



AUTOMATIC STUDENT ATTENDANCE SYSTEM USING FACE RECOGNITION

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Abstract- Nowadays Educational institutions are more concerned about their student's attendance. This is mainly due to students overall academic performance may be affected by their attendance count and irregularities to the class. Hence, there is a requirement of computer-based student attendance management system which will ease the manpower in maintaining attendance record automatically using facial recognition through Image Processing using Eigen face recognition technique. The application includes face identification, which saves time and eliminates chances of proxy attendance because of the facial recognition system. Hence, this system can be implemented in a field where attendance plays an important role. The system uses Principal Component Analysis algorithm which is based on Eigen face approach. This algorithm compares the test image and training image and determines students who are present and absent.

Keywords: Face Recognition, Image Processing, Eigen face, Principle Component Analysis

I. INTRODUCTION

The Face Recognition technique is one of the most efficient techniques for identification of people. It can be utilized in the field of education for managing the attendance of students. There are a lot of colleges and schools in which thousands of students are taking education. To maintain the attendance and records of these many numbers of students is a very difficult task. To avoid these difficulties, there is a need of an automated system which provides accurate attendance reducing chances of fake attendance. It can be achieved using face recognition approach. The proposed system is aimed to design and implement uniquely identifiable face detection and recognition system which can be easily implemented and operated for marking attendance. The aim is to automate the attendance marking system which is efficient and accurate. This will help to reduce hard-work and time and also reduce possibilities of proxy attendance.

II. LITERATURE SURVEY

Matthew Turk and Alex Pentland [1] proposed the concept of Face Recognition using Eigen Face Method in 1991. This method tracks a subject's head and then recognizes the person by comparing characteristics of the face to those of known individuals. Initially, a principle component factor "eigenvector" is determined using PCA then the set of characteristic feature image "Eigen face" are found. This method is simple and fast as it is an unsupervised method.

Paul Viola, Michael J. Jones [2] proposed the concept of Robust Real Time Face Recognition in 2004. They defined a face detection framework that is capable of processing images extremely rapidly while achieving high detection rates.

NirmalyaKar, and DwijenRudra Pal [3] proposed the concept of implementing automated attendance system using Face Recognition Technique in 2012. They showed that the system will record the attendance of the student's in classroom automatically using face recognition approach. Each student is identified by face and the attendance is marked.

AjinkyaPatil, MrudangShukla [4] proposed the concept of implementation of class-room attendance system based on face recognition in 2014. In this approach, they used face detection and face recognition system. The face detection differentiates face parts from on-face parts and is therefore essential for accurate attendance. The face recognition for marking the student's attendance uses supervised method LDA. The Raspberry pi module is used for face detection recognition.

O. Shoewu and O.A. Idowu [5] proposed the concept of Development of Attendance Management System using Biometrics in 2012. The system takes attendance electronically with the help of a finger print device and the records of the attendance are stored in a database. Attendance is marked after student identification.



III. PROPOSED SYSTEM

The aim of the proposed system is to create a system that will automatically mark the attendance of students using face recognition technique.

1. Face detection:

The face detection method proposed by opencv technique is used due to its high accuracy and low false detection. An image of a student is captured using a camera located at the center of the lecture room. At fixed time intervals, a frame of the video is extracted out and then converted to grayscale before performing face detection. The GLCM method uses integral images to compute the features which classifies the images and uses GLCM learning algorithm to select important features from the potential features computed. Efficient classifiers are formed and then combined to form a cascade to eliminate background regions of the image so that computational time is spent on promising face like regions. After performing the face detection on the converted grayscale frame, boundary boxes are then inserted at the faces detected in the frame. The detected faces are then passed through a filter to determine their size. If the detected faces are found to be between the ranges of 30×30 to 200×200 , the detected faces are cropped and stored for face recognition.

2. Face recognition:

The face recognition method used in the proposed system is Eigenfaces as it is able to recognize slightly tilted face which is important as students will be moving their heads from time to time. Eigenfaces works based on principal component analysis. The eigenvectors for the training set of images and its weight is computed and stored. When an unknown image is inputted, its weight is computed and compared with the weights of the training images. For the recognition process, unknown faces are detected, cropped and resized to 30×30 before being histogram equalized to ensure the recognition of the students, even if they are sitting at the back in the frame of the classroom video. Histogram equalization spreads out the most frequent intensity values of an image which will then increase the contrast of the image. The stored detected faces are then passed through the face recognition system where it will compute the distance between the inputted images to each of the images in the database. If the minimum distance is above a threshold, the system will classify the image as an unknown. If not, the distance is calculated and the average distance of that image to each student in the database is computed. The identity of the unknown face will be the student in the database which has the lowest average distance with the Unknown face.

IV. BLOCK DIAGRAM

Fig. 1 consists of entire block diagram of automatic attendance system. Face recognition system is to identify a person using his face image. Face recognition module that recognizes the individual student's face and update the student attendance database automatically. Presently there are 2 databases which we are using in our project. The first database is used for training purpose. The first step is that, to train our module means to save the images and create a database of the student's faces and their feature vectors while the second database is used for testing purpose means the person whose face is going to be identified.

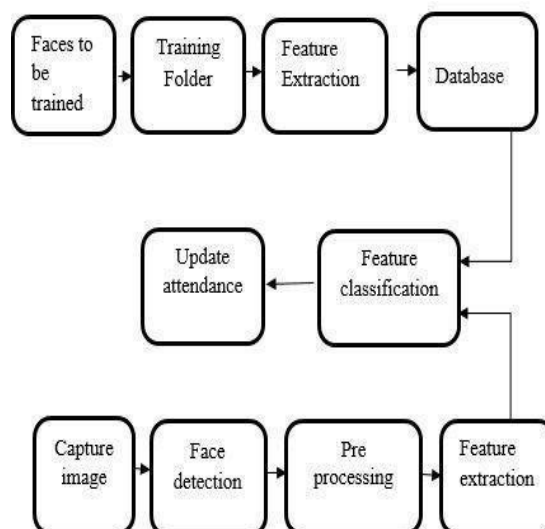


Fig.1 BLOCK DIAGRAM OF AUTOMATIC ATTENDANCE SYSTEM



V. TEST RESULTS AND DISCUSSION

In PCA based face recognition, by increasing the number of images of faces in the database increases the recognition rate of system. But the recognition rate starts saturating after a definite sum of increase in eigenface value. This is because increasing the images in the database increases the recognition rate but however this increase is compensated by noisy images which decrease the recognition accuracy.

VI. CONCLUSION

With the help of a divergent combination of algorithms, this system helps us to achieve desired results with better accuracy and less time consumption. The database of subjects for distinct classes is cached in the backend of the system. The system is commenced at start of lecture. The subject name is fetched from the backend of the system for every hour and the attendance for the same is marked.

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