft will be at extreme top position. Hence the cutter is in full cutting position. When cam pin is in extreme top position i.e. disengaging position, the crank shaft will be at extreme right position. Hence the paper cutting is achieved by above four processes of Geneva and cutter.

MAIN COMPONENT

- a. Geneva wheel.
- b. Roller chain.
- c. cutting blade.
- d. Sheet Metal.
- e. Pneumatic Piston.
- f. Motor.

a. Geneva Wheel

Four Slot driven wheel, we are using thus its advances by one step of 900 for each rotation of the drive wheel. Hence the intermittent motion is achieved for $\frac{1}{4}$ of the 3600. A mechanism that translates a continuous rotation into an intermittent rotary motion, using an intermittent gear where the drive wheel has a pin that reaches into a slot of the driven wheel and thereby advances it by one step, and having a raised circular blocking disc that locks the driven wheel in position between steps.

b. Roller Chain

A roller chain is the type of chain driven most commonly used for transmission of mechanism power between two sprockets. It consist of a series of short cylindrical rollers held together by side links. It is driven by a toothed wheel called a sprocket.

c. Cutting Blade

A metal cutting is a tool, designed to cut metal with a straight edge metal cutters vary in size. This metal cutter is used as the oscillator in the four bar crank and lever mechanism.

d. Sheet Metal

Sheet metal fabrication is a classification of manufacturing processes that shape a piece of sheet metal into the desired part through material removal and/or material deformation. Sheet metal, which acts as the workpiece in these processes, is one of the most common forms of raw material stock. The material thickness that classifies a workpiece as sheet metal is not clearly defined. However, sheet metal is generally considered to be a piece of stock between 0.006 and 0.25 inches thick.

e. Pneumatic Piston

Pneumatic cylinder guides the piston in a cylindrical metal piece that moves in a straight line in the cylinder. The air is converted into mechanical energy by expansion in the engine cylinder by expansion. The gas is compressed in the cylinder of the compressor to increase the pressure. Pneumatic cylinder is composed of cylinder, end cover,

piston, piston rod and seal. The piston is lubricated by the oil mist in the compressed air when the cylinder works. There are also small parts of the lubricating cylinder.

f. Motor

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion. The specification of motor used is 12 Volts, 4.5 Amps with 30 rpm.

DESIGN CALCULATION

The design calculation of Geneva contains terms as:

R = radius of Geneva Wheel

r1 = radius of driving crank

rp = radius of driven pin

e = center distance

α = semi indexing angle (driven)

b = semi indexing angle (driver)

z = number of slots on the driven disk

ω = angular velocity of driving crank

n = speed of rotation of crank (rpm).

Θ = angle of locking

Number of slots on Geneva wheel (Z) = 4

Nmotor = 60 rpm

For Z=4

a) Semi indexing angle: (α) = 45°

b) Gear ratio (E) i.e. ratio driving crank Speed of Geneva wheel 1:1

$$\begin{aligned} \text{c) Indexing Time ratio: } V &= \frac{[Z-2]2Z}{[4-2]2 \times 4} \\ &= 0.25 \end{aligned} \quad (1)$$

$$\begin{aligned} \text{d) Semi indexing Angle (driver crank): } \beta &= \frac{\pi [Z-2]2Z}{\pi [4-2]2 \times 4} \\ &= \frac{\pi}{4} \end{aligned} \quad (2)$$

$$\begin{aligned} \text{e) For entry without shock: } (R/e) &= \sin \frac{\pi Z}{4} [R/e] \\ &= \sin \frac{\pi 4}{4} \\ &= 0.707 \end{aligned} \quad (3)$$

f) Now, on the basis of space available, center distance (e) = 35mm

$$R/e = 0.707 \times 35$$

$$R = 25 \text{ mm.}$$

$$\text{Radius of Geneva} = 25 \text{ mm}$$

$$\text{Hence, Diameter of Geneva wheel} = 50 \text{ mm}$$

$$\begin{aligned} \text{g) Angle of locking: } \Theta &= \frac{\pi Z [Z+2]}{\pi 4 [4+2]} \\ &= 270^\circ \end{aligned} \quad (4)$$

h) Smin = distance between the centre of Geneva wheel radii of curvature of slot on wheel Smin = 0.2929 e

Where, e = 35mm

$$S_{\min} = 35 \times 0.2929$$

$$S_{\min} = 10 \text{ mm}$$

Length of slot is 18mm and thickness is 10 mm

Selection of motor

Mtd – net torque on driven shaft

Mtf – frictional torque on driven wheel

I – mass moment of inertia of all attached masses reflected to driven

Shaft N – efficiency of Geneva Mechanism = 0.95

When the driven shaft mounted is mounted on antifriction bearings

Mti – inertia torque on driven shaft

Assuming $M_{tf} = 0$

Net torque on driven shaft: $M_{td} = M_{tf} + M_{ti}$ (5)

$$M_{td} = M_{ti}$$

Inertia torque on driven shaft: $M_{ti} = I \cdot \alpha$ (6)

Mass moment of inertia of all attached masses reflected to driven: $I = m k^2$ (7)

$$= 30 \times 0.052$$
$$= 0.75 \text{ Kg.m}^2$$

Substituting I and α in eq. (7)

$$M_{ti} = 0.075 \times 9.81 \times 1.5625$$

$$= 1.1496 \times 10^3 \text{ N mm}$$

$$M_{ti} = M_{td}$$

$$w \times 1/n = 1.149 \times 0.3141/25 \times 10.95$$

$$M_{ti} = 0.303 \text{ Nm}$$

Instantaneous power required on the driving shaft: $N = M_{ti} \cdot \omega/75 \text{ H.P.}$ (8)

$$= 0.303 \times 0.314/75$$

$$= 0.00127 \text{ H.P.}$$

From this selecting the motor having the large power than that of

$$N = 0.00127 \text{ H.P.}$$

So selecting the synchronous motor having power capacity

$$= 0.002 \text{ H.P.}$$

ADVANTAGES

- It will reduce the time for marking the metal.
- The dimension of the metal will be accurate.
- Manufacturing cost is less.
- No noise pollution.
- Can be used for small scale industries.

CONCLUSION

The design and analysis of metal cutting machine using Geneva mechanism will be very useful for small scale industry. There are machine based on metal cutting but it has demerits like large in size, costly, need skilled labours to operate and it need electrical input. But we have our machine which will overcome this demerit by compact size, less cost no need for skilled people and there is no need of electrical input. The main aim of this machine is to reduce timing for metal cutting and neglect the time for marking the sheet metal. This aim can be achieved by our machine.

FUTURE SCOPE

- Implementation for large industries is possible.
- By changing cutter shape we can cut metal with different designs.
- By modifying Geneva slots we can cut different standard size metal.
- Machine can be modified to cut lather and other thick sheets.

REFERENCES

1. Vijay Kumar U, Ghanshyam Kumar, Dhareesh Bansod, Deepak Sahu, Rishabh Bendre and Aakanksha Suryawanshi, Design and Analysis of Paper Cutting Machine work on the Geneva Mechanism, IJARIE, 2(2), 2016, 35-43.
2. Han Jiguang Yu Kang, Analysis and Synthesis of Geneva Mechanism with Elliptic Crank, International Journal of Hybrid Information Technology, 8(8), 2015, 253-260.
3. Haraga and Elena Ionita, Aspects Theoretical and Practical based on the Finite Element Analysis and Modeling of Geneva Mechanism, IJASTR, 1(2), 2015, 20-40.

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Reciprocating wheel spray pump for agriculture purpose

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Abstract:. The project is intended to help the farmers as India being an Agriculture based country. It is a Pesticide Sprayer mounted on a Cart which is operated mechanically without any external source of energy. The aim of developing such a concept is primarily because of preventing the 3 major drawbacks of the pump being used currently- Firstly, the farmer has to carry the entire weight of the pesticide spraying (approx. 20+ kg) pump on his shoulder; secondly, he has to continuously use his one hand to pump using the handle; thirdly, the farmers don't take enough precaution which results in fatal diseases because of direct contact with the chemicals. All these factors have been taken care of in this project along with being cost effective, light in weight and good in strength. The pump already available with the farmer can be directly used in this mechanism. The handle of the sprayer will be mechanically operated through the rotating shaft of the wheels of the cart using an efficient mechanism. This will result into the reciprocating motion of the piston and hence pumping will be done. This will be a case of Pure Mechanical Automation.

Key Words: Sprayer, Trolley, Slider-Crank Mechanism, Mechanical Automation.

INTRODUCTION:

Farming is the backbone of Indian economy. In this agriculture sector there is a lot of field work, such as weeding, reaping, sowing etc. Apart from these operations, spraying is also an important operation to be performed by the farmer to protect the cultivated crops from insects, pests, fungi and diseases for which various insecticides, pesticides, fungicides and nutrients are sprayed on crops for protection. Farming has undergone a great evolution in last 50 years. Out of the various reasons involved for this evolution is control of various diseases on crops. Now days, there are many types of pesticide sprayer already in market. For the different types of pesticide sprayer there are have a different shapes, sizes, method to carry it but the function are same. The current idea on sprayer in our project is to utilize effectively for reducing time of spraying, human efforts and cost of spraying. The conventional sprayer having some difficulties such as it needs lot of effort to push the lever up and down in order to create the pressure to spray. Another difficulty of petrol sprayer is to need to purchase the fuel which increases the running cost of the sprayer.

It produces more vibrations and noise that irritates the farmer and he refuse to do such work repeatedly. In order to overcome these difficulties, we have proposed a wheel driven sprayer, it is a portable device and no need of any fuel to operate, which is easy to move and sprays the pesticide by moving the wheel. The mechanism involve in this sprayer is reciprocating pump, and nozzles which we reconnected at the front end of the spraying equipment. A special arrangement is implemented for adjusting the pressure as low and high with the help of adjusting the nut. Also the weeding is done by this equipment. In Agricultural sector use of cheap and beneficial equipment for effective weeding and spraying for increase productivity which is very important for better contribution for India's GDP.

We have to make economic machineries so farmers can purchase it as per capital income of our country's farmers are low and our country per capital income is low that of compared to other country as our country is developing country. Present scenario in agricultural field in India related to sprayer is that farmers are using hand operated sprayer or motorized sprayer. According to idea in our project we are making a small agricultural reciprocating multi sprayer which is mechanically operated by a slider crank mechanism.. As more no of nozzle are there hence spraying is done rapidly and time and money is saved.

LITERATURE REVIEW:

Gururaj et al India is set to be an agricultural based country and approximately 75% of the peoples are dependent on farming directly or indirectly, in this agriculture sector there is a lot of field work, such as weeding, reaping,

sowing etc. Apart from these operations, spraying is also an important operation to be performed by the farmer to protect the cultivated crops from insects, pests, fungi and diseases for which various insecticides, pesticides, fungicides and nutrients are sprayed on crops for protection. In today's world, we use many different spraying technologies involving use of energy like electrical energy, solar energy, and chemical energy of fuels. This fact makes us know that how large amount of energy is getting used at such place where mechanical energy can be used instead of direct energy sources. Farmers are facing enormous problem while spraying the pesticide like tank capacity is very small, high cost and spraying time taken more. In order to reduce these problems many different type of sprayers has been introduced in the market, but these devices do not meet the above problems or demands of the farmers.

Saravanakumar et al In agricultural sector generally farmer uses traditional way that is spray carried on backpack and spraying crop. This becomes time consuming, costly and human fatigue is major concern, these problems can be overcome by using agricultural reciprocating multi sprayer. It facilitates uniform spread of the chemicals, capable of throwing chemicals at the desired level, precision made nozzle tip for adjustable stream and capable of throwing foggy spray depending on requirement. In our project we use slider crank mechanism to convert rotary motion into reciprocating motion to operate the pump, thus the pesticide is spread through the nozzle. This work gives continuously flow of pesticide at required pressure and height. A special arrangement is implemented in this project to adjust the pressure as high or low. We also use a weed cutter in our model for removing unwanted plants. By using agricultural sprayer, spraying time and weeding time, human efforts reduces and results in cost reduction.

Sandeep et al India is a land of agriculture which comprises of small, marginal, medium and rich farmers. Small scale farmers are very interested in manually lever operated knapsack sprayer because of its versatility, cost and design. But this sprayer has certain limitations like it cannot maintain required pressure; it lead to problem of back pain. However this equipment can also lead to misapplication of chemicals and ineffective control of target pest which leads to loss of pesticides due to dribbling or drift during application. This phenomenon not only adds to cost of production but also cause environmental pollution and imbalance in natural echo system. This paper suggests a model of manually operated multi nozzle pesticides sprayer pump which will perform spraying at maximum rate in minimum time. Constant flow valves can be applied at nozzle to have uniform nozzle pressure.

CONSTRUCTION:

The main components of agricultural reciprocating multi sprayer are as follows:

Sprockets: The name 'sprocket' applies generally to any wheel upon which radial projections engage a chain passing over it. It is distinguished from a gear in that sprockets are never meshed together directly, and differs from a pulley in that sprockets have teeth and pulleys are smooth. We use freewheel and chain wheel for chain and sprocket arrangement.

Chain: The chain is made of steel which is used to transmit power from gear sprocket to pinion sprocket, and it has a no sleep.

Crank: The function of crank is to transfer motion from prime mover to the connecting rod for further operation. Here the circular disc having eccentricity at which rotary motion of crank is converted into reciprocating/linear motion of connecting rod.

Connecting rod: The main function of connecting rod is to convert rotary motion into reciprocating/linear motion. Here connecting rod convert rotary motion of crank to reciprocating motion of pump and extension rod.

Pump: It consist of piston and cylinder arrangement, it has a lever to operate the motion of piston in reciprocating direction. The pump generates the pressure of 2 bar and discharge of 2 lpm.

Nozzle: It is a device which converts the pressure energy of fluid into kinetic energy, spray nozzle is a precision device that facilitates dispersion of liquid into a spray. Nozzle is used for purpose to distribute a liquid over an area.

Wheel: Wheel is used to carry the whole assembly and move machine from one place to another by rotary motion of it. A bicycle wheel is a wheel, most commonly a wire wheel, designed for a bicycle. Bicycle wheel is designed to fit into the frame and fork via drop outs, and hold bicycle tyre. A typical modern wheel has a metal hub, wire tension spokes and a metal or carbon fiber rim which holds a pneumatic rubber tire. We use a tubeless tire wheel.

Frame: The main function of frame is to carry whole assembly on it so it has to be strong enough to hold it. The frame is made of square pipe and it is formed out of mild steel.

Tank: We want our tank to carry as much fluid as it can be along with its self weight as less as possible. We have taken a tank which is almost 16 liter capacity. A material for tank used is plastic fiber. Plastic fiber is very low in weight as compared to other materials. It also has very low cost.

WORKING:

The figure 1 & 2 shows the assembly of the agricultural sprayer. The operator grabs the handle and pushes the cycle forward as cycle moves forward, the wheel rotate. When the wheel rotates then the gear sprocket mounted on wheel is also rotate at same speed. The chain drive transfers the motion of gear sprocket to pinion sprocket. The pinion

sprocket and crank is mounted on either side of same shaft, the rotary motion of shaft is converted into the reciprocating motion with the help of crank and connecting rod mechanism. The connecting rod is also connected with lever and then the lever oscillates at fulcrum. The piston connected at fulcrum produce reciprocating motion in cylinder and the required pressure is achieved. The pesticide from tank sucks in cylinder and piston forced the pesticide to nozzle through the pipe; the numbers of nozzles are connected to spray the pesticide. We can adjust the pressure, which is required for spraying with the help of special arrangement is to change the length of crank by providing slot on crank. By providing some adjustment at joint of connecting rod and lever free rotation of crank or neutral position can be achieved. Using these adjustments pumping is stop and the wheel rotate freely when you need not spray pesticide.



Figure 1. Diagram for Agricultural Sprayer



Figure 2. complete diagram for Agricultural Sprayer

SPECIFICATIONS:

- Length of frame , $L= 915$ mm.
- Rear portion breadth frame , $B_1= 460$ mm.
- Front portion breadth frame , $B_2= 270$ mm.
- Height of frame , $H= 640$ mm.
- Holding rod length = 385 mm.
- Maximum height of spraying , $H_{max}= 770$ mm.
- Stem height of back portion , $h= 305$ mm.
- No .of teeth in gear sprocket , $Z_1= 45$ teeth.
- No .of teeth in pinion , $Z_2= 14$ teeth.
- Diameter of gear sprocket , $D = 190$ mm.
- Diameter of pinion , $d = 80$ mm.
- Length of tank holder , $l= 355$ mm.
- Breadth of tank holder , $b= 175$ mm.
- Stroke length of crank = 80 mm.
- Tank capacity = 16 litres.
- Frame to Tank holder length = 210 mm.
- Distance between gear sprocket and pinion. = 400 mm
- Connecting rod length = 650 mm.
- Wheel diameter = 60 mm.

CONCLUSION

- ✓ The suggested model has removed the problem of back pain, since there is no need to carry the tank (pesticides tank) on the back.
- ✓ As suggested model has more number of nozzles which will cover maximum area of spraying in minimum time & at maximum rate.
- ✓ The c.f. valves can also be applied which help in reducing the change of pressure fluctuation and c.f. Valves helps to maintain pressure.
- ✓ Proper adjustment facility in the model with respect to crop helps to avoid excessive use of pesticides which result into less pollution.
- ✓ Imported hollow cone nozzles should be used in the field for better performance. 6. Muscular problems are removed as there is no need to operate the lever.
- ✓ This alone pump can be used for multiple crops.

FUTURE SCOPE:

Near about 50-60% of Indian occupation depends on farmers. India is under-developed country and many farmers cannot afford costlier machines for these operations. Several modifications can be made to improve the performance of proposed model. The modifications can be as follows;

- Solar energy can be used instead of mechanically pushing the vehicle.
- Sensors can be used so that the movement of the vehicle can take place automatically.
- AI (Artificial Intelligence) can be introduced in near future with less investment.

REFERENCES

1. Application technology: Problems and opportunities with Knapsack sprayer, Including the cf valves or Constant Flow Valves.- David McAuliffe and Vanessa P. Gray
2. Journal of arboriculture weed control in landscape plantings¹ by J.F. Ahrens April 1981 vol. 7, no. 4.
3. Backpack Sprayer-Modified for small farm Crop Protection-Rutgers Snyder Research & Extension Farm Staff-Edited by John Grande and Jack Rabin.
4. To Spray or Not to Spray: Pesticides, Banana Exports, and Food Safety John S. Wilsona Tsunehiro Otsuki*, b a b Development Research Group (DECRG), World Bank, 1818 H Street NW, Washington, D.C. 20433, USA March 2002.
5. Farmers understanding of pesticides safety labels and field spraying practices. By Oluyede Clifford Ajayi and Festus K. Akinnifesi_Scientific Research and Essay Vol (2), pp.204-210, June 2007 ISSN 1992-2248@2007 Academic Journals .
6. Wilcoz. M. 1969. A sprayer for application of small amounts of herbicides to flats. Weed Sci. 17:263-264.
7. Performance evaluation of bullock drawn sprayers for cotton crop-m. Veerangouda, k. V. Prakash, Jag Jiwan Ram and G. Neelakantayya.
8. Designing, construction and evaluation of tractor-back sprayer with Variable Rate Technology (VRT) by using aerial maps information Mehrdad Fouj Lali¹, Parviz Ahmadi Moghadam² 1 msc in Mechanics of Agricultural Machinery, Urmia University, Iran 2 Assistant Professor in Mechanics of Agricultural Machinery, Urmia University, Iran.
9. Maharashtra Progressive Agriculture – A new Horizon –Confederation of Indian Industry
10. Modification of a knapsack sprayer for more efficient use j. Founk.
11. Small farmers in India-Challenges and opportunities- S.Mahendra Dev .
12. Modification of a Knapsack Sprayer for more efficient use- J.Founk Research Station, Agriculture Canada, Harrow, Ontario NOR.

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Mechanical properties of banana fiber, kenaf fiber and aluminium mesh reinforced epoxy composites

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Abstract: Nowadays, Natural Fiber Reinforced composites (NFCs) are emerging to be a good substitute for synthetic fiber reinforced composites as NFCs have many advantages such as low density, high specific strength, recyclability, low cost and good sound abatement quality etc. Among all types of NFCs, a vast study has been done on banana fiber, kenaf fiber and Aluminium mesh with EPOXY resin reinforced composite. However, only limited work has been done on the banana fiber, kenaf fiber reinforced composite and the effect of their hybridization on mechanical properties. Effect of alkali treatment on kenaf fiber reinforced composite is discussed in the project. The laminate was prepared by using hand lay-up method. For a improving the mechanical properties for the reinforcement composites material like Tensile, Impact, Flexural, Hardness and water absorption test has been performed on a specimen according to ASTM (American society for testing and material) standard.

Key Words: Natural Fiber, Banana Fiber, Kenaf Fiber, Hand Lay-up, Aluminium mesh

INTRODUCTION:

In recent years, the interest in composite materials is increasing due to its advantages as compared to synthetic fiber. Composites materials can be defined as engineered materials which exist as a combination of two or more materials that result in better properties than when the individual components are used alone. Composites consist of a discontinuous phase known as reinforcement and a continuous phase known as matrix.

In practice, most composites consist of a bulk material the matrix, and a reinforcement of some kind, added primarily to increase the strength and stiffness of the matrix. NFCs are found to be new emerging material. An increasing amount of interest has developed over the past few years in NFCs, especially due to weight saving, low cost, and attractive look. Especially, Natural fibers such as Bamboo, Banana, Kenaf, Hemp, jute, flax are showing good compatibility in automotive applications. One of the reasons for this growing interest in natural fibers, as it has higher specific strength than glass fiber and a similar specific modulus. The energy consumption to produce natural fiber is far less than synthetic fiber. The main advantage of using natural fiber is they are biodegradable and recyclable, while synthetic fiber shows poor recyclable characteristics. Hybridization of banana woven and kenaf fiber chosen considering its attractive look and low weight. So, an attempt has been made to study the mechanical properties of the banana fiber, kenaf fiber and hybrid banana fabric/kenaf fiber reinforced composites.

APPLICATIONS OF COMPOSITES:

- Banana/kenaf fiber reinforced composites have excellent mechanical properties. In the automotive manufacturing industry, composite materials are mainly used in a variety of body components, engine cover, dashboard, door, floor, seat, refrigerated truck, fire engine, box car and other transport tanker.
- Light-weight-Composites are incredibly light weight, especially in comparison to materials like concrete, metal and wood. Often a composite structure will weight $\frac{1}{4}$ that of a steel structure with the same strength. That means, a car made from composites can weight $\frac{1}{4}$ that of a car made from steel. This equates to serious fuel savings.
- In the mechanical manufacturing, composite materials have a very wide range of usage, such as fan blades, paper-making machinery accessories, textile machinery parts, coal mining machinery parts, pumps, food machinery parts and protective shield and so on.

LITERATURE REVIEW:

B.Asabe Popat et al: This present work evaluated the effect of fiber orientation on mechanical properties of banana Fiber and epoxy composites. In this work banana fiber is used as reinforcement and epoxy is used as matrix material. Samples of different orientations of banana fiber reinforced composites were fabricated by Hand lay-up technique and investigated their mechanical properties like tensile strength and flexural Strength. The work of this experimental stud has been carried out to determine the mechanical properties due to the effect of banana fiber orientations such as 0degree, 45degree, 90degree, orientation and volume fraction such as 30%, 40%, 50%. The results of this study indicate the orientation 0 and 40% volume fraction shows the better mechanical properties than 45% & 90% degree & 30%&50% fiber volume fraction.

M.Akil et al: The development of high-performance engineering products made from natural resources is increasing worldwide, due to renewable and environmental issues. Among the many different types of natural resources, kenaf plants have been extensively exploited over the past few years. Therefore, this paper presents an overview of the developments made in the area of kenaf fiber reinforced composites, in terms of their market, manufacturing methods, and overall properties.

Venkatasubramanian et al: This work deals with fabrication and investigation of mechanical properties of natural fiber such as abaca and banana fibre and compare with the hybrid natural fibre composite. Tensile, Flexural and Impact strength of the composites are investigated in the process of mechanical characterisation. The reinforcement material used is a by product of epoxy resin namely Bisphenol-A. Hand lay-up technique is used to manufacture the composite and the fibre content is varied through volume fraction of upto 0.5. Glass fibre om top and bottom layers of the laminate improves it's surface finish and adds up strength. The natural fiber is sandwiched in intermediate layers with the glass fibre. It is found that Abaca-Glass composite is found to have better tensile strength than the other combination and Abaca-Glass-Banana hybrid composite is found to have better Flexural strength and Imapct value.

