COMPARISON OF AUTOMATIC FACE RECOGNISION METHODS USING OPEN-CV FOR AUTOMATED ATTENDANCE MARKING

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Abstract – **Now a day face Recognition or face identification methods are play important role to identify the person's identity. Face recognition is nothing but method to identify individual by using face of them or to indentify images, videos or real-time system. Without any physical, contact this automated attendance system marked attendance by using face of individuals. To simplify the verification procedure of an individual, so many industries are moved to automation system. The main aim this paper is to analyze and mark the comparison of different image processing algorithms.**

Keywords –Face recognition, face identification, automation, LBPH.

I. INTRODUCTION

Traditional way of attendance marking getting old and time consuming whereas it is a burden to the attendance marker to calling their names and marking attendance. The digital world is widely spread so this traditional way to marking the attendance must be digitalized way and if attendance system automated so then this problem solution comes under the picture. This automated way of marking attendance does not want any one physical contact to mark the attendance of individuals. This system is marked the attendance of any individuals who created there profile in this system only at first time of profile creation after that there is no need to create profile of that particular individuals. We manage photographs and picture routinely though our PDA's thus devices and pictures are seen and taken over, e.g. in rods, general Stores, and so many public area.

Open-CV open-source computer vision this platform library sets which use for real-time image processing now it's available in C, C++, Python, and Android. The available

algorithm Eigenfaces, Fisherfaces, and Local Binary Pattern Histogram (LBPH). In this paper, we are going to compare these algorithms and how they are efficient in any way.

- **Eigenface Algorithm.** This face recognition is an appearance-based approach to seek collection of faces and encode images using this information and compare images of individuals of holistic. These methods extract principle components that affect the different variations of images. In particular, the eigenfaces are the chief segments of dissemination of countenances, or comparably, the eigenvectors of the covariance grid of the arrangement of face pictures, where a picture with N pixels is viewed as a point (or vector) in N-dimensional space [1].

- **Fisherface Algorithm.** This algorithm is nothing but a modified algorithm of eigenface. Fisherface algorithm also uses the Principle components Analysis. Fisherface uses the Linear Discriminant Analysis for making difference between two images. This one not only uses the focus on the total average but also focuses on the averages per class.

- **Local Binary Pattern Histogram (LBPH).** This one has also required a grayscale picture for processing and training. It works on the 3*3 pixels. And the center pixel is compared with their neighbor. This one is superior to eigenface and fisherface. For feature-based approach, nearby highlighted on the face, for example, eye and nose are recognized founded on which recognition is performed.

II. LITERATURE SURVEY

Author in [1], "Real time Facial Expression and Emotion Recognition Using Eigen faces, LBPH and Fisher Algorithm" expressed that the system is totally based in the real time system and compare different result of algorithms i.e. Eigenface, Fisherface and LBPH. Based on their research they are concluded that there system is worked on large-scale framework on real time.

In this paper [2], "Face Recognition based Attendance Management System" this paper author, proposed that system architecture in four steps I. Database creation II. Face creation III. Face recognition IV. Attendance updating. Here user can interact with GUI System, provide different option for student registration faculty registration, and mark attendance and for automated registration, they have taken 60 samples and store for training the images. So the final result class student attendance is automated marked.

In this paper [3], "Comparison of Facial Recognition Algorithm Though a Case Study Application" this research author proposed that comparison of different algorithms and categorised into 5 subject, 10 Subject and 15 Subject. In addition, there result is fully demonstrated in neural network and supervised learning network for an facial recognition task.

In this paper [4], "Comparison of personality Recognition Algorithms" author concluded with they are adopted real time face and text search application, for finding the datasets from the a database.

Author in [5], "Face Recognition Based Attendance System" in this paper author concluded that they are capturing video from using digi-cam. They made system that automatic attended the marking system of classroom i.e. based on real time system with high precision. They had also suggested that future work large area like seminar hall where want to sensing so many people presents, poor lightning condition they are overcome thus problem in future.

In [6], "LBPH Based Improved Face recognition At Low Resolution" in this paper author used local binary pattern at allow resolution for face recognition they are used LBPH algorithm for final calculation they are use face comparison with the propose system of DATASET (LR500) then they are trying to recognised the known and unknown person. And also proposed future work for security agency for low light security surveillance.

In [7], "Comparison of Face Recognition Algorithm Using Open-cv for Attendance System" in this one searcher suggested that comparison of Opencv and Matlab for an attendance system. Also explain LBPH algorithm working for attendance management they are implemented Eigenface, Fisherface and Local Binary Pattern. They are concluding that LBPH is best algorithm for face recognition.

