INTERNATIONAL JOURNAL FOR INNOVATIVE RESEARCH IN MULTIDISCIPLINARY FIELD
ISSN: 2455-0620 [Impact Factor: 6.719]
Monthly, Peer-Reviewed, Refereed, Indexed Journal with IC Value : 86.87
Volume - 8, Issue - 2, FEB - 2022 Publication Date: 28/02/2022

DOIs:10.2015/IJIRMF/202202008 --:-- Research Article

Modified LBP algorithm for improving face recognition models

[1]Mamta Gupta, [2]Teena Dubey
[1, 2]Assistant Professor, CSE, SGSITS, Indore, India
Email - [1] mamtaguptacs08@gmail.com, [2] teenatrivedi@gmail.com

Abstract: *Face recognition from images is a portion of the general object recognition problem. It is of specific interest in a broad collection of applications. Here, the face recognition is based on the new proposed modified LBP algorithm by using some components of existing LBP algorithm of the face recognition. The results of the experiments show that using this approach, we can improve the contrast and brightness of the face. The aim is to show that modified LBP is better than existing LBP in face recognition. Face area and facial attribute detection plays an vital part in various software such as human computer interaction, video surveillance, face scanning, and face recognition. Face identification hardly only create hackers virtually unfeasible to sneak of one's "password" but also expand the user-friendliness in human-computer interaction. Apparently the face is the most visible part of human counterpart and serves as the first distinguishing factor of a human being.*

Key Words: *Face recognition, LBP, Histograms, Identification Process.*

1. INTRODUCTION:

Object detection is a well known research content that has been study in computer vision system. There are a plenty of procedure developed that can be applied to perform the object detection task and this paper focusing of Local Binary Pattern technique. The Local Binary Pattern algorithm (LBP) is one of the well known algorithm in object detection field. Aside from object detection, it also been generally engaged in face detection and recognition [1]. It is as well as used for further object classes [2]. The LBP is a simple local descriptor which generates a 0 and 1 form code i.e. binary code for a pixel neighborhood. Despite its simplicity, some modifications of LBP has been proposed to improve the system in object detection [3]. In term of local binary pattern method of object detection, there are several technique apply to perform LBP in object detection. The LBP method can be based on shapes [4], edge texture [5], ghost elimination [6] and textured based [7]. This paper study the features of each method applied and extract the result in object detection task. It also study about different types of LBP modification that make it more compatible with the task of object detection. Each of the LBP modification has its own features, advantages and disadvantages in performing LBP task.

2. LITERATURE REVIEW:

The paper[1] gives us an analysis of drowsiness detection in real-time during daylight with efficient brightness towards the face. The main motive was to determine the sleepiness of the driver while driving to avoid road accidents is achieved in this system The face region was determined by the LBP algorithm and eye region was determined by the Haar algorithm and eye blinking was detected by the AdaBoost algorithm together with Haar cascade which was developed for eye blinking detection. As the system recognizes the face, eye region, eye blinking gives us the output instantaneously in real-time. In lack of brightness, insufficient light, or night vision the system is unable to capture the drowsiness of the driver. In the future, it is possible to improve our system in every aspect of working conditions. This paper [2]study about the object detection by using local binary patterns. The original Local Binary Patterns (LBP) features has its own drawbacks. It is too intuitive in changes of the image retrieve by the application. When it comes to object detection, the same object can produce several LBP values, leaving the system perplexed as to which object has been detected. The original LBP also can only access finite local information because of its operator that covers a small neighborhood area. Some researchers investigating the advance of LBP and come out with the latest modifications of it's to improve its effectiveness in object detection fields. They are mainly of Non-Redundant Local Binary Patterns (NRLBP) algorithm, Multi-scale Block Local Binary Pattern (MBLBP) algorithm, Discriminative Robust Local Binary Pattern (DRLBP) algorithm and Integral Local Binary Pattern (INTLBP) algorithm. There are quiet further advance Local Binary Pattern that can be study to accomplish the function of object detection. This paper [3] presents a real-time mask detection and face identification for attendance system. A skeleton of mask detection embedded in face recognition was suggested for the system to

