

# SECURE AUTOMATIVE LOCKING CONTROL AND ANTI THEFT USING GPS & BLUETOOTH

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**Abstract:** At present there is no innovative solution to unlock car doors and to provide car Anti-theft mechanism. We tried here to implement car door unlocking using Bluetooth technology and anti-theft system using GSM technology. This paper strives to achieve an efficient and inexpensive solution for scenarios like we may forget our car keys inside the car in which it was equipped with central locking system. This central locking system after certain period of time (which is pre-configured) the car doors will be automatically locked leaving keys inside the car. Whenever a car has been theft we register a complaint against it, though we know we can't find the car immediately. Our paper comprises of trending technologies such as android, blue tooth and GSM. We have developed a personal android application using with which the system is controlled. We implemented three level authentication mechanism in which only car owner can operate the system with his mobile. We came out with a solution for the above two mentioned problems.

**Keywords:** Arduino Uno, HC-05 Bluetooth Module, MAC Authentication, Android, GPSsystem.

## Related Work:

The paper shows the function of controlling car doors using mobile Bluetooth Technology. This technology will help the user to access his/her car with an ease. The function was executed and implemented by using 89c2051 and 89s52 microcontroller. The function which was built, can be operated within the range of 10 meters from the vehicle through Mobile Bluetooth.[3] Many of us face difficulties in unlocking/ locking the car upon losing the car key. Moreover, if a car gets stolen and used for any illegal activities banned by the government then a car owner will face many legal issues. So to solve all these issues, an embedded system was designed and implemented in a real car that provides car security as well as additional features such as locking and unlocking of the car doors and turning ON and OFF the car engine using smart phone.[1] The paper shows an application which was implemented and developed for mobile phone to access car door locking system. This system was developed by integrating both hardware and software by using 'EmbeddedBlue' 506 Bluetooth technology. 'EmbeddedBlue' and Smart Phone were used as communication devices. The software was designed using the Dynamic C which was compiled and loaded into Rabbit Core Module. [2]

## Introduction:

In this work we designed hardware consisting of Arduino interfaced with Bluetooth module(HC-05) and GSM module .we used Arduino UNO board with Atmega microcontroller which controls the operations of system .We have used AT commands to configure and provide authentication and security with HC-05 module. The main reason why we used Bluetooth and GSM is because Bluetooth range is only for ten meters which is sufficient for car door unlocking whereas theft cannot be in sight hence we used GSM technology for anti-theft. We have implemented a novel idea for anti-theft system in which initially the vehicle engine will be shut down and the new location of the vehicle will be transmitted to the owner's mobile displaying the exact location of the vehicle on Google map in android application using GPS. Simultaneously a text message with location address will be sent to nearby police station. Now a day's everyone has a car and buying a car is a big dream and investment to people, they are thing about the advancement in the automobile industry. In behalf of that industries are concentrating to make vehicles to work in automated way. And making links with software industries to make automated systems. Because those system are integrated up with both software and hardware equipments. It can be developed for an easy access of unlocking and locking the car through mobile.

**Existing System:**

Normally for the above situations either we can try to open the car doors by trial and error basis or finally to break car door glasses and open the doors. The first method does not give guarantee solution for the above problem and second costs most in terms of money. And also some have implemented using GSM technology to unlock and lock the doors by sending a message to GSM module every time which is comprised of Sim card and also an expensive task because to send an SMS every time it costs some charge.

**Proposed System:**

This main criteria is organized in three modules

1. Car Door Unlock and lock System Using Bluetooth Technology
2. Car Anti-Theft System Using GSM and GPS Technology
3. Smart Phone Application Using Android



Fig : Types of central door locking system

On the basis of Modus operandi of central door locking system or power lock can be any or combination of the following two types:

1. Manual system: Power lock system allows to centrally locking all the doors of the car including tailgate from the driver's gate by pressing a button manually.
2. Remote keyless system: Locking / unlocking of the doors can be done by a remote controller as well. Much like the way a television remote control works. By pressing a specified button on remote person can enter in to car without using a key.

**Construction of central door locking system:**

Power lock is an electro mechanical system. We can divide the central door locking system to the following subsystems:

1. Remote controller: Remote controller is a small hand held battery operated device. Transmitter of the remote controller can produce unique coded infra-red (IR) or radio frequency (RF) signals to ECM (Electronic Control Module) upon pressing the different buttons of it.
2. Electronic Control Module (ECM): ECM is the signal processing unit. It decides the amount of polarity of power to be supplied to different solenoid or motors of actuators upon receiving the IR or RF signals from remote controller.
3. Actuators: Locking / unlocking of power lock is actually happen by the actuators. These are placed in the doors. Following two types of actuators are used:
  - 3.1. Solenoid: Solenoid is an electromagnetic switch. It locks the doors when current passed in it by the ECM in one direction and unlock when the direction of current is reversed.
  - 3.2. Motor: In place of solenoid, DC motors could also be used as actuator.

The rotary motion of the motor is converted to linear motion by means of rack and pinion mechanisms. Again by changing the directions of current rotation direction of motor is changed .Thus it locks for one direction of current decided by the ECM and unlocks for opposite direction.

