Face Recognition based Attendance Management System

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Abstract –

In this digital era, the facial recognition system plays an essential role in almost every sector. Face recognition is one of the mostly used biometry. It can be used for security, verification, identification and has many more advantages. Despite low accuracy compared to the recognition of the iris and fingerprint recognition, it is widely used due to its contactless and non -invasive process. In addition, a facial recognition system can also be used to mark attendance in schools, universities, offices, etc. This system aims to build a class attendance system that uses the concept of facial recognition as an existing manual attendance system is time consuming and cumbersome. And there may be chances of participating in representatives. The need for this system is therefore increasing. This system consists of four phases of database, facial detection, facial recognition, attendance updates.

Database is created pictures of students in class. Face detection and recognition is performed using the Haar-Cascade classifier and the algorithm of the local binary pattern. Faces are detected and recognized from the living video broadcast in the classroom. Participation will be sent to the relevant faculty at the end of the meeting .

*Key Words***:** Face Recognition; Face Detection; Haar-Cascade classifier; Local Binary Pattern Histogram; attendance system

1.INTRODUCTION

The traditional method of attendance marking is a tedious task in many schools and universities. It is also a special burden for faculties that should be labeled by manually calling the names of students that could take about 5 minutes of the entire session. This is time consuming. There are some chances of participating in representatives. Therefore, many other institutes have begun to deploy many other techniques for recording participation, such as the

use of radiofrequency identification (RFID) [3], iris recognition [4], fingerprint recognition, etc. However, these systems are based on queues that could consume more time and disturbing nature. Face recognition has determined an important biometric function that can be easily obtained and is

Non -intensive. Face recognition systems are relatively ignored by different facial expressions. The face recognition system consists of two categories: verification and facial identification. Face verification is a 1: 1 comparison process, compares the face image with images of the template, and while there are 1: N problems that compare the query images[1]. The purpose of this system is to create a attendance system that is based on facial recognition techniques. Here the face of the individual will be considered to indicate participation..

Nowadays, facial recognition gains more popularity and has been widely used. In this article we have designed a system that detects students' faces from live video broadcasting.

If the detected face is found in the database, they will be marked with a classroom and participation. This new system will consume less time than compared to traditional methods

. 2. Literature Survey

The authors designed [3] a model of automated attendance system. The model focuses on how facial recognition integrated with the identification of radiofrequency identification (RFID) detects authorized students and numbers as they get inside and get out of the classroom. The system maintains an authentic record of each registered student. The system also maintains the data of each student registered for a specific course in the attendance protocol and provides the necessary information as needed. In this article, the

authors designed and implemented [4] a attendance system that uses IRIS biometrics. Initially, the participants were asked to register their data along with their unique Iris template. At the time of participation, the system automatically participated in the classroom by capturing the eyes of each participant, recognizing their iris and finding a match in the created database. The prototype was based on the web. In, the authors designed [5] a attendance system based on face recognition. Algorithms such as Viola-Jones and a histogram of oriented gradients (HOG) along with the classifier of support vectors (SVM) were used to implement the system. The authors considered various real -time scenarios such as scaling, lighting, occlusion and position. The quantitative analysis was performed on the basis of the ratio of the high -end signal to the noise (PSNR) and was implemented in Matlab Gui. Authors in [6] Research to obtain the best algorithm of face recognition (Eigenface and Fisherface) provided by open CV by comparing the curve of the operational characteristics (ROC) and then implemented it into the attendance system. Based on experiments conducted in this article, the ROC curve has shown that eigenface achieves a better result than Fisherface.

The system implemented by the algorithm of its own point of view reached the rate of accuracy of 70% to 90%. V [7] The authors proposed a method for students of students in the classroom using the technique of facial recognition by combining discrete ripples (DWT) and discrete cosine transformations (DCT). These algorithms were used to extract the student's face properties followed by the use of radial basic function (RBF) for classification of facial objects.