MATERIALS:

The components are used to making a sample Banana fiber, Kenaf fiber, Aluminium mesh, Epoxy resin, Hardener, Hand lay-up process like gelcoat, mat (for cover the sample), brush, Hard wax, soft towel, carnauba type, metal roller and trimmed with saw blade or diamond blade.

PROPOSED METHODOLOGY:

METHODOLOGY:

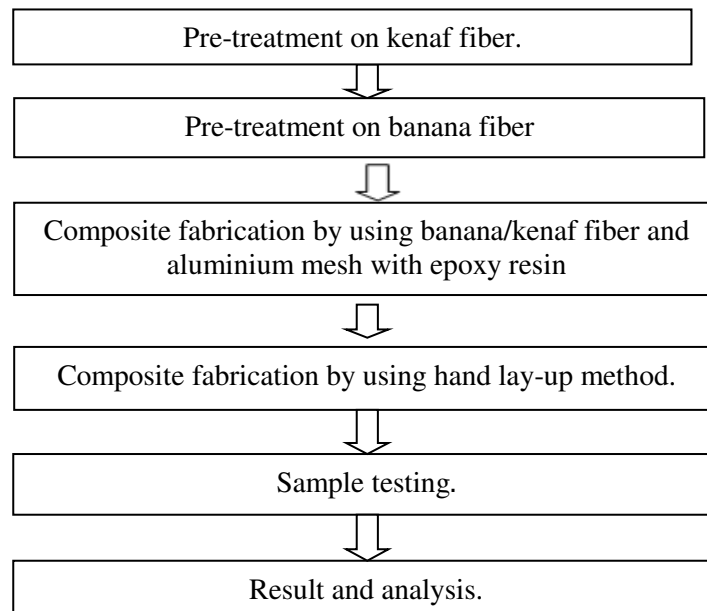


Figure 1: Methodology

MANUFACTURING OF COMPOSITES:

- **Open mould processes:** Some of the original FRP manual procedures for laying resins and fibres on to forms.
- **Close mould processes:** Much the same as those used in plastic moulding.
- **Filament Winding:** Continuous filaments are dipped in liquid resin and wrapped around a rotating mandrel, producing a rigid, hollow, cylindrical shape.
- **Pultrusion processes:** Similar to extrusion only adapted to include continuous fibre reinforcements.

HAND LAY-UP TECHNIQUE:

Preparing the mould:

- Remove dust and dirt from mould.
- If mould is of new fiber, apply soft wax and buff with soft towel. Then brush with P.V.A. parting compound and allow drying.
- If mould material is natural composite, well-cured banana/kenaf fiber, apply three coats of hard wax, carnauba type, buffing between each coat.

Applying the gelcoat:

- If gelcoat is to be brushed on, allow first coat to cure and then apply second coat to make sure there are no light spots.
- When gelcoat has cured long enough that your fingernail cannot easily scrape it free (test at edge of mould where damage will not show on part) then proceed with next step.

Lay-up skin coat:

- Cut $\frac{3}{4}$ or 1 oz. Mat to cover part. Brush catalyzed resin over gelcoat, and then apply the mat.
- Work with roller adding more resin where necessary until all white areas in mat fibers have disappeared and all air bubbles have escaped.
- A mohair roller is ideal for rolling in the resin, and a ribbed plastic or aluminium roller assists greatly in popping any remaining bubbles.
- Avoid leaving excess resin standing in puddles. Resin-rich areas weaken the part.
- Where rollers will not reach, brushes must be used. When this step is complete, clean all tools in acetone.
- Allow skin coat cure before next step.

Laying fibre reinforcement:

- When the two layers of mat and one layer of roving an additional layer of mat and roving will add additional strength.
- Apply each layer as in step 3, but it will not be necessary to wait or curing between these layers.
- Be sure to shake all acetone out of brushes and rollers before applying resin.
- Acetone drips can result in uncured spots in the lay-up.

Trim:

- On a small lay-up the fibre glass laminate which hangs over the edge of the mould can be trimmed off easily with a razor knife if you catch the "trim stage," of the period after the lay-up has gelled but before it has hardened. On a larger lay-up it can be trimmed with a saw or diamond blade.

Cure:

- May take from two hours to overnight, depending upon turnover desired, temperature, catalization, and nature of the part.
- In laid up male mould, the part comes off more easily before it shrinks appreciably.
- If the part is subject to warping, a longer cure may be necessary.

Remove part from mould:

- First, examine the trim edge all the way around the mould and make sure there is no resin bridging the line between the mould and the part.
- Sand this edge where necessary. They plastic wedges, "can be pushed into the edges" to start the separation.
- Continue separation by pulling and flexing.

Finish:

- Trim edges and back of part may need to be sanded and coated with surfacing resin or interior gelcoat.

FABRICATION OF BANANA/KENAF FIBER WITH ALUMINIUM MESH AND EPOXY RESIN:

- Hand Lay-up technique are used for the fabrication of specimens. For fabrication of kenaf fiber reinforced composite, kenaf fibers are chopped three layer and another two layers aluminium mesh, and mat is prepared in random oriented direction.
- Similarly same procedure as well as banana fabrication can be made.
- For hybrid samples, the plain-woven banana fabric was placed at top and bottom , Aluminium mesh was placed second and fourth layer and kenaf mat placed at the core.
- There are four different combination sample can be prepared.
 - ✓ Sample -1 = 3 layer banana fiber + 2 layer aluminium mesh
 - ✓ Sample -2 = 2 layer banana fiber + 2 layer aluminium mesh + 1 layer kenaf fiber.
 - ✓ Sample -3 = 3 layer kenaf fiber + 2 layer aluminium mesh
 - ✓ Sample -4 = 2 layer kenaf fiber + 2 layer aluminium mesh + 1 layer banana fiber.



Figure 2. Fabrication of sample specimen

MECHANICAL PROPERTIES:

- Tensile test
- Flexural test
- Impact test
- Hardness test
- Water absorption test

TENSILE TEST:

To better understand the properties of sample fiber composites material for tensile testing will be carried out in the laboratory. Data will be collected and stress strain curve plotted.



Figure 3. tensile test at UTM machine



Figure 4. Flexural test at UTM machine

FLEXURAL TEST:

To determine the flexural strength of sample fiber composites material which comes in to when a play road slab with sub grade support a subjected a wheel load and volume change due to shrinking. The most common purpose of a flexure test is to measure flexural strength and flexural modulus. Flexural strength is defined as the maximum stress at the outermost fiber on either the compression or tension side of the specimen.

IMPACT TEST:

The impact test is performed to study the behavior of materials under dynamic load i.e., suddenly applied load. Impact strength defined the capacity of a metal to withstand blows without fracture is known as impact strength or impact resistance. Impact testing machine given below.



Figure 5. Impact testing



Figure 6. barcol hardness testing machine

HARDNESS TEST:

The barcol hardness test characterizes the indentation hardness of materials through the depth of penetration of an indenter, loaded on a material sample and compared to the penetration in a reference material. The barcol hardness test is generally used on soft materials such as rigid plastics. It measures hardness based on indentation of a sharp point with a flat tip. The test is performed using a similar method and indentation device as that used to measure shore D hardness, however the shore D indenter has a round tip.

WATER ABSORPTION TEST:

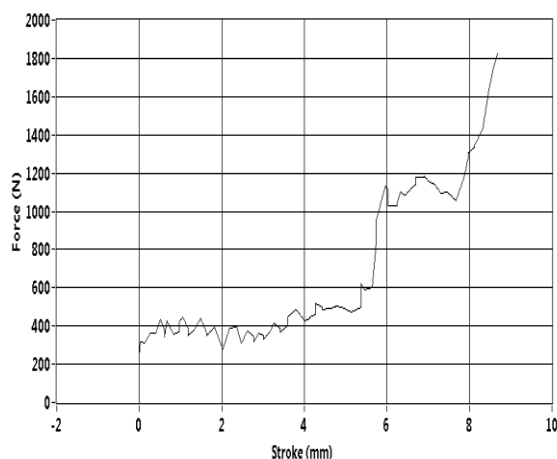
Water absorption gives an idea of strength. Water having absorption more porous in nature and are generally considered unsuitable unless they are found to be acceptable based on strength. Active absorption refers to the absorption of water by roots with the help of adenosine triphosphate, generated by the root respiration: as the root cells active take part in the process, it is called active absorption. According to renner, active absorption takes place in low transpiring and well-watered plants, and 4% of total water absorption is carried out in this process. The active absorption is carried out by two theories; active osmotic water absorption and active non-osmotic water absorption. In this process, energy is not required.

RESULT AND DISCUSSION:

INTRODUCTION: This chapter deals about various result from experimental testing. The result from experimental work given from properties of values for giving materials properties and boundary condition .

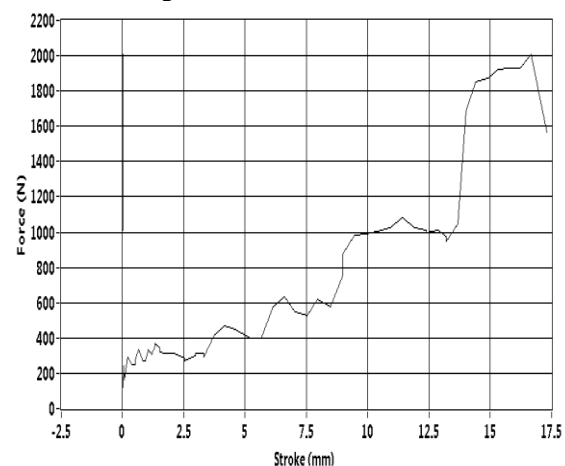
TENSILE TEST: The sample was taken as per the ASTM standard and tensile test was conducted in a universal testing machine. The graph was plotted force and stroke.

The tensile test graph was plotted force vs stroke for Sample 1 and sample 2 fiber material.



$F_{max} = 1.82 \text{ KN}$ & $UTS = 16.98 \text{ Mpa}$

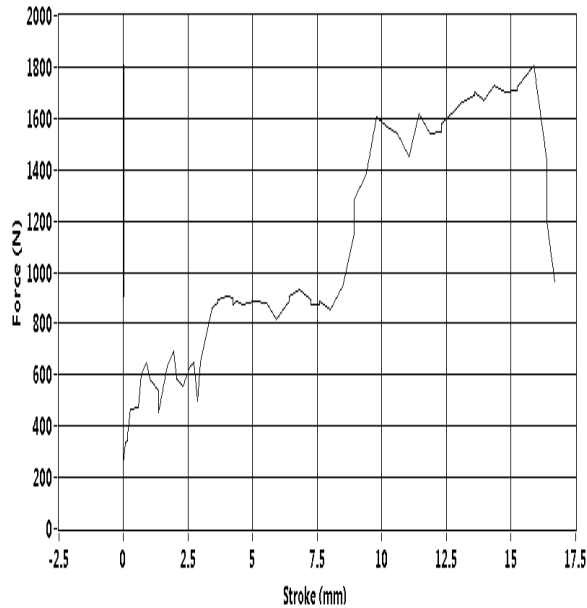
Figure 7. Sample 1



$F_{max} = 2.01 \text{ KN}$ & $UTS = 17.46 \text{ Mpa}$

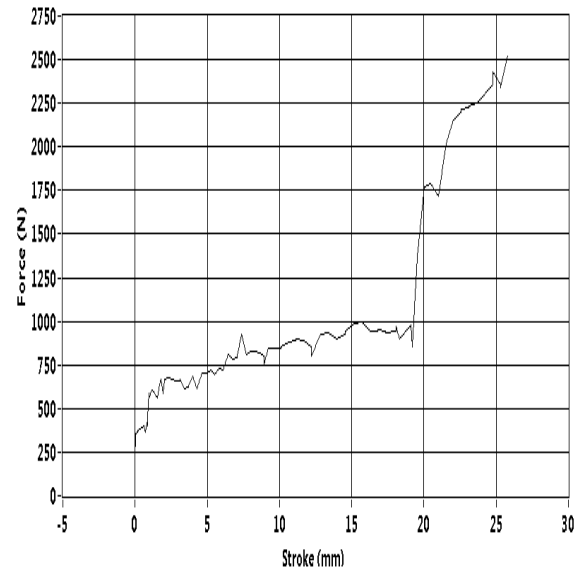
Figure 8. Sample 2

The tensile test graph was plotted force vs stroke for Sample 3 and sample 4 fiber material.



Fmax = 1.81KN & UTS = 18.36 Mpa

Figure 9. Sample 3



Fmax = 2.52 KN & UTS = 24.45 Mpa

Figure 10. : sample 4

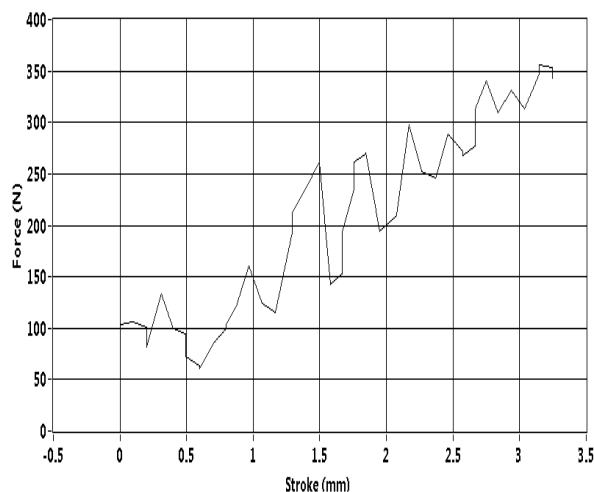
S.NO	TENSILE STRENGTH	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4
1	Fmax at KN	1.82	2.01	1.81	2.52
2	UTS at Mpa	16.98	17.46	18.36	24.45

Table 1 : tensile strength

Hence to comparing the four sample specimen for the highest value in tensile strength is sample 4 (Fmax = 2.52KN & UTS = 24.45 Mpa)

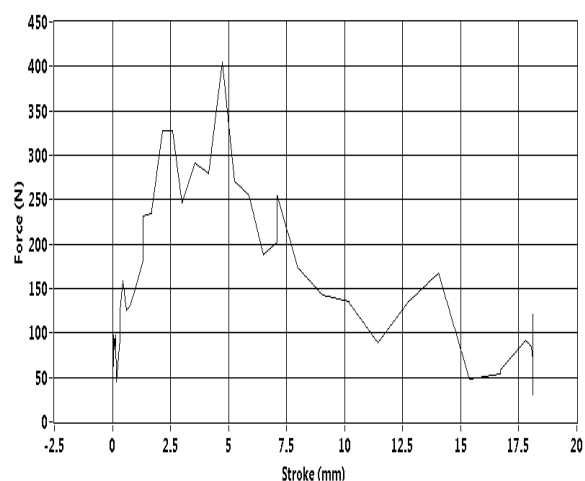
Flexural test: The sample is taken flexural test was conducted in a universal testing machine. The graph was plotted against force and stroke.

The flexural test graph was plotted force vs stroke for Sample 1 and sample 2 fiber material.



Fmax = 0.36 KN

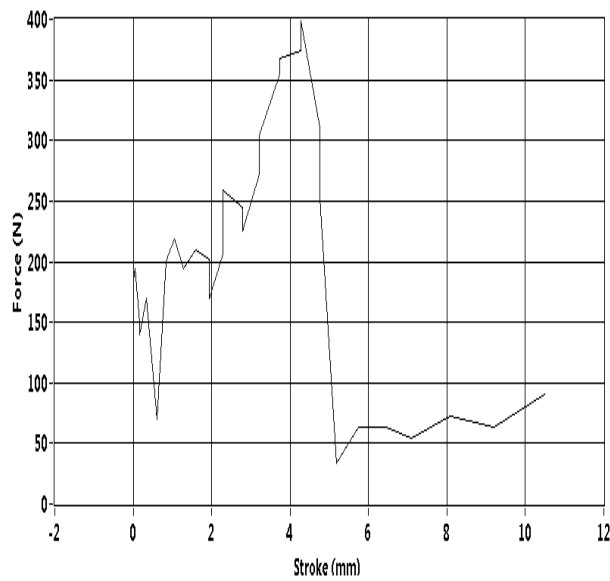
Figure 11. Sample 1



Fmax = 0.40 KN

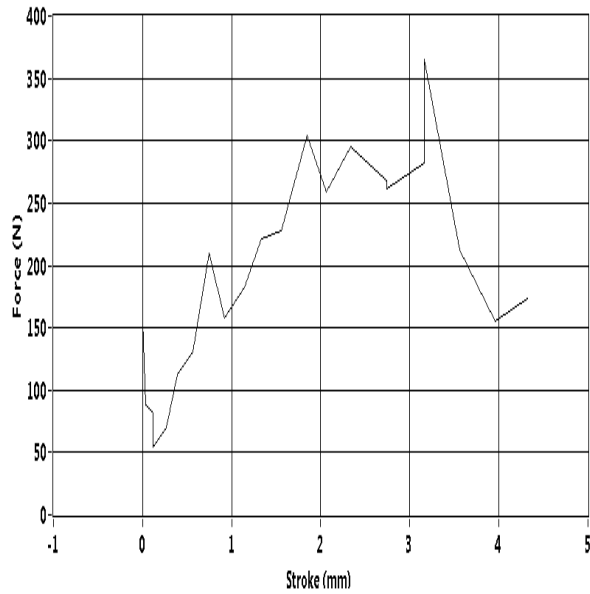
Figure 12. Sample 2

The flexural test graph was plotted force vs stroke for Sample 3 and sample 4 fiber material.



Fmax = 0.40 KN

Figure 13. Sample 3



Fmax = 0.36 KN

Figure 14. Sample 4

FLEXURAL LOAD	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4
Fmax at KN	0.36	0.40	0.40	0.36

Table 2: Flexural load

Hence to comparing the four sample specimen for the highest value in flexural load is sample 2 & 3 (Fmax = 0.40)

IMPACT TEST: The sample is taken and impact test was conducted in a impact testing machine. The values is plotted in joules.

TESTING	SAMPLE1	SAMPLE2	SAMPLE3	SAMPLE4
IMPACT TEST VALUE IN JOULES	6	4	14	2

Table 3 : Impact test

Hence to comparing the four sample specimen for the highest value in Impact test is sample 3 (14 joule).

HARDNESS TEST: The sample is taken and barcol hardness test was conducted in a shore D hardness testing machine. The values is plotted in below table.

TESTING	SAMPLE-1	SAMPLE-2	SAMPLE-3	SAMPLE-4
BARCOL HARDNESS	21,20,19	24,23,25	23,22,24	19,20,21
AVERAGE	20	24	23	20

Table 4. Barcol hardness test

Hence to comparing the four sample specimen for the highest value in Barcol hardness test is sample 2 (average value is 24) .

WATER ABSORPTION TEST: The sample are testing for water absorption test. The values are plotted in percentage. Hence to comparing the four sample specimen for the highest v alue in water absorption test is sample 3 (0.53%).

TESTING	SAMLE-1	SAMPLE-2	SAMPLE-3	SAMPLE-4
WATER ABSORPTION IN %	1.18	2.33	0.53	0.71

Table 5. water absorption test

CONCLUSION:

- The experimental investigation and mechanical Behaviour of banana/kenaf fiber and aluminium mesh filled epoxy resin composites leads to the following conclusions.
- This work shows that successful fabrication of a banana/kenaf fibre and aluminium mesh with epoxy resin filled epoxy composite by simple hand lay-up methods.
- The experimental work such as tensile, flexural, impact, hardness and water absorption test are carried out on the banana/kenaf fiber and aluminium mesh with epoxy resin reinforced composite specimen.
- It has been noted that mechanical properties of the composites such as tensile strength, flexural strength, impact test, barcol hardness test and water absorption test of the composites are also greatly influenced by natural composite fibres and aluminium mesh with epoxy resin.

REFERENCES:

1. D. Puglia, J. Biagiotti and J. M. Kenny, "A Review on Natural Fiber based Composites," Journal of Natural Fibers, November 2008.
2. M. R. Sanjay, G. R. Arpitha, L. Laxman Naik, K. Gopalakrishnan, B. Yogesha "Application Of Natural Fibers And Its Composites: An Overview," Scientific Research Publishing, March 2016.
3. H. M. Akil, M. F. Omar, et.al., "Kenaf fiber reinforced composite: A Review," ELSEVIER, Materials and Design 32 (2011) 4107-4121.
4. James Holbery and Dan Houston, "Natural-Fiber-Reinforced Polymer Composites in Automotive Applications," JOM November 2006.
5. Dr. Isabella Schiedel, Prof. Dr. Georg Stephan Barfuss Dr. Tobias Nickel and Lion Pfeufer, "Use Of Visible Natural Fibers In-Vehicle Interiors," in development interiors.
6. Alavudeen, N. Rajini et. Al., "Mechanical properties of banana/kenaf fiber-reinforced hybrid polyester composites: Effect of woven fabric and random orientation", ELSEVIER, Materials and Design 66 (2015) 246-257.
7. V. Fiore, G. D. Bella, A. Valenza, "The effect of alkaline treatment on mechanical properties of kenaf fibers and their epoxy composites", ELSEVIER, Composites: Part B 68 (2015) 14-21.
8. M. Ramesh, S Nijananthan, Mechanical property analysis of kenaf-glass fiber reinforced polymer composites using finite element analysis"
9. Lina Herrera-Estrada, Selvam Pillay and Uday Vaidya, "Banana Fiber Composite For Automotive And Transport Applications," The University of Alabama at Birmingham, AL 35294.
10. Dhanaraj Patil and Amit Panchwadkar, "Design and Performance of Collapsible Door Armrest under Crash Test," in International Journal Of Innovative Research In Advance Engineering, vol. 1, issue 6, July 2014.
11. Subodh C. Misra, Roy A. Palasek, "Materials for Automotive Interiors door trim panel," SAE The Engineering Society for Advancing Mobility Land Sea Air and Space 880338, March 1988.
12. Daniel L. Sobey, Marcus K. Chao, David L. Garrett, "Interior Composite Material," SAE The Engineering Resouce for Advance Mobility 51632, General Motor Corp.
13. N. Venkateshwara, "Mechanical Properties Of Banana/Kenaf Fiber-Reinforced Hybrid Polyester Composites: Effect Of Woven Fabric Random Orientation," in Materials and Design, ELSEVIER pp.

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DESIGN AND FABRICATION OF HYBRID WEEDER

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Abstract: In agriculture mechanical methods of weeding are preferred over other methods of weed control because of their added advantages of simple construction, low cost and environmental friendly. Mechatronics concept was incorporated in development of a battery assisted hybrid weeder for weeding operation in wide row (more than 30 cm) crops. This work involved the design and construction of hybrid weeder, after discovering that tools such as cutlass and hoes require high drudgery, time consuming and high labour force. As a solution to these problems, hybrid weeder was designed and constructed. The hybrid weeder was made of two arms and sprayer system, the arms are used remove the weeds with the help of blades. The average field capacity with this machine was 0.0554 ha/h at walking speed of 1.52 km/h with 97.5% weeding efficiency. The machine is gender-friendly with simple in design and technology and has potential to be adopted by small and hill farmers with reduced drudgery. The concept of transforming manual operated to battery assisted hybrid weeder was found satisfactory for wide row crops.

Key Words:

INTRODUCTION:

Agriculture is the backbone of India, and weed removal being one of the primary process in the field, there is a necessity for weed to be removed in all the fields to increase the quality of crops and to decrease the effect of weeds on crops. A weed may be defined as any plant or vegetation that interferes with the objectives of farming or forestry, such as growing crops, grazing animals or cultivating forest plantations. A weed may also be defined as any plant growing where it is not wanted.

Agriculture mainly depends on weather condition, water resource, seeds and fertilizers. The weather condition can't be controlled by any external sources. The climatic conditions also reduces the water level due to evaporation. The above causes can't be controlled. But the selection of the seed and fertilizer can be controlled. After the cultivation process seeds are placed under the soil. The growth of the plants is done by applying water and fertilizer. The weeds are grown automatically by absorbing some amount of water, fertilizers. The initial cultivation is done by the advanced machines and the final cultivation of productivity is done by the machines. There are many innovations introduced in various machines for agriculture. Weed control is one of the most difficult tasks in agriculture that accounts for a considerable share of the cost involved in agriculture production. Farmers generally expressed their concern for the effective weed control measures to arrest the growth and propagation of weeds. In Indian agriculture, it's a very difficult task to weed out unwanted plants manually as well as using bullock operated equipments which may further lead to damage of main crops. More than 33 percent of the cost incurred in cultivation is diverted to weeding operations there by reducing the profit share of farmers. A weed is essentially any plant which grows where it is unwanted. Weeding is one of the most important field operations and consumes 15 per cent of total energy spent in crop production. With the advent of mechanization and the adoption of high yielding varieties interest in mechanical weeders is seen among the farmers. Mechanical weed control reduces the drudgery involved in uprooting of the weeds. Moreover mechanical weeders besides killing the weeds loosen the soil between rows thus increasing air and water intake capacity. But this method of weed control has received much less scientific attention compared to the other methods. As a result traditional tools, implements and methods are still used by majority of the farmers for weed control.

OBJECTIVE:

The objective of the project is to design, construct and test automatically operated portable weeder, to provide the best opportunity to farmer's to easily control and removing the weed from farm. Weeding with the use of tools like cutlass and hoe requires high labour force in a commercial farming system, hence mechanical weeder is necessary to reduce the labour force. Environmental degradation and pollution caused by chemical is reduced by the use of Mechanical weeder. Presently in India, weeding with simple tools such as cutlass, hoe etc. is labour intensive and intensive and time consuming. Thus, there is a need for the design of manually operated weeder for intensive and commercial farming system in India. Low effective operation, high work effort and high time requirement for different types of hoe or cutlass, can be overcome with the use of mechanical weeder.

LITERATURE REVIEW:

Albert Francis.A.et.al: In this present day elimination of weeds in agricultural uncultivated land is done by various machines, which are available. But there is no special machine for eliminate the weeds in cultivated agricultural lands. The weeds reduce the growth of plants and productivity. The existing machines for cultivate the land by using the source of fuel. The previous design of machines consumes maximum amount of fuel. It can be reduced that various innovators are designing the solar powered machines. But it can't work for long time. The climatic conditions also affects the performance. The battery operated cultivated machines are not preferable after the discharge of the battery. The initial and final stages can be easily performed with special machines. But the intermediate distance preparation and production process does not fixed with any machines. The problem can be reduced in our design of weed removing machine, it fulfills the demerits of existing methods. After the complete growth of plants they can be easily collected by an artificial machines. The existing huge size weed remover machines affects the plant between the intermediate rotations.

Harish.et.al: Weed removal is one of the major activities in agriculture. Chemical method of weed control is more prominent than manual and mechanical methods. However, its adverse effects on the environment are making farmers to consider and accept mechanical methods of weed control. Chemical weeding is the most extensively used method of weed removal. But these chemicals used for weeding are harmful to living organisms and toxic in nature. Research has been carried out to use some combination various methods of weeding. The need of replace the use of herbicides with more sustainable weed control techniques encouraged the definition of innovative physical weed control strategies. Mechanical and thermal means were used to control weeds. Weed removal by mechanical method is one the methods frequently used these to remove weeds from the agricultural fields. Research has been conducted on economical methods for weed removal without damaging the crops. Weeding Machines designed and developed with intent of being operated in specific crops like tomatoes, corn, and rice. These machines are mostly intra row weeding machines which remove weeds within multiple crop rows at once. Weeding machines like three row walking type one were developed and successfully to remove weeds from rice.

Meena.et.al: studied about weed management is an ever-present challenge to crop production. Presence of weeds in general reduces crop yield by 31.5 per cent (22.7 % in Rabi season and 36.5 per cent in Kharif and summer season). Yield losses due to weeds were about 65 per cent depending on the crop, degree of weed infestation, weed species and management practices. Presently available weeder mostly runs by tractor or power tiller, these are large in size, cannot work for low inter row spaced crops. The main working components of power weeder were flexible drive shaft, worm gear box, rotor shaft, flanges and blades

Sarang.et.al: The current backpack sprayer has lot of limitation and it required more energy to operate. The percentage distribution of farm holding land for marginal farmers is 39.1 percentage, for small farmers 22.6 percentage, for small and marginal farmers 61.7percentage, for semi-medium farmers 19.8 percentage, for medium farmers 14 percentage and for large farmers 4.5 percentage in year 1960-61. Clearly explain that the maximum percentage of farm distribution belonged to small and marginal category. The principles of motion of trolley which transmit its rotary motion from chain and sprocket arrangement and reciprocating piston into the cylinder for pumping the pesticides which is used to the manually operated organic fertilizers cum pesticides sprayer. Generally used low cost Knapsack sprayer having major drawbacks as back pain and exertion of the user due to its heavy Weight and manual pumping.

Akash Singh.et.al: Agriculture is most important in our country it can be help in to the growth of the country. In India most of the farmer are using hand weeder and this method is very old method of removing of weed from the field. It can be take more time and more effort to do this work and it is the time taken process. We introduce this weeder to reduce the effort of the farmer and increase the rate of weed removing procees. When we use this weeder the battery can supply the power to the motor and this motor can rotate the shaft. With the help of this shaft arm can be move. Due moving of this arm blade are enter into the land with its sharp edge. Remove grass and make soil soft which is useful for plant growth. So this weeder is useful to farmer and also for gardener. Where weeder are continuously pushed, V-shape sweep is preferred and tool geometry of these cutting blades is based on soil-tool-plant interactions. Though many manually operated weeders are available they are not popular because farmers feel it to be heavy as compared to conventional. The aim of the project is to design, construct and test, to provide the best opportunity for

the crop to establish itself after planting and to grow vigorously up to the time of harvesting. The main motive of this weeder to provide less costly machine to the poor farmer to better growth. It is less costly and time saving device for the farmer.

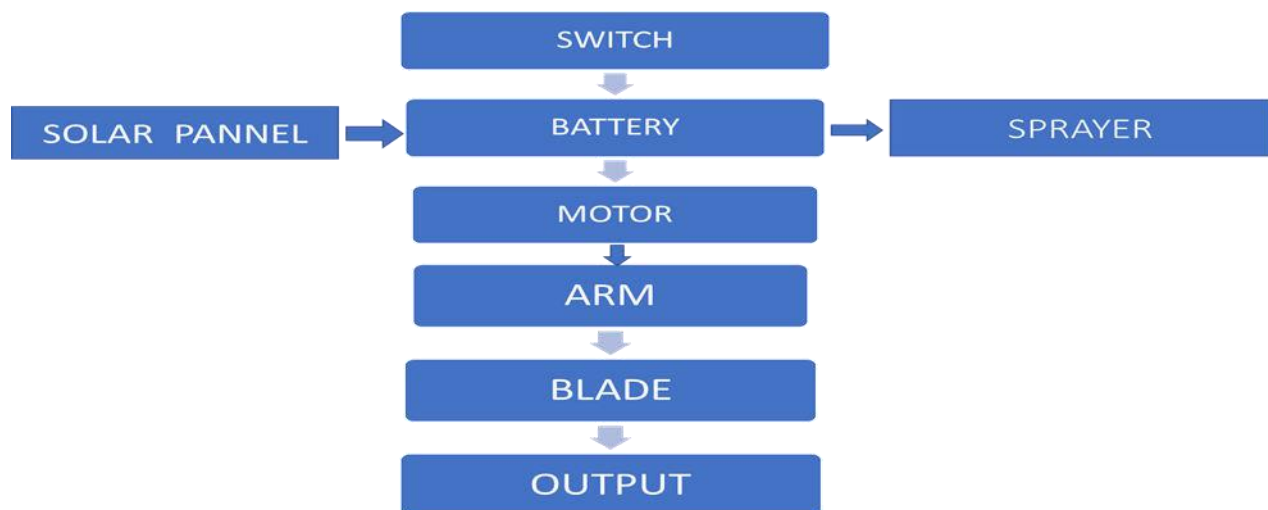
MATERIALS:

The components are,

- Solar panel(110W/18VP)
- Battery(12V/35AH)
- Wiper motor(12V)
- Sprayer tank
- Sprayer motor(12V)
- Convertor(12V-DC)
- Chain drives
- Wheels
- Arms
- Blades
- Switch

METHODOLOGY:

BLOCK DIAGRAM:



Block diagram of hybrid weeder

WORKING AND SPECIFICATIONS:

WORKING PRINCIPLE:

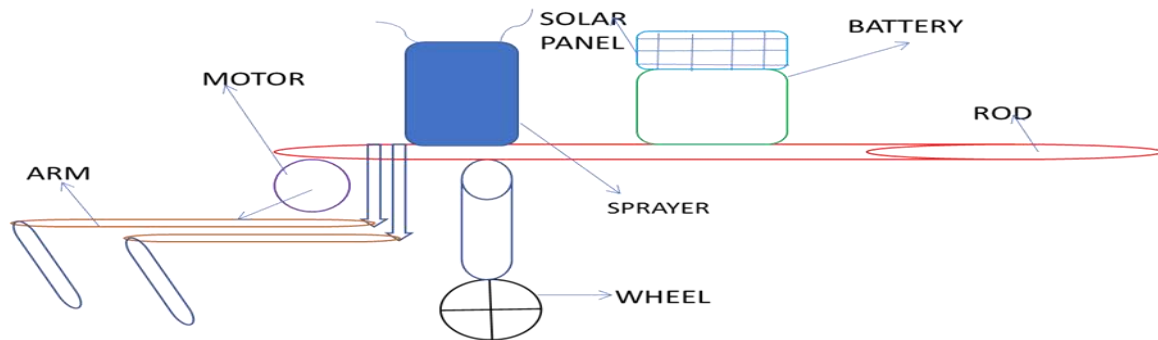
- The previous problem of agriculture weeds are that they can't be easily eliminated in the cultivated lands. Because there is no special machines available in the field.
- The weed elimination is done by human effort. It can be reduced in our design of weeder, It will minimize the human effort at low cost.
- The design of distance between the two blades are adjustable with respect to our requirements.
- The horizontal adjustments are mainly provided for placing the blades in certain distance with one another.
- The blade distance mainly depends on plant size and age.
- The top of the wheel shaft a battery and motor is provided for rotating the blades.
- The distance can be adjustable but the battery setup is fixed at that same point of contact. The selection of hybrid weeder is only for low load purpose. Because the rotary blades are rotated with respect to given power and speed. The soil level also decides the speed of the machine.
- The battery power is directly connected to the motor and it is connected to the arms. The secondary arms is coupled with the blades.
- The rotary motion is transmitted to blades by using chain drives. The handles are provided for turning the direction of the machine. The forward direction movement of the machine is done on the wheel shaft is connected to the motor.
- The blades are rotated in clockwise direction and the weed is removed perfect to near the plant. In the design totally minimize the time of weed elimination in the field of agriculture.
- The small thickness of the wheels can be rotated at any plants between the cultivated lands and it is not affected the plants

- In the another side of an hybrid weeder the spraying system is takes place.
- The sprayer is in a setup of tank with motor and connected with the battery.
- By using the switch the sprayer motor is ON for spraying across the crops.
- This is the working principle for an Hybrid weeder.

WORKING OF MODEL:

The hybrid weeder consists two arms with blades and spraying system.

D MODEL:



HYBRID WEEDER:



RESULTS AND DISCUSSION:

The main goal of the work proposed is to signify an innovative concept. For this, certain useful data are extracted from our theoretical model, and a calculation on the deviation percentage derived from the standard calculated values is deliberated as follows. The testing are been conducted in wide row crop field (eg: corn ,brinjal, sugarcane, lemon, coconut, etc..) for which the following observations are made:

WORKING CALCULATION:

Observation made by the HYBRID WEEDER.

Time Required to cut 1 Plant = 30sec

No. of plants in 1 Acre of land Approx. = 1500 plants

which gives the resultant time of = $30 \times 1500 = 45000$ sec

therefore time required in hrs = $45000/3600$

required to cut the plants for 1 acre of land (Approx) = 12.5 hrs

By conventional method,

Time required to cut the 1 acre of land

No. of labor required for work = 5 labor

ay = 8 hrs/ day

= $4 \times 8 = 32$ hrs for 5 labors.

Therefore time required to working for same field is less by Machining method then conventional method.