## 1. Car Door Unlock and lock System Using Bluetooth Technology:

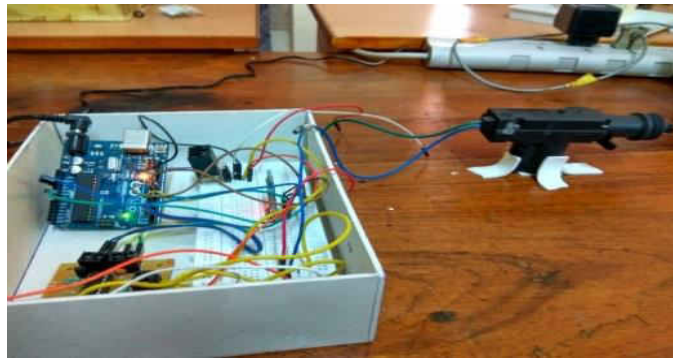


Fig 1: Hardware connections of actuator with Arduino

### Preliminaries:

Arduino: The UNO board used to control the code related operations

Bluetooth Module: The Bluetooth device through which we communicate with Arduino

Central Locking Gun: Mechanical device that is used to lock and unlock the car doors

Android App: An Android application that sends instructions to Arduino.

### Working:

In this objective we EMPHASIZE on locking and unlocking of the car .Firstly we dumped the code into the Arduino that is used to activate the actuator. And then through the app instructions are send to Arduino based by clicking or through voice control. Based on the instructions the code runs and signal is send to driver board of the actuator and through driver board actuator activates. Here we strictly concentrated on the authentication that everyone can't access the Arduino though connected with Bluetooth. Because we wrote the code for app in such a way that it only works when connected to the specified MAC address that we have given in the code. This provides a vast security that a device with specified MAC address having person only can activate the actuator. We also provided a security to Bluetooth by changing the pass code to pair using AT commands in such a way that only a pass code known person can pair with Bluetooth device.

## 2. Car Anti-Theft System Using GSM and GPS Technology:



Fig 2.1: GSM and GPS Module



Fig 2.2: 40 amps Relay

### Preliminaries:

Arduino: The controller used to control the modules.

GSM module: This is used to send and receive the SMS to send the location and shutdown the car.

GPS module: This is used to track the exact the location where exactly the car has been and display it on the map.

Relay: The relay should have capacity of 40 amp to cut the power supply to the engine to stop the car.

### Working:

Usually there are so many cases in robbery of the vehicles. Generally if any of our vehicles is theft we will complaint to nearby police station about the theft and file a complaint. From then there might be a chance of losing the vehicle permanently or getting the vehicle after a long time from the date of complaint. To overcome

this we introduced this idea in such a way that we will send a message to GSM module equipped in the car as soon as the message arrives the signal will be sent to Arduino and it will operate the 40 amp relay cuts the ignition fuse and the vehicle stop. On the other hand code will run on Arduino and through GPS exact location will tracked and send to the owner of the vehicle displaying the location on the map, and also text message will be sent to nearby police station .In this way we can achieve the anti-theft mechanism.

**3. Smart Phone Application Using Android:**



Fig 3.1: Screen shot of mobile application

**Preliminaries:**

Android studio: Which one is used to develop an android application.

Java Platform: Which one is used to write the code in the android studio.

**Working:**

We have used android platform to achieve controlling all the modules. In the android application we have provided two ways to control modules. One way is through touch and other with voice control for which we used google voice services. To stop the car engine we can send SMS to the GSM module connected to the hardware which is placed in the car. Once the car engine is stopped its location is displayed on the mobile app. We have provided MAC authentication for the system. MAC address is a 48 bit address used to access the network. MAC address can be found in android mobile at settings/about phone.

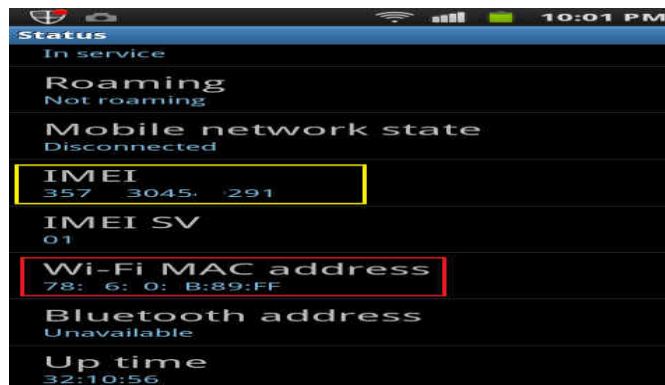


Fig 3.2: Screen shot of mobile MAC address

**Results:**

Bluetooth, GSM and Voice Controls Description of Android Application:

Button 2	To Control Door One Using Bluetooth
Button 4	Can Be Used To Control only Door Two
Button 7	Can Be Used To Control only Door Three
Button 8	Can Be Used To Control only Door Four
Button 12	To Stop Car Engine Using GSM
Button 13	Can Be Used For Future Scope
Voice	Voice Control With Google Voice Service

Table 1: Description of operations on mobile application



Fig 4: GPS location and path of the theft vehicle

### Conclusions:

We have developed this system for the applications like car door unlocking where the owner of the car forgets his/her car keys locked inside the car. This system can also be used to save lives of the children whom get themselves inside the car while playing before the keys are found physically. The app help in such a way that it will be user friendly that can understand by anyone for the faster access.

We have Strictly Considered that, this system can used only by the owner of the car on his mobile. This is achieved by MAC authentication. This system is also integrated with anti-theft feature where by using this feature owner of the car can find and locate his vehicle immediately and notify the nearest police station with an SMS alert. This helps the users of this system to track the vehicle within no time and with stopping the vehicle engine, the vehicle will not move further.

We are planning for the future scope of the system in terms of displaying the number of kilometres the vehicle can drive before the fuel is consumed

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