

Smart Attendance Management System Based On Face Recognition Algorithm

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Abstract

Facial Recognition is a technology of biometrics has been used in many areas like security systems, human machine interaction and image processing techniques. The main objective of this paper is to calculate the attendance of students in a easier way. We proposed a system called automated attendance management system that uses face recognition method gives solution to the faculty thereby reducing the burden in taking attendance. The system used to calculate attendance automatically by recognizing the facial dimensions. An efficient face recognition based attendance system has been developed by improving the efficiency of the system and also for the secured attendance. The algorithm used in this system is Eigen Faces. The system is not only detecting the faces but also the distance of the facial characters under varying conditions. The proposed system provides the success rate at face recognition is around 93% to 95% and face identification is 99% and gives better result than the existing methods.

Keywords: Face Detection, GSM, Image Capture, Extraction, Pre-processing.

1. Introduction

The student attendance record is one of the most important things in any institutions. Computers can detect a person's face using a digital image or video. It may be done by comparing the image captured in the real time with the database image. The facial characters obtained from a real time image is to be

compared with the facial characters of the database image stored. The automated attendance management system gives a facility to the faculties to reduce the burden in taking attendance. This system takes the attendance automatically using face recognition. However, it may be difficult to estimate the attendance using each result of face recognition independently because of the high the face detection rate.

In [1], A finger print based attendance system has been developed which can be used to place the students finger on the sensor during the lecture time without the instructor's intervention. This system provides a fool proof method for marking the attendance. RFID based system is introduced in which students carry a RFID card and they need to place that on the card reader to record their attendance. The system gives a fraudulent access because an unauthorized person makes use of RFID card and enters into the institution [2].

In [3], Daugman's algorithm based Iris recognition system is developed that does capturing the image of iris recognition, extraction, storing and matching. It may have difficulty to lay the transmission lines in the places where the topography is bad. In [4], the authors proposed a method which is consist of many stages such as face skin detection, facial features positioning, representative features extraction and face matching. A face detection method has been introduced that is capable of processing the image significantly fast and achieves high detection rates [5].

In [6], a fast and reliable automatic human face recognition systems is developed for the purpose of localizing and extracting the face region. In [7] authors have proposed the existing techniques for facial feature point detection from colour images which includes template matching facial geometric and symmetric analysis. An algorithm is introduced in [8] for Multi Layer Perception (MLP) which is used to recognize face. In [9], a face identification framework is introduced to find whether two faces images recognize the same person.

2. Proposed Automated Attendance Management System

The block diagram of proposed automated attendance management system is shown in figure.1. It is based on face recognition algorithm. When a person enters the classroom, his image is captured by the camera at the entrance. Face region is then extracted and then used for further processing.

2.1 Feature Points on Human Face

The proposed automated attendance management system uses a face recognition algorithm. The distance between the face parts is first calculated and then to be stored in the system. The facial characters stored are to be compared with the real time image of the students. When the student enters the classroom the system starts identifying the faces of the students. The time for the period also gets started and the system now detects the faces and extracts the facial characters of the students. The extracted facial character will be compared with the database image. If the face of the student is matched with the facial character stored in the database then the attendance timing for respective student gets started.

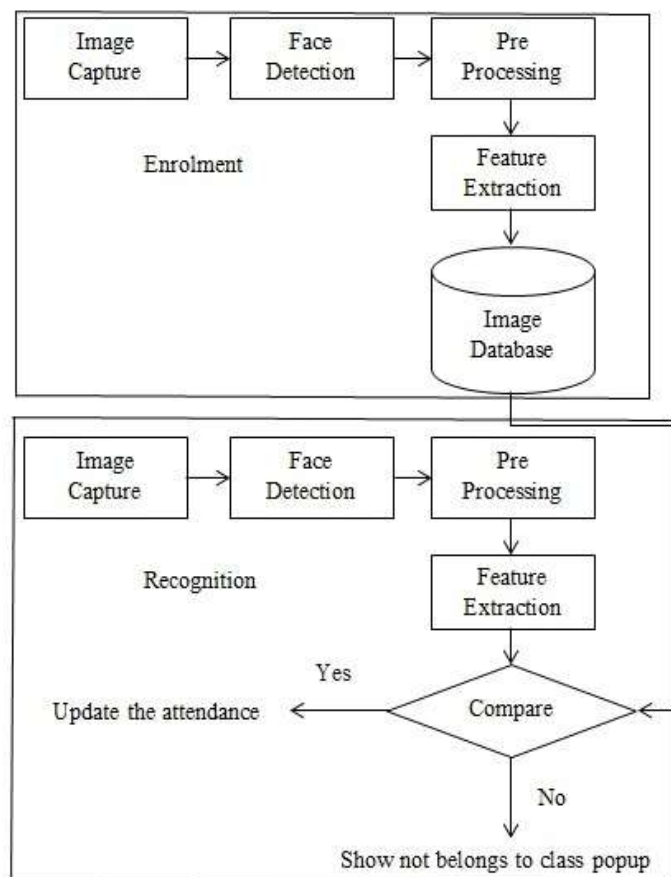


Fig. 1. Block Diagram of Proposed Automated Attendance Management System

2.2 Face Detection

Face detection needs a face detection algorithm which helps us to extract the facial characters. Various face recognition algorithms are developed for face detection such as Face geometry based methods, Feature Invariant methods, Machine learning based methods. Viola Jones [5] proposed a framework which provides a high detection rate. His detection algorithm is an efficient real time algorithm for many applications. It gives better results in different lighting conditions and we combine a multiple Haar classifiers to achieve a better detection.