3. PROPOSED SYSTEM

All class students must register by entering the required details and then their images will be captured and stored in the data file. During each session, the faces will be detected from the live broadcast in the classroom. The detected faces will be compared with the pictures present in the data file. If a match is found, participation will be marked for the relevant student. At the end of each session, the list of absent will be sent to the relevant faculty dealing with a session. System architecture of the proposed system is listed below.(as shown in fig 1)
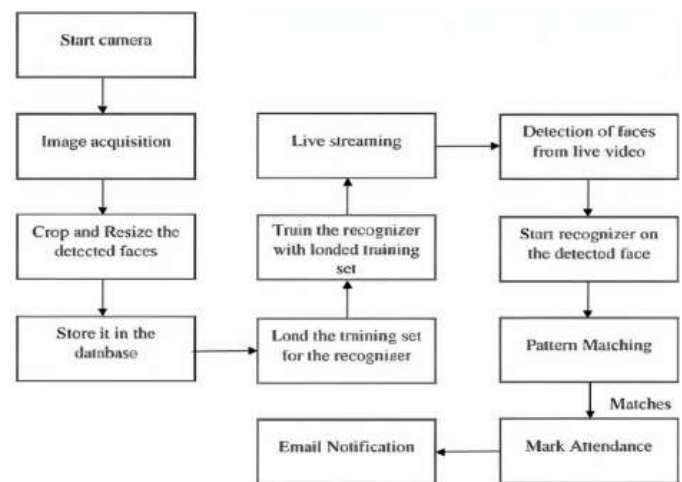

Fig.1. System Architecture

This process can usually be divided into four phases

1. Images of creating data sets of students are captured using a web cam. More pictures of one student will be obtained by different gestures and angles. These pictures are subject to pre-pro processing. The images are cropped to obtain the Region of Interest (ROI) which will be further used in recognition process. Next step is to resize the cropped images to particular pixel position. Then these images will be converted from RGB to gray scale images. And then these images will be saved as the names of respective student in a folder

2. Facial detection of face detection is performed here using the Haar-Cascade with OpenCV classifier [8]. The Haar Cascade algorithm must be trained to detect human surfaces before it can be used to detect the face. This is called extraction of elements. The Haar Cascade training data used are XML-haarcascade_frontalface_default files.

3. The face recognition process can be divided into three steps- prepare your training data, face recognition, forecast. There will be training data that are present images.[9]

4. Data file. They will be assigned to an integer label to the student to which it belongs. These images are then used for facial recognition. Recognition of the face used in this system is a local histogram of a binary pattern. Initially, a list of local binary patterns (LBP) of the entire face is obtained. These LBPs are converted into a decimal number and then the histograms of all these decimal values are performed. At the end, one histogram

will be created for each picture in training sessions. Later, the histogram of the face recognition to be recognized is to be recognized, and then compared with the already calculated histograms and returns the best matching label associated with the student to which it belongs to .

Faculty will be updated with a monthly attendance certificate at the end of each month

4. RESULTS & DISCUSSIONS

Users can interact with the GUI system(as shown in fig 2). Users will mainly provide three different options, such as students' registration, faculty registration and participation in Mark. Students are to enter all required data in the students' registration form (as shown in fig 3). After clicking on the registration button, the webcam starts automatically . Then it automatically starts clicking on the photos until 60 samples are removed or CRTL+Q is pressed..
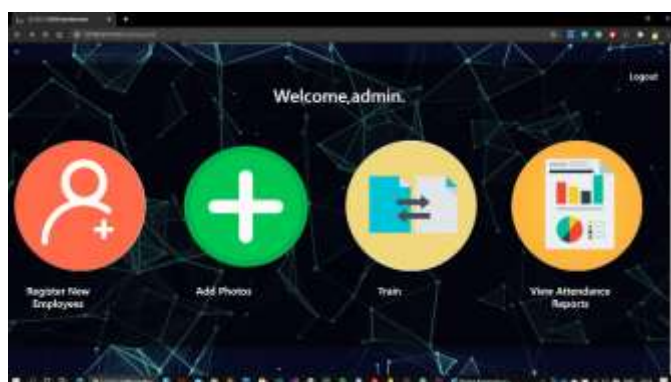

Fig 2 Interface Page

Fig 3 Login Page

The captured images will then be processed and stored in the Training Images folder. Faculty should register with the relevant courses codes together with their e-mail ID in the provided registration form of the faculty.

This is important because the list of absent will eventually be sent to the relevant faculties.

5. CONCLUSION

The aim of this system is to create an effective class attendance system using facial recognition techniques. The proposed system will be able to mark participation via Face ID. They find their faces via a webcam and then recognize your faces. After recognition, this will indicate the participation of a recognized student and update the attendance record. By leveraging computer vision and deep learning techniques, particularly facial recognition algorithms, this system minimizes the chances of proxy attendance, reduces administrative overhead, and enhances user convenience. The integration of real-time recognition, high accuracy rates, and ease of deployment make it a viable solution for educational institutions, workplaces, and other organizations.

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