REALTIME CALCULATION:

Area of land (acre)	Time required by hybrid Weeder (hrs)	Time required by conventional method (hrs)
1 acre	12.5	32
2 acre	25	64
5 acre	62.5	160
10 acre	125	320

RESULT:

Practically our Hybrid weeder can be used for spraying and also used for weed removal purposes. All the parts are connected in such a way that in every stage of agriculture the equipment can be rearranged or easily assembled with fasteners to required length and specifications of field operation. Our team has successfully combined many ideas from various fields of mechanical engineering and agricultural knowledge to improve the yield and by reducing the labor effort and expenses. The whole idea of hybrid weeder is a new concept and can be successfully implement in real life situations.

CONCLUSION

Recent trend of labour shortage and seasonal price hikes as led the farmers to use efficient farm machinery. From the experiment it was found that the hybrid weeder could be an effective means for fast and low cost weeding of different crops. The yield was slightly higher in mechanical method than in manual method. In conclusion, it was found during observations after the design, construction and testing of this particular hybrid weeder that the overall benefits accruing and associated with use of the equipment includes:

- ✓ It was faster than the traditional method of controlling weed .
- ✓ High efficiency.
- ✓ It cannot work where there was stones or any obstacles.

FUTURE SCOPE:

Through observation, this work was good for local farmers and small scales agro base industries that need a better treatment and operations carried out on farms.

- ✓ Flow can be implement.
- ✓ The weight of weeder can be reduced by using lightweight materials and by reducing size of wheel.
- ✓ Since weeder was designed for low cost the weeder can be made automatic by using motor.
- ✓ By using some advanced attaching mechanisms the time required for assembling can be reduced for additional attachments.
- ✓ Fixing the extra attachment of leveler.

REFERENCES

1. Design of Machine Elements. Bhandari VB, McGrawHill publication.
2. Automobile engineering. Dr. kirpal Singh, Vol.1
3. Development and Evaluation of a Rotary Power Weeder by Olaoye. JO and TA Adekanye, university of Ilorin.
4. International Journal of Innovative Research in Science, Engineering and Technology. 2014; 3(4).
5. International Journal of Modern Engineering Research (IJMER). 2013; 3(6).
6. Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas Mandy Tu, Callie Hurd, and John M.Randall.
7. Weide RYVD, Bleeker PO, Achten VTJM, Lotz LAP, Fogelberg F, Melander B. Innovation in mechanical weed control in crop rows. Weed Research. 2008; 48(3):215-224.
8. Tillett ND, Hague T, Grundy AC, Dedousis AP. Mechanical within-row weed control for transplanted crops using computer
9. Albert Francis A, Arvinth R, Ajit M, Barat Kumar M, "Weed removing machine for Agriculture" ISSN2277-9655, Impact Factor: 4.116, CODEN: IJESS7, May 2017.
10. HP. Pathade, Priya Shinde, Nilesh Magar, Sainath, Mundaware, "Multipurpose Weeding Machine"/Vol2, issue.4,402-405, April 2015
11. Rajat Bhosale, Akshay Herkar, Narayan Shinde, Avinash Herkar "DESIGN AND FABRICATON OF ROTARY WEEDER" Vol.3/issue2/print:ISSN:2395-1990/online:2394-4099 2017.

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**ANALYSIS OF ALUMINIUM BASED FLY ASH REINFORCED
COMPOSITE USING POWDER METALLURGY**

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Abstract: Aluminium based fly ash (FA) reinforced composites were characterized using the powder metallurgy technique followed by sintering. About 2.5 and 5 wt% of fly ash were added as reinforcements. These were compacted at a pressure of 400mpa by single action die compaction process. The obtained compacts were sintered in the temperature range of 470 to 500 degree Celsius in a argon gas atmosphere. The sintering was kept at 3 hours. The effects of FA on the mechanical properties of Al were investigated. Mechanical property characterizations reveal an improvement of hardness with higher weight percentage of FA incorporated. An attempt is made to compare the values of pure base and the reinforcement material with mixed compact. The Micro hardness test, Compression test and Wear test of the tested samples indicates the uniform distribution of the reinforcement particles in the matrix without any voids.

Key Words: :aluminium powder, fly ash powder, die compacting, sintering hardness test, compression test, wear test

INTRODUCTION:

Among the various types of Metal Matrix Composites (MMCs), light-weight MMCs such as Aluminium (Al) based composites are arousing more interest due to their potential applications in aerospace, automotive and sports equipment industries. A composite material is a material composed of two or more constituents. The constituents are combined at a microscopic level and are not soluble in each other. Generally, a composite material is composed of reinforcement (fibers, particles, particulates, flakes, and/or fillers) embedded in a matrix (metals, polymers). The matrix holds the reinforcement to form the desired shape while the reinforcement improves the overall mechanical properties of the matrix. When designed properly, the new combined material exhibits better strength than would each individual material. The most primitive man-made composite materials are straw and mud combined to form bricks for building construction.

LITERATURE REVIEW:

In present study corrosion studies were conducted on Al7075/SiC nanocomposites processed by powder metallurgy and stir casting techniques. The weight percentage of SiC nanoparticles was varied from 1% to 4% for preparing the nanocomposites. The corrosion studies were conducted by means of salt spray technique by following ASTM B117 standard in which samples were immersed in highly corrosive environment of 3.5% NaCl. The weight losses of Al7075 alloy and its nanocomposites showed that with the increase in test duration from 12 to 96 hours, the weight losses of all nanocomposites increased significantly. Powder metallurgy processed nanocomposites showed higher weight loss when compared to those processed using cast route. Corroded surface analysis revealed pitting corrosion as main corrosion mechanism for all materials processed using both the processing techniques. Overall, for as cast materials the localized corrosion in form of micro-pits were observed while in case of powder metallurgy processed materials the corrosion was spread over entire surface. Powder metallurgy processed showed higher weight loss than that of alloy and nanocomposites proceeds using cast route.

Magnesium based flyash (FA) reinforced composites were characterized using the powder metallurgy technique followed by sintering. Up to 0.5 to 2 wt. % of fly ash were added as reinforcements. The effects of FA on the mechanical properties of Mg were investigated. Mechanical property characterizations reveal an improvement of hardness with higher weight percentage of FA incorporated. An attempt is made to compare the values of pure base

and the reinforcement material with mixed compact. Compressive strength and Yield strength increases remarkably with the increase in reinforced particulate for sintered specimens. In this study aluminium fly ash, Bagasse ash, and Alumina particles were utilized for the fabrication of Al- alloy – based metal matrix composite by means of powder metallurgy. After compacting and sintering Al powder containing 5 10 and 15 wt% and particles. Make the wear test specimen and wear test carried on pin on disc machine to keep all parameter constant and compare the wear rate with pure aluminum. It observed that the wear rate increase with increasing the reinforcement in the base metal up to 15 wt. %. Wear rate observed to be more in alumina reinforced composite while least in bagasse ash reinforced composites.

Present work involves an investigation to find out the best combination of process parameters for a Fe–Cr–Mo alloy with the help of Design of Experiments (DOE) tool. The Fe–Cr–Mo alloy containing 0, 0.4 and 0.8 wt.% carbon is compacted at 650 MPa pressure and sintered at 1120°C and 1200°C temperature, respectively, with 3.5 or 6°C/minute cooling rate. Quality characteristics like hardness and tensile Strength are analysed for various combinations of graphite weight %, sintering temperature, and cooling rate. The conducted experimental trials are based on the design matrix obtained from general factorial design. Significant regression models are developed from the above-mentioned process parameters to predict the quality characteristics using DOE tool. The developed mathematical model during the course of research helped in investigating best combination of process parameters for powder processing. The desirability test showed its usefulness in finding out the number of optimization strategies to achieve the optimum values of hardness and tensile strength. The observed results are correlated with the microstructure. Diffusion of carbon during sintering decides the optimum amount of carbon. Higher carbon addition result in residual graphite which weakens the sintered alloy. Analysis revealed that the graphite addition, sintering temperature and cooling rate are the significant model terms for both the objective function.

Powder metallurgy of nickel-based super alloys have been developed and used for a wide range of products, owing to their excellent high temperature rupture life, creep strength and fatigue crack growth resistance. Typical processes for high performance PM super alloys include hot isostatic pressing (HIPing), hot extrusion and hot isothermal forging. Hot isostatic pressing is normally conducted at a high temperature by using metal forming standards at low pressure for a long time. However, an intrinsic problem, i. e. powder prior boundary (PPB) precipitate networks, can occur in the HIPing process. Methods to reduce PPB effects on the mechanical properties of nickel-based super alloys, including heat treatment, changing the proportions of composition elements, and plastic deformation to break up the PPB networks, are reviewed. Due to the oxide on the surface of the powders, PPB formations in an intrinsic problems in powder metallurgy of Nickel-based super alloys.

MATERIALS:

The components are used to making a sample like hand lay-up process like die compacting set-up, Sieve shaker, Weighing machine, Matrix (Al alloy 6061), Reinforcement (Fly Ash), Zinc stearate, Die compactor, and Digital control muffle furnace

POWDER METALLURGY:

- Powder materials
- Powder compacting
- Die compacting
- Sintering

Aluminium: Aluminium is a silvery-white metal, the 13 element in the periodic table. It is the most widespread metal on Earth, making up more than 8% of the Earth's core mass



Figure 1. Aluminium powder

Fly ash: Fly ash is a fine powder that is a by-product of burning pulverized coal in electric generation power plants. Fly ash is a pozzolan, a substance containing aluminous and siliceous material that forms cement in the presence of water. It is a fine grey coloured powder having spherical glassy particles that rise with the flue gases.



Figure 2. Fly ash powder

Powder Compacting: The process of powder compaction plays an important role in the final properties of the specimen. A hydraulic pressing machine of 10-ton capacity was used to press the tool-steel die mechanically, in which the powder alloy is present. There will not any different in densities over the specimen, since the powder is compacted under uniform pressure by the hydraulic press.



Figure 3: Die compacting set up

Sintering Process: Parts are heated to below the melting point to allow solid state diffusion and bond the particles together. The specimen was cooled after reaching their specified temperatures and with stipulated soaking time within the furnace.



Figure 4. : muffle furnace

MECHANICAL PROPERTIES:

- micro hardness test
- compression test
- wear test

Micro Hardness Test: The method used here for testing the hardness is the Vickers hardness test method. The Vickers test is often easier to use than other hardness tests since the required calculations are independent of the size of the indenter, and the indenter can be used for all materials irrespective of hardness. The basic principle, as with all common measures of hardness, is to observe the questioned material's ability to resist plastic deformation from a standard source. The Vickers test can be used for all metals and has one of the widest scales among hardness tests.

Compression Test: FMI make the 'F' series machines are electronic screw driven machine with precision screw and column construction and variable speed drive. These are high precision high performance universal testing machines, maximum capacity up to 200kN. With the help of computer and microcomputer from control of load to processing of data are carried out with excellent performance, reliability, flexibility and easy operation. The machines are suitable for studying mechanical behaviour of iron 2 metals, various materials like iron & metals, rubber plastics, ceramics, fabrics, composites, cables and wires.

Wear Test: Rolling-sliding wear tester is the most popular tribo meter for investigating wear as well as frictional behavior of a materials under conditions of rolling, sliding, or a combination of both. Two discs are fixed to two parallel shafts and pressed against each other under a constant contact load. Driven by a motor through a train of gear, the specimens are rotating along with the shafts. The rotating speed can be controlled, so that when the linear speeds of two wheels are equal at the contact point a pure rolling contact is achieved.

RESULTS AND DISCUSSION:

Micro hardness test:

SI NO:	SAMPLE 1	HV	SAMPLE 2	HV	SAMPLE 3	HV
1	AL(100%)	22.3	AL(97.5%)+FLY ASH (2.5%)	26.2	AL(95%)+FLY ASH (5%)	30.3
2	AL(100%)	22.8	AL(97.5%)+FLY ASH (2.5%)	27.0	AL(95%)+FLY ASH (5%)	30.5
3	AL(100%)	22.8	AL(97.5%)+FLY ASH (2.5%)	27.1	AL(95%)+FLY ASH (5%)	31.4
	AVG	22.6	AVG	26.8	AVG	30.7

Compression Test:

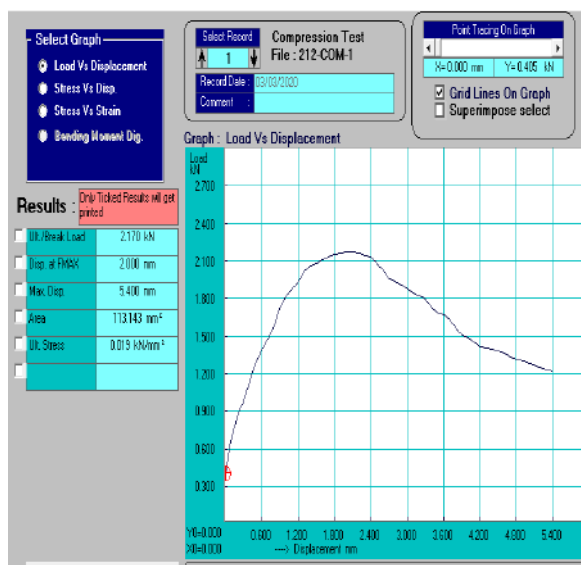


Figure 5.: compression test sample 1

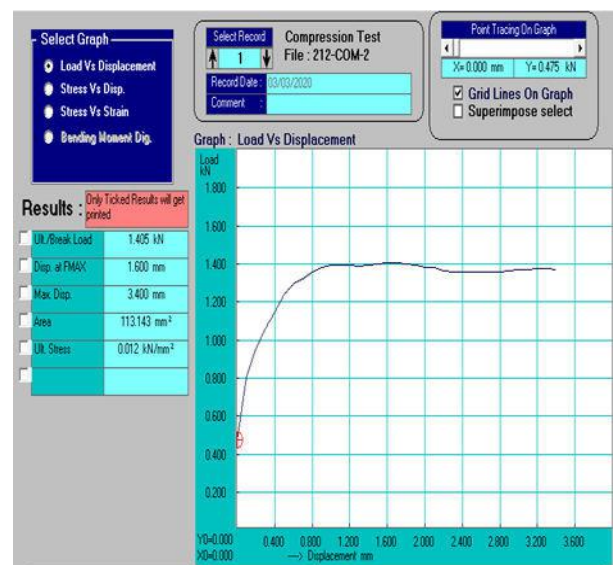


Figure 6: compression test sample 2

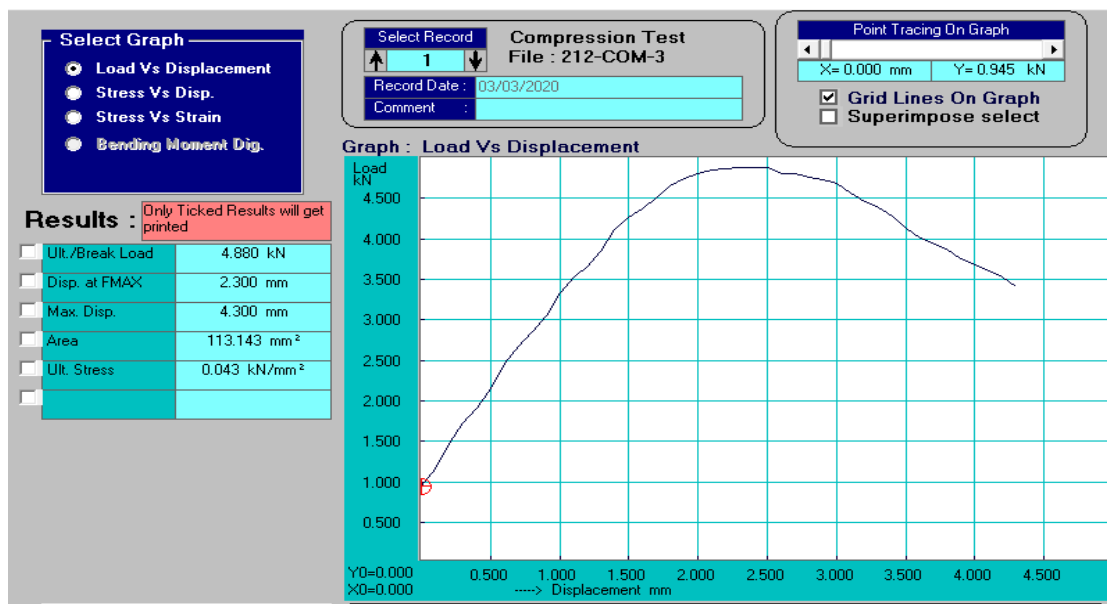


Figure 7. compression test sample 3

Wear Test:

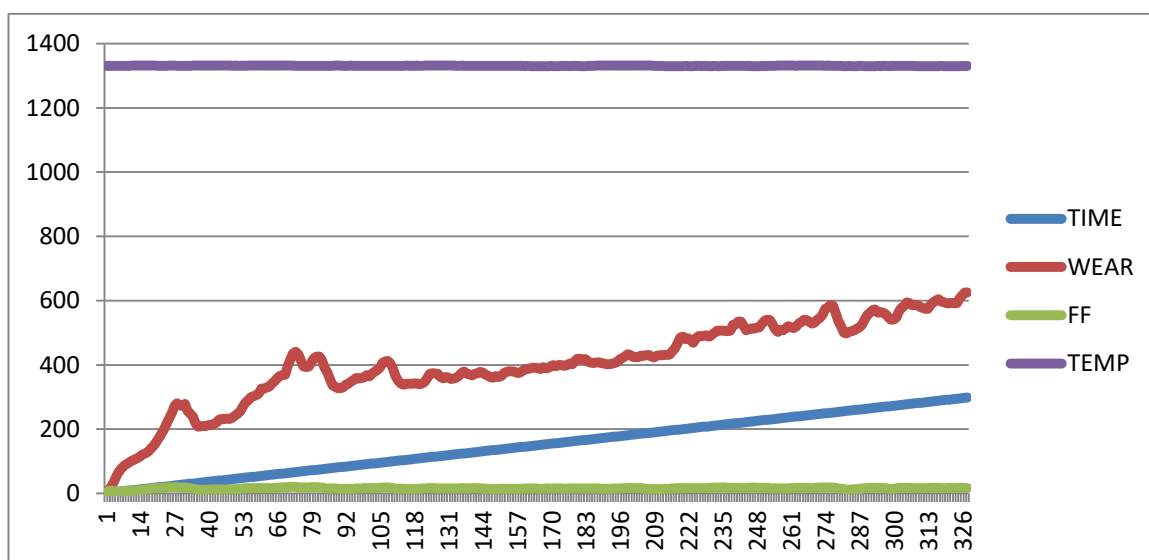


Figure 8. wear test sample 1

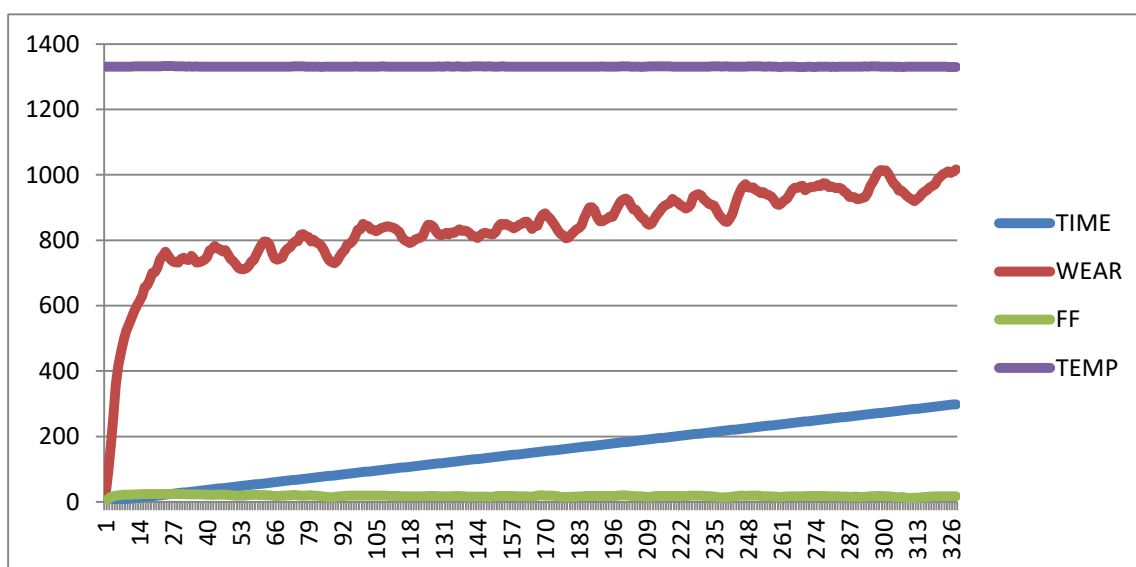


Figure 9: wear test sample 2

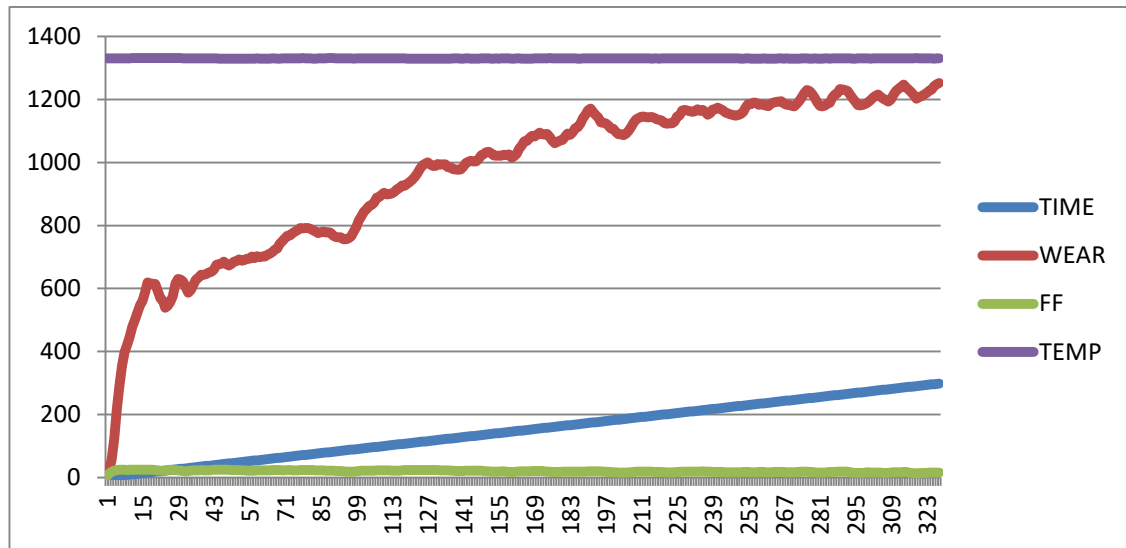


Figure 10.:wear test sample 3

CONCLUSION:

The compaction and the sintering processes of the Aluminium alloy and Fly ash as reinforcement was achieved successfully. The specimens were processed under sintering conditions and so they exhibited different figures of hardness done on Vickers hardness test method. The sintering temperature, soaking time and density played an important role in powder metallurgy. The temperatures and the soaking time were maintained between 470 to 500 degree Celsius and for 3 hours respectively. The highest hardness values of the 22.6 H.V., 26.8 H.V. and 30.7 H.V respectively. Wear of materials done by sliding a pin-on-disk apparatus in a wear test different types of graph plotted. Finally, the compression test of specimen done and also find load and displacement curve for both test and also mention a load vs displacement graph. Finally, the experiments are done by as per ASTM standards.

REFERENCE:

1. Sahim Y., *Materials and Design*, 24: 671-679 (2003).
2. Sevik H. and Kurnaz S. C., *Materials and Design*, xx, xxx-xxx, (2005).
3. Al-Qutub, A.m., Allam, I.M., Qureshi, T.W., *Materials Processing Technology*, xxx, xxxxxx, (2006).
4. Abouelmagd G., *Materials Processing Technology*, 155-156, 1395-1401 (2004).
5. Izciler M. and Muratoglu M., *Materials Processing Technology*, 132: 67-72 (2003).
6. Mazen A. A., *JMEPEG*, 8: 487-495 (1999).
7. Geng L., Li A. B., Meng Q. Y., *Materials Science and Engineering A*, 386:212-221(2004).
8. Gonzales C., Martin A., Llorca J., *Scripta Materialia*, 51: 1111-1115 (2004).
9. Mazen A. A. and Ahmed A.Y., *JMEPEG*, 7, 393-401, (1998)
10. Rohatgi P. K., Guo R.Q., Huang P., Ray S., *Metallurgical and Materials Transaction A*, 28A: 245-250 (1997)
11. Guo R. Q. and Rohatgi P.K., *Materials Science*, 32: 3971-3974 (1997)
12. Mahendra K. V. and Radhakrishna K., *Materials Science- Poland*, 25: 57-68 (2007)
13. Boresi A.P., Sidebottom O.M., Seely F.B., Smith J.O., *Advanced Mechanics of Materials*, 3 ed, John Wiley & Sons, New York, 503-505 (1978).