comply with the ongoing pandemic situation. Image data, face identification, mask detection, face identification, and attendance logging are all part of the framework. Haar cascade was applied for mask and face detection. Face recognition was done using two techniques: eigenfaces and LBPH. In the experiments, the LBPH surpassed the Eigenfaces for face recognition. The system was implemented in KCC, Malaysia. Staring test and performance indicate the effectiveness of the procedure to apply face recognition to register attendance. For future work, an investigation on an method that is able to perform partial face occlusion recognition applying a partial face image will be conducted. Such an approach would permit face identification without the subjects' need to detaching their face mask or masked face recognition, which is compulsory in some countries due to the COVID-19 pandemic.

In this paper[4], Because of its computational simplicity and resistance to light variations, the local binary pattern (LBP) descriptor is commonly employed in texture analysis. However, because only the sign information of the difference vector in a limited region is used, LBP has limits in terms of fully capturing discriminative information. We propose a novel texture classification descriptor—feature based local binary pattern—to improve the performance of LBP (FbLBP). The proposed FbLBP decomposes the difference vector into two parts: sign and magnitude. The sign part is represented by traditional LBP, while the magnitude part is described by two characteristics of the magnitude vector's mean and variance.. In this research, [7] To determine the most discriminative bins, most of these approaches use feature selection algorithms. Another technique offered recently was to choose all of the most discriminant LBP histograms. This study improves on earlier approaches by presenting a hybrid of LBP bin and histogram selections, in which a histogram ranking method is applied before a bin selection mechanism is processed. The proposed method is tested on five benchmark image databases, with the findings demonstrating that the combination of LBP bin and histogram selections outperforms the simple LBP bin and LBP histogram selection approaches when used separately.

3. METHOD:

The LBP operator is a general amalgamation of gray-scale invariant with an existence of certain condition measure, that is by computing the difference of the average gray level of those neighborhood[5]. The eight circular neighborhoods surrounding a center pixel is shown in Figure. The eight neighborhoods, P have radius, R equal to 1. The LBP operator in 3×3-neighborhood pixel is shown in Figure. It operates by thresholding each pixel with respect to the center gray value and form a binary number[6]. As illustrated by Figure, the threshold can be obtained by comparing the neighborhood pixel, g_p with the center pixel, g_c. The operator gives binary value of 1 if the g_p is larger than g_c and 0 otherwise. The LBP's ultimate form is a decimal value. The attribute extracted by the LBP operator are illustrated in a histogram. This operation can mathematically be expressed as

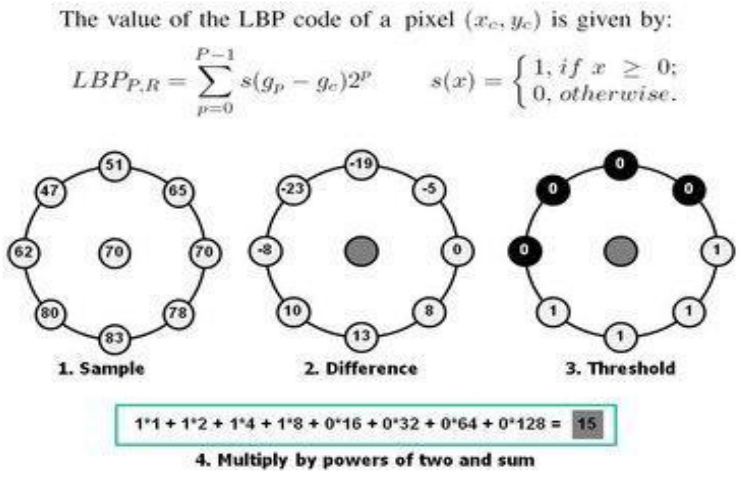

Figure-1.1

We receive a low contrast image as a result of the aforesaid technique. As a result, the previous algorithm failed to recognise the image appropriately.

3.1. ALGORITHM FOR MODIFIED LOCAL BINARY PATTERNS:

In Modified LBP algorithm mean of segmented images is being calculated. Mean value of all pixels is compared with all the pixel values in image instead of taking central pixel value to compute a threshold. Depending on

the threshold, the features are extracted. This technique proven to be an effective way to extract texture features. In this method, the target window is divided into a number of cells and the pixel which is greater than or equal to the mean value of all pixels, then the cells are labeled with "1" otherwise "0".
Decimal equivalent of achieved binary value will be calculated.

50	60	80
34	45	23
67	86	98

Table-1.1

With this , mean of all pixel values is 60.33. On comparing this mean value to all pixel values Sx=1 if img[x][y] >= arr Otherwise
Sx=0 if img[x][y] < arr
New binary image matrix will be :

0	0	1
0	0	0
1	1	1

Table-1.2

Decimal equivalent achieved from above matrix is 464. In this manner, our updated algorithm produces a high-contrast image.

4. RESULT ANALYSIS: The final image (Figure-1.3) is obtained by using the existing LBP technique.

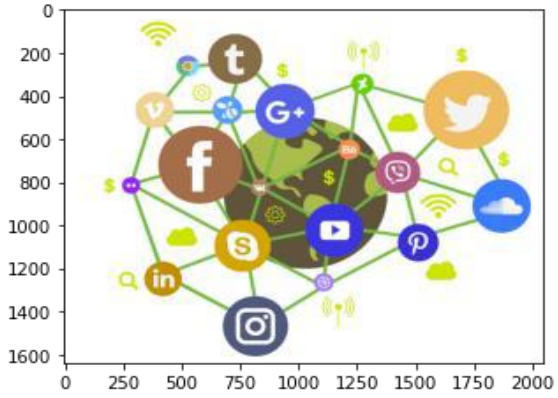

Figure-1.2

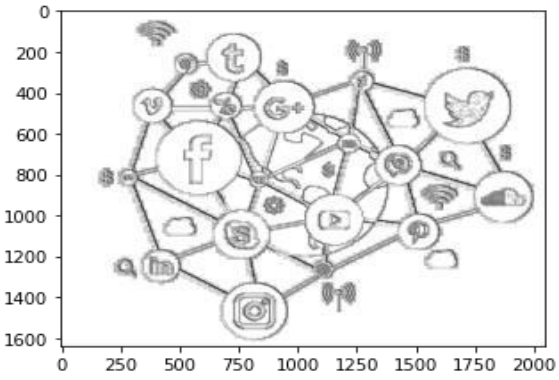

Figure-1.3

The final image (Figure-1.5) is obtained by using a modified LBP technique.

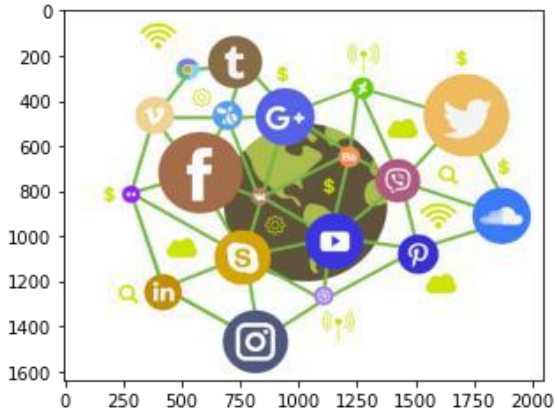

Figure-1.4

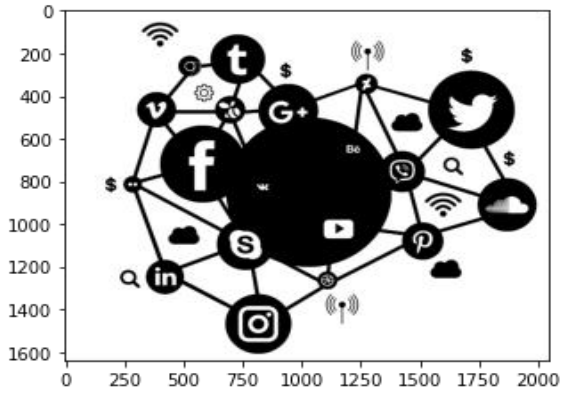

Figure-1.5

The final image (Figure-1.7) is obtained by using the existing LBP technique.

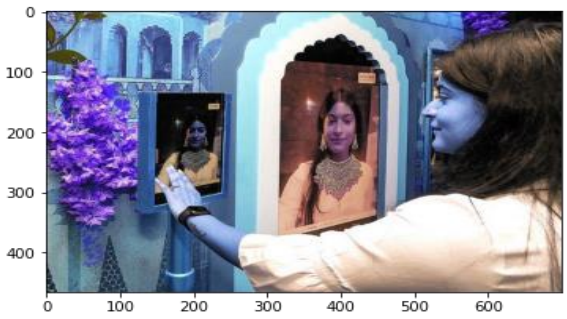

Figure-1.6

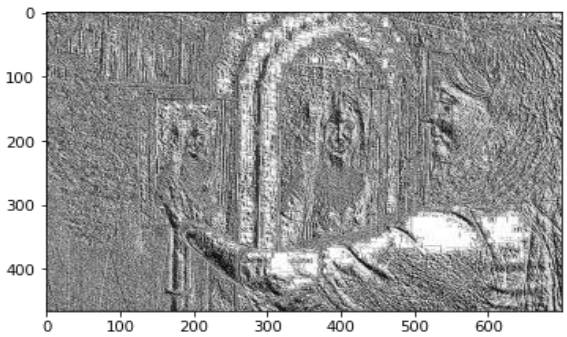

Figure-1.7

The final image (Figure-1.9) is obtained by using a modified LBP technique.

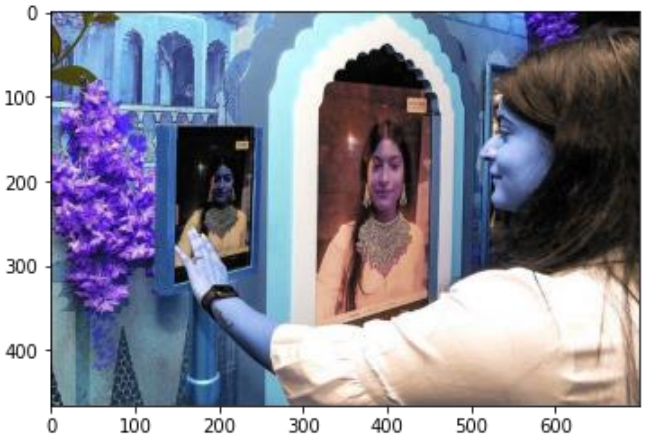

Figure-1.8

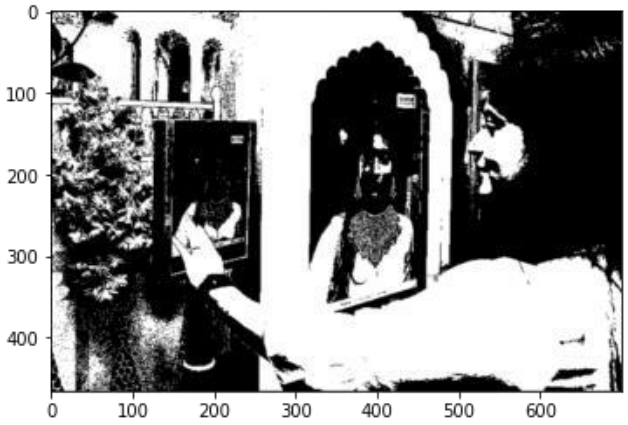

Figure-1.9

When compared to the resultant picture obtained using the updated LBP method, the contrast value of the resultant image obtained using the old LBP technique is low.