III. COMPARISON OF METHODS

For taking the best algorithm between these three we mention thus Figure. 3 which shows that particular ratio of all thus three algorithm error and correct operation. Where on a scale of 0 to 8. On the scale of 0 to 8 that maximum error showed by the eigenfaces algorithm, its depicts that 6 correct operations and two error whereas the fishes face show that 6.5 correct operation and 1.5 errors and LBPH show that 7 correct operations and 1 error. The Blue one depicts the correct operation and error shown in brown.
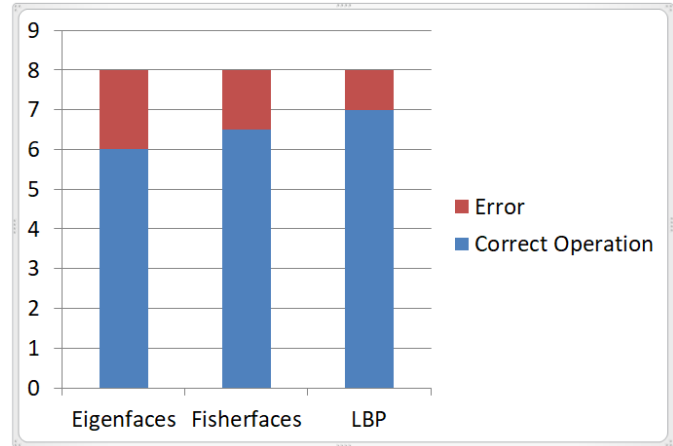

Figure. 3 Correct Operation

When the distance between the cameras and person is getting bigger then the rate of accuracy will be changed. By analysed comparing from Figure. 3. And comparing three methods is concluded that LBPH shows maximum accuracy for doing a correct operation.

From this analysis principle component analysis is great and dependent on facial look and relative changes. Whereas fisherfaces work on multiple images so this problem is not included in it. LBPH also handles relative changes with an individual image with light conditions great, with one character picture to prepare. Considering the abovementioned, the LBPH technique is the top choice.

IV. IMPLEMENTATION TOOL

For taking a picture from the individual we have been taken a webcam so to take the picture so here the face detection step is completed. This recognition can be utilized for face discovery, distinguishing proof of items, the grouping of human activities, following developments. We have using the Open-CV is an open-source PC vision and AI programming library. It accepts a critical part of ceaseless action, which is essential in today's system. The next step is face normalization where we have to normalize the face where background noises are avoided and canceled. After this one trains that data to generate the dataset of thus three algorithm. The after dataset is generated and images will be train and the final result will be declared.

V. IMPLEMENTATION OF ALGORITHM

A. *Eigenface working*

Work on the premise of recognizing particular highlights of the face like the eyes, nose, cheeks and how they vary from one another. It centers around the spaces of maximum change [3]. It accepts that all pieces of the face are not similarly essential or huge for a face.

The first step want to select principle components for the images. Then thus of all features are compared with the database at the time of training. Find the one which suited. Best suite components are matched and results get out [3].

B. Fisherfaces working

The Linear Discriminant Analysis plays out a class explicit dimensionality decrease. To discover the mix of highlights that isolates best between classes to inside classes dissipate. Fisherfaces intensely relies upon the information. Firstly compute the average by using Euclidean distance of all faces and then calculated the averages of each faces subtract second from 1 and want to build scatter matrices and generate new matrix column the eigen vector and lastly project the faces into LDA space [3]. The essential thought of Local Binary Patterns is, to sum up, the nearby construction in a picture by contrasting every pixel and its area. Take a pixel as focus and edge its neighbors against it. The principle thought is to separate the LBP picture into nearby areas and concentrate a histogram from each. These histograms are called Local Binary Patterns Histograms.

C. LBPH working

The essential thought of Local Binary Patterns is, to sum up, the nearby construction in a picture by contrasting every pixel and its area. Take a pixel as focus and edge its neighbors against it. The principle thought is to separate the LBP picture into nearby areas and concentrate a histogram from each. These histograms are called Local Binary Patterns Histograms.
Present new image to the recognizer. At second the histogram is created for each of the new images. Then the comparison step old image is compared with the new one finally detect the best match and return there a best result that matched with the current images.

VI. FINAL RESULT

For the final calculation each of algorithms are tested with 10 samples of individuals and training dataset and by comparing of them show the final output that is in Figure. 7.

Algorithm	10 Individual Accuracy Percentage
Eigenfaces	67%.
Fisherfaces	79%
LBPH	92%

Figure. 7 Accuracy Percentage

As seen in Figure. 7 and after all the 10 individual samples finally concluded that the accuracy rate of each algorithm. Eigenfaces successfully tested with 10 samples and show an accuracy rate of 67% whereas fisherfaces show that the greater accuracy rate from the eigenfaces i.e. 79%. But in the case of LBPH that is different in this algorithm, the maximum result is 92% which is greater than both algorithm's accuracy rate. So from this final result conclude that the LBPH has a greater accuracy rate.

VII. CONCLUSION

In this work, of face recognition, we are examining and comparison of fisherface, eigenface, and LBPH has seen that the best algorithm from them is LBPH with a higher accuracy rate. So if we use Local Binary Pattern Histogram then it would be a great recognizer model with a 92% of accuracy rate.

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