3. Results And Discussion

In the proposed system, after recognizing the faces of the students the register numbers and names of the students will be updated into the system. At the end of the class, it gives a provision to announce the names of all students who are present in the class.

3.1 Database Development

For the verification process first a database has to be created. The student's details are first entered in the database and the face is trained and the database is saved. Database takes the Student ID, Student name, Department and Year as shown in the figure.2 and finally it captures the image of the student.

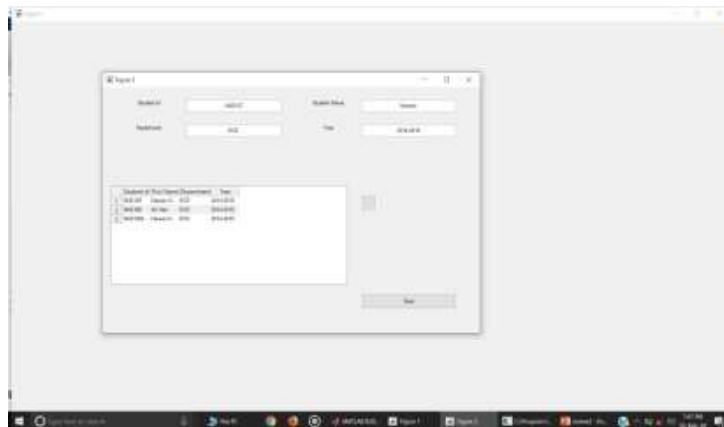


Fig. 2. Creation of Student Database

All the Student's face and details are stored in the database. The face is detected on the captured student's image as shown in figure.3 and stored. The Database will help the verification process to

identify the student. The captured image is stored in the database along with the respective student details. During the verification process the image the webcam again captures the image of the student and compares that captured image with the stored images in the database.



Fig. 3. Detected Face

3.2 Verification Process

The Verification process helps us to identify the student and checks whether the student is an authorized person or not. The webcam records the continuous real time video and identify the faces of the students. The student faces are matched with the faces in the database image and if the faces are matched with the database image then the attendance is marked as Present otherwise it displays as unauthorized person. The verification process is shown in the Figure.4. Once the person image is matched it displays a message authorized person.

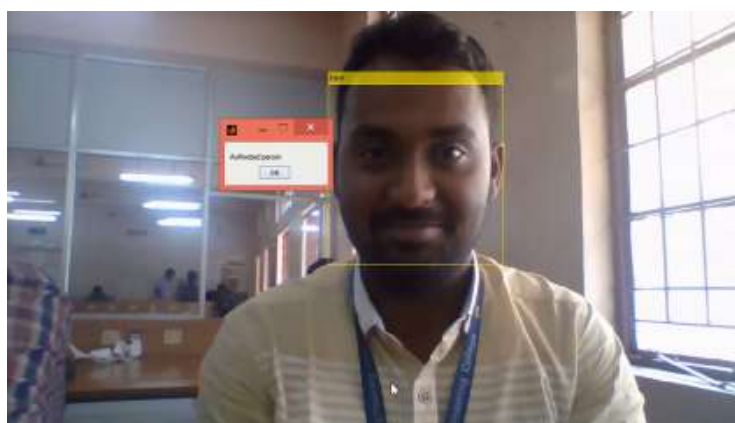


Fig.4 Verified Face as Authorized Person

3.3. Text Message Process



Fig. 5. Text Message Verification

After the verification process a text message of absent students list that are not verified in the verification process is sent to the Attendance In charge in the department. The students roll numbers are taken and it is then sent to the mobile number as a text message using GSM module. Here we use GSM SIM900A. The figure 5 shows the absent list of the Student in class which is sent as a text message. Thus the absent students are noted by the faculty which helps taking attendance in a easier way.

4. Conclusion

Existing method is focused on the method to obtain the different weights of each focused face based on location. In this paper, we proposed a complete framework for accurate human face based identification attendance management system. It does not only detecting the faces but also the distance of the facial characters by using face recognition algorithm. Also it is used to detect the images in both colour and gray scale under varying conditions. The proposed system provides the success rate at face recognition is around 93% to 95% and face identification is 99%. The system produces minimum error rate only at around 5-7%. In overall, the proposed system gives better result than the existing attendance system.

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