

Research on Smart Attendance System Using Facial Recognition

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Abstract

To maintain the attendance record with day-to-day activities is a challenging task. The conventional method of calling name of each student is time consuming and there is always a chance of proxy attendance. The following system is based on face recognition to maintain the attendance record of students. The daily attendance of students is recorded subject wise which is stored already by the administrator. As the time for corresponding subject arrives the system automatically starts taking snaps and then apply face detection and recognition technique to the given image and the recognize students are marked as present and their attendance update the corresponding time and subject id. We have used deep learning techniques to develop the system, histogram of oriented gradient method is used to detect faces in images and deep learning method is used to compute and compare feature facial of students to recognize them. Our system is capable to identify multiple faces in real time.

Keywords: *Deep learning, python, Image Processing, Face Recognition, CNN, KNN.*

INTRODUCTION

Every organization requires a robust and stable system to record the attendance of their students. And every organization have their own method to do so, some are

taking attendance manually with a sheet of paper by calling their names during lecture hours and some have adopted biometrics system such as fingerprint, RFID card

reader, Iris system to mark their attendance. The conventional method of calling the names of students manually is time consuming event. The RFID card system, each student assigns a card with their corresponding identify but there is a chance of card loss or unauthorized person may misuse the card for fake attendance. While in other biometrics such as finger print, iris, or voice recognition, they all have their own flaws and also they are not 100% accurate.

Use of face recognition for the purpose of attendance marking is the smart way of attendance management system. Face recognition is more accurate and faster technique among other techniques and reduces chance of proxy attendance.

MOTIVATION

Attendance maintenance is a significant function in all the institutions to monitor the performance of the students. Every institute does this in its own way. Some of these institutes use the old paper or file based systems and some have adopted strategies of automatic attendance using some biometric techniques.

A facial recognition system is computerