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Intelligent Automated Attendance System Based on Facial Recognition

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Abstract - *In School and colleges, daily attendance is a common and important activity to check the performance of the student. For large number of students, manual attendance will be a difficult process. In these days, for overcome these difficulties, some of the automated system developed. Each these automated system have some drawbacks like cost, fake attendance, low accuracy and intrusiveness. For solve these drawbacks, need to develop a smart and automated attendance system. This paper introduces face detection method using the haar cascade classifier algorithm and recognition using local binary pattern histogram algorithm technique. The system will record the attendance of the students in class room environment.*

Key Words: Face Detection, Face Recognition, Haar cascade classifier, LBPH algorithm

1. INTRODUCTION

Attendance is a very important factor in institutions and organizations to maintain the record of lectures, salary, and work hours etc. Manual method of attendance is followed in most of the institutions and organizations using papers and files. Now days, some of them are shifted to biometric technique. The current method in colleges and schools used, that are professors adding the attendance in a paper sheet with the roll number and name of the student and after mark of attendance, professors updates the attendance in a excel sheet themselves. This type of method is more time consuming and hectic. The question is why not shifting to an automated attendance system which works on face recognition technique. At the entry of classroom, have to mark the attendance of the students and employees.

2. RELATED WORK

Smart attendance monitoring system: A face recognition based attendance system for classroom environment [1] this system using face recognition and face quality assessment, help the attendance marking more easier. Once the system is trained then it can be used in future without any error. It uses graphical user interface. The names are stored in ascending order by this way, it reduce the efforts in conventional process. The names are roll down based on alphabets.

Implementation of classroom attendance system based on face recognition in class [2]this system capturing images of individuals and stored the detected image of face is data base by using viola and Jones algorithm. Comparison is done by eigen face method. And authorised person can mark attendance by just opening an exe file.

Fingerprint attendance system for classroom needs [3] makes the process easier and faster by using graphical user interface. This is achieved by firstly registering the finger print of students and that are stored in databases. Since fingerprints are unique in nature, so each student can mark this own attendance easily and it reduce time consumption related to manual method.

RFID based attendance system [4] that can identify each person by providing a ID card with an RFID tag make the process, reduce the problem that are related to the conventional method. This is done by placing ID card on the reader and attendance marked at the right time without any time delay.

A design and implementation of a wireless iris recognition attendance management system [5] The Daugman's algorithm describe a system for marks attendance using iris recognition. For making this process easier the system is first trained and images are stored in database. Attendance is marked by matching this image.

3. PROPOSED MODEL

3.1 System Architecture

The system architecture consist of camera, detecting face, face recognition, training set, storing in database and finally marked the attendance. This system works using the Python programming language. The proposed automated attendance system based on face recognition.

The proposed block diagram of automated attendance system is shown in the Figure 1.

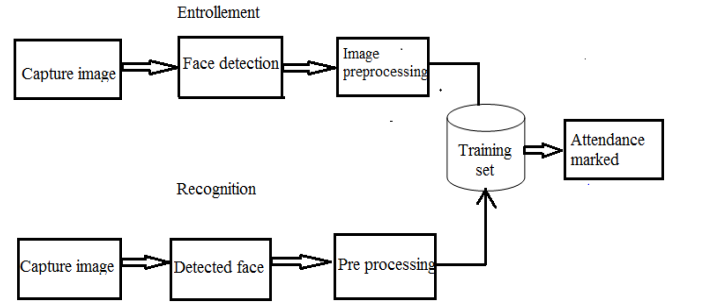

Fig -1: Proposed block diagram

3.1.1 Capture Image

The system contain camera that capture the faces of students. Then the image is sending for face detection.

3.1.2 Face Detection

Haar cascade classifier used to face detection. Face detection means identify and locating a face in a captured image.

3.1.3 Image Pre processing

The system first images captured and convert it into gray scale image. That means colored image is converting to gray scale image.

3.1.4 Training set

The recognized the image is detected faces from trained data.

3.1.5 Face recognition

The system important part is face recognition. The detected image is done by cropped and processed later by face recognition. This method is used of identify the each person using his face image.

3.1.6 Attendance marked

After recognition process if the particular student will be marked the attendance in the database of students details. The attendance status of student can also be identified with the help of user id and password.

4. PROPOSED ALGORITHM

This system important part is face detection and face recognition. For face detection using haar cascade classifier face detection algorithm while for face recognition using local binary pattern histogram algorithm.

4.1 Face Detection using Haar Cascade Classifier

Paul Viola and Michael Jones proposed an effective object detection method of object detection using haar feature based cascade classifier. This approach based on machine learning. From a lot of positive and negative images starts training for the cascade function. For object detection this functions will be used. For face detection, we need some positive and negative images, which have no face images, for train the classifier. After the training, extracts the features from it. Haar feature functions are our conventional kernal. From under white rectangle from sum of pixels under black rectangle, each feature is a single value obtained by subtracting sum of pixels.

4.2 Face Recognizer using Local Binary Pattern Histogram

In locally dataset, characterize each image and performs analyzes when new unknown image is provided. In the dataset, compares the result to each of dataset the images. By characterizing the local patterns within the location in the image, analyzing the images. This method is much better than other methods. For given input image, LBPH algorithms generate new histogram during recognition process. Then compare with the early stored histograms. It will detect the top best matched histogram it will be return with the associated label with the corresponding histogram.

In this system, there are 3 steps for the face recognition.

- First is, with the label for each person's images which is get from input. From each image detects the faces. Then assign each detected face with the associated label to the person who belongs to.
- The second step is, by feeding data from step first to train Open CV's LBPH face recognizer.
- The third step is, to face recognizer, transfers some test images. And tests if it predicts them correctly.

5. SYSTEM FLOW CHART

The flowcharts the operation of automated attendance system shown in figure 2.

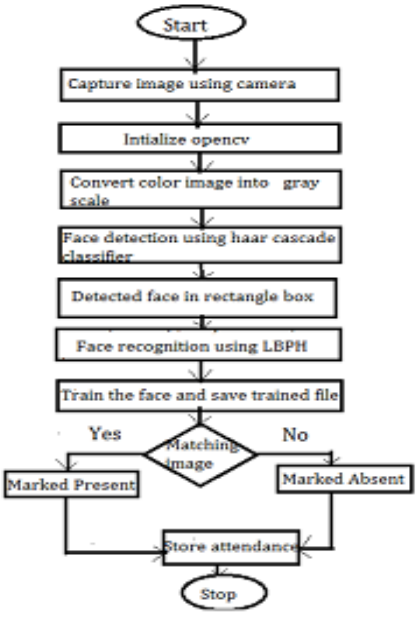

Fig -2: System flow diagram

This system contain first image is captured and convert into the gray scale image. That means colored image is converted to gray scale image. Then face is detect and recognition the face. And it is matched with the trained ones. If it is matched with the trained one the attendance is marked as update the attendance and generate report.

6. CONCLUSION AND FUTURE SCOPE

This replaces the manual attendance with the automated system, which will time saving, low cost, efficient and fast. The whole system is implemented in PYTHON programming language. Haar cascade classifiers and Local Binary Pattern Histogram are used in this system implementation, which gives better accurate results than other method for implementing the system.

In future works for the students gets SMS regarding his/her attendance as alert. This purpose is done used by a GSM module. Also parents get the SMS alert of their student attendance.

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