Using existing LBP and Modified LBP to compare image values

	Contrast	**Brightness**	
Image1	54	255	**LBP**
	114	255	**Modified LBP**
Image2	93.6	56	**LBP**
	120	24	**Modified LBP**

Table-1.3

Image histograms for the conventional LBP algorithm and the Modified LBP algorithm are compared.

Histogram of Image1 for LBP

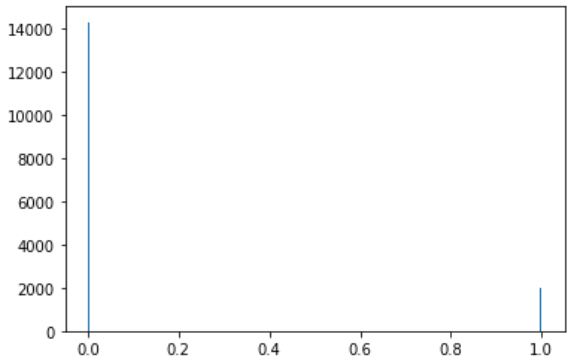

Figure-1.10

Histogram of Image1 for Modified LBP

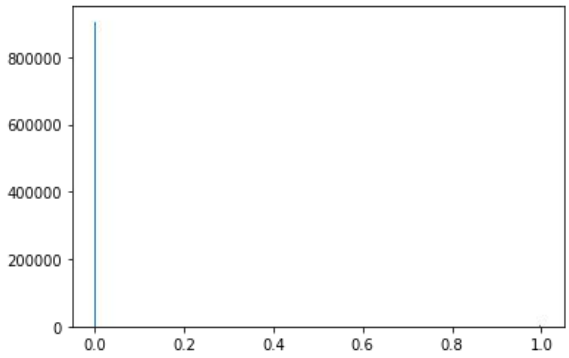

Figure-1.11

5. CONCLUSION:

One of the most essential challenges in computer vision and biometrics is face recognition. In this paper, a new LBP algorithm is developed. A good contrast image with clear texture is achieved by modified LBP algorithm. Using modified LBP algorithm better image is achieved even with low brightness. It could be employed in a variety of disciplines in the future, including picture matching, pedestrian and car target identification and tracking, and biological and medical image analysis.

REFERENCES:

1. Yuvraj Suryawanshi, Sushma Agrawal(Govt College of Engineering Aurangabad, India)(2020), Driver Drowsiness Detection System based on LBP and Haar Algorithm, IEEE Fourth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)
2. Mohd Safirin Karis, Nur Rafiqah Abdul Razif, Nursabillilah Mohd Ali, M. Asyraf Rosli, Mohd Shahrieel Mohd Aras, Mariam Md Ghazaly (2016), Local Binary Pattern (LBP) with application to variant object detection: A survey and method, IEEE 12th International Colloquium on Signal Processing & Its Applications (CSPA)
3. Serign ModouBah ,FangMing(2020) , An improved face recognition algorithm and its application in attendance management system. Volume 5, Research on Facial Expression Recognition Based on LBP and DeepLearning
4. Zhibin Pan, Hongcheng Fan, Zhengyi Li(2017) , Feature Based Local Binary Pattern for Rotation Invariant Texture Classification, ReasearchGate.
5. Mingxing Jia,Zhixian Zhang, Pengfei Song, Junqiang Du (2014), Research of Improved Algorithm Based on LBP for Face Recognition, Chinese Conference on Biometric Recognition.
6. Manish Kumar, Rahul Gupta, Sumit Saini, Abhishek Goel Assistance professor B.Tech, JETIR (April 2018), Novel Weighted Lbp Approach For Face Recognition System Volume 5, Issue 4 www.jetir.org (ISSN-2349-5162)
7. Alice Porebski , Vinh Truong Hoang, Nicolas Vandenbroucke and Denis Hamad(23 June 2020), Combination of LBP Bin and Histogram Selections for Color Texture Classification, Journal of Imaging(MDPI).