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Energy-Efficient Reliable Routing Considering Residual Energy in Wireless Ad Hoc Networks

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Abstract: We address the trouble of energy-efficient dependable wireless communication in the presence of unreliable or loss wireless link layers in multi-hop wireless networks. RMER and RMECR are proposed for networks in which either hop-by-hop or end-to-end retransmissions make sure reliability. duplication studies show that RMECR is able to find energy-well planned and reliable routes alike to RMER, while also enlarge the operational lifetime of the network. This makes RMECR an classic solution to increase energy-efficiency, reliability, and lifetime of wireless ad hoc networks. We conducted extensive copy to study the capacity consumption, the end-to-end hold up , and the network throughput of our protocols compared with existing protocols

Key Words: Wireless communication, RMER and RMECR, Throughput.

INTRODUCTION:

We propose two novel energy-aware routing algorithms for wireless ad hoc networks, called Reliable Minimum Energy Cost Routing (RMECR) and Reliable Minimum Energy Routing (RMER). RMECR addresses three important requirements of ad hoc networks: energy-efficiency, reliability, and prolonging network lifetime. It considers the energy consumption and the remaining battery energy of nodes as well as quality of links to find energy-efficient and reliable routes that increase the operational lifetime of the network. RMER, on the other hand, is an energy-efficient routing algorithm which finds routes minimizing the total energy required for end-to-end packet traversal. RMER and RMECR are proposed for networks in which either hop-by-hop or end-to-end retransmissions ensure reliability. Simulation studies show that RMECR is able to find energy-efficient and reliable routes similar to RMER, while also extending the operational lifetime of the network. This makes RMECR an elegant solution to increase energy-efficiency, reliability, and lifetime of wireless ad hoc networks. In the design of RMECR, we consider minute details such as energy consumed by processing elements of transceivers, limited number of retransmissions allowed per packet, packet sizes and, the impact of acknowledgment packets. This adds to the novelty of this work compared to the existing studies.

2. LITERATURE REVIEW:

Minimum Energy Paths for Reliable Communication in Multi-hop Wireless Networks

Current algorithms for minimum-energy routing in wireless networks typically select minimum-cost multi-hop paths. In scenarios where the transmission power is fixed, each link has the same cost and the minimum-hop path is selected. In situations where the transmission power can be varied with the distance of the link, the link cost is higher for longer hops; the energy-aware routing algorithms select a path with a large number of small-distance hops. In this paper, we argue that such a formulation based solely on the energy spent in single transmission is misleading. This cost function captures the cumulative energy expended in reliable data transfer, for both reliable and unreliable link layers. Finally, through detailed simulations, we show that our schemes can lead to up to 30-70% energy savings over best known current schemes, under realistic environments.

DISADVANTAGE:

A formulation of the link cost fails to capture the actual energy spent in reliable packet delivery a more accurate formulation needs to consider the link error rates to account for the potential cost of retransmissions needed for reliable packet delivery. Wireless links typically employ link-layer frame recovery mechanisms

Energy Efficient Routing With Unreliable Links in Wireless Networks:

Energy efficient routings and power control techniques in wireless networks have drawn considerable research interests recently. In this paper, we address the problem of energy efficient reliable routing in wireless networks in the presence of unreliable communication links or devices or loss wireless link layers by integrating the power control techniques into the energy efficient routing. We study both the case when the link layer implements a perfect reliability and the case when the reliability is implemented through the transport layer, e.g., TCP. We study the energy efficient unicast and multicast when the links are unreliable. Subsequently, we study how to perform power control (thus, controlling the reliability of each communication link) such that the unicast routings use the least power when the communication link are unreliable while the power used by multicast is close to optimum.

DISADVANTAGE:

In many scenarios, design of wireless protocols is guided by two essential requirements: energy efficiency and resilience to packet losses. Efficiently handling losses in wireless environments, therefore, has significant importance. Even under benign conditions, various factors, like fading, interference, multi-path effects, and collisions, lead to heavy loss rates on wireless links.

MRPC:

Maximizing Network Lifetime for Reliable Routing in Wireless Environments MRPC, a new power-aware routing algorithm for energy-efficient routing that increases the operational lifetime of multi-hop wireless networks. In contrast to conventional power-aware algorithms, MRPC identifies the capacity of a node not just by its residual battery energy, but also by the expected energy spent in reliably forwarding a packet over a specific link. Such a formulation better captures scenarios where link transmission costs also depend on physical distances between nodes and the link error rates. The main contribution of this paper is in showing how power aware routing protocols must not only be based on node specific parameters (e.g. residual battery energy of the node), but must also consider the link specific parameters .

DISADVANTAGE:

The metric of actual interest is not the transmission energy of individual packets ,but the total operational lifetime of the network. In MRPC, the cost of choosing a particular link at any instant is defined as the idealized maximum number of packets (orbits to be more general) that can be transmitted by the transmitting node over the specific link, assuming the complete absence of any other cross traffic at that node

PARO: Supporting Dynamic Power Controlled Routing In Wireless Ad Hoc Networks:

This paper introduces PARO, a dynamic power controlled routing scheme that helps to minimize the transmission power needed to forward packets between wireless devices in ad hoc networks. Using PARO, one or more intermediate nodes called “redirectors” elects to forward packets on behalf of source–destination pairs thus reducing the aggregate transmission power consumed by wireless devices. PARO is applicable to a number of networking environments including wireless sensor networks, home networks and mobile ad hoc networks. In this paper, we present the detailed design of PARO and evaluate the protocol using simulation and experimentation

DISADVANTAGE:

A dynamic power controlled routing scheme for wireless ad hoc networks. We Evaluated PARO and compared its performance to MLSR. We found that PARO consumed less power in order to find power efficient routes compared to MLSR due to its point-to-point on-demand design. An implementation of the PARO system using a commercial IEEE 802.11 radio showed a basic proof of concept even though some inefficiencies and anomalies were identified

Minimum Energy Reliable Paths Using Unreliable Wireless Links:

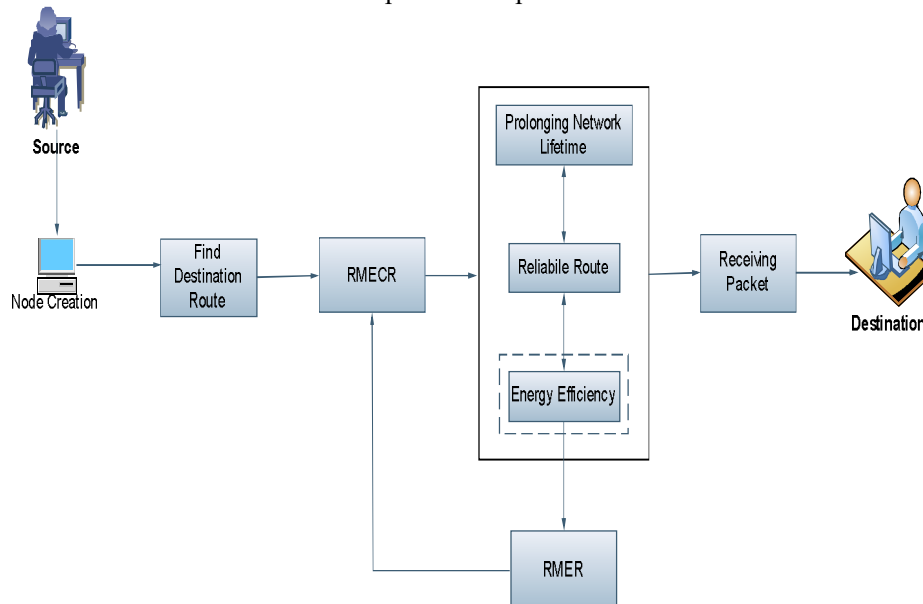
We address the problem of energy-efficient reliable wireless communication in the presence of unreliable or loss wireless link layers in multi-hop wireless networks. Prior work has provided an optimal energy efficient solution to this problem for the case where link layers implement perfect reliability. A link layer that is not perfectly reliable was left as an open problem. In this paper we rest present two centralized algorithms, BAMER and GAMER, that optimally solve the minimum energy reliable communication problem in presence of unreliable links. Subsequently we present a distributed algorithm, DAMER that approximates the performance of the centralized algorithm Wireless communication networks have been deployed at an increasingly fast rate, and are expected to reshape the way we live in this physical world.

DISADVANTAGE:

Link layer retransmission actually cannot guarantee reliable delivery, due to various reasons. In the end-to-end retransmission model where some link in the communication path is unreliable.

PROPOSED SYSTEM OVERVIEW:

We propose a novel energy-aware routing algorithm, called Reliable Minimum Energy Cost Routing (RMECR). RMECR finds energy efficient and reliable routes that increase the operational. Life time of the network. In the design of RMECR, we use an in-depth and detailed analytical model of the energy consumption of nodes. 1) We consider the impact of limited number of transmission attempts on the energy cost of routes in HBH systems. We show that by taking this limitation into account, a shortest path routing algorithm like Dijkstra's algorithm – which has been considered as an optimum solution in for the problem of minimum energy routing in wireless ad hoc networks – does not provide an optimal solution. We consider the impact of acknowledgment packets on energy cost of routes in both HBH and E2E systems. the energy cost of packet transmission from a source node to an intermediate node depends on both upstream and downstream links of that intermediate node. Neglecting the impact of acknowledgement packets means that we disregard the impact of downstream links on the energy cost. 3) We consider energy consumption of processing elements of transceivers. As mentioned earlier, underestimating the energy consumption of transceivers can severely harm reliability and energy-efficiency of routes. A detailed consideration towards various aspects of the energy consumption of nodes makes our work realistic and thus closer to practical implementations.



SYSTEM ARCHITECTURE:

SYSTEM HARDWARE DESIGN:

Processor	: Any Processor above 500 MHz.
Ram	: 128Mb.
Hard Disk	: 10 Gb.
Compact Disk	: 650 Mb.
Input device	: Standard Keyboard and Mouse.
Output device	: VGA and High Resolution Monitor

SYSTEM SOFTWARE DESIGN:

Operating System	: Windows Family.
Language	: JDK 1.6
Data Bases	: MYSQL
Front End	: Java

CONCLUSION:

We presented an in-depth study of energy-aware routing in ad hoc networks, and we proposed a new routing algorithm for wireless ad hoc networks, via, Reliable Minimum Energy Cost Routing (RMECR). RMECR can increase the operational lifetime of the network using energy-efficient and reliable routes. In the design of RMECR, we used a detailed energy consumption model for packet transfer in wireless ad hoc networks. RMECR was designed for two types of networks: those in which hop-by-hop retransmissions ensure reliability

FUTURE ENHANCEMENT:

In this work we send the data with minimum energy and reliability and with the high life time of the networks. In future we are going to avoid multipath routing which considers high cost we going to consider End to end reliability.

IMPLEMENTATION:

We propose a novel energy-aware routing algorithm, called Reliable Minimum Energy Cost Routing (RMECR). RMECR finds energy efficient and reliable routes that increase the operational. In the design of RMECR, we use an in-depth and detailed analytical model of the energy consumption of nodes.1) we consider the impact of limited number of transmission attempts on the energy cost of routes in HBH systems

REFERENCES:

1. "Wireless Networks," Proc. ACM Mobi Hoc, pp. 146-156.
2. "Energy Efficient Routing with Unreliable Links in Wireless Networks," Proc. IEEE Int'l Conf. Mobile Ad hoc and Sensor Systems (MASS '06).
3. "MRPC: Maximizing Network Lifetime for Reliable Routing in Wireless Environments," Proc. IEEE Wireless Comm. and Networking Conf. (WCNC '02). "Minimum Energy Paths for Reliable Communication in Multi-Hop
4. "PARO: Supporting Dynamic Power Controlled Routing in Wireless Ad Hoc Networks," Wireless Networks, vol. 9, no. 5.
5. "Minimum Energy Reliable Paths Using Unreliable Wireless Links," Proc. AC Mobi Hoc, pp. 449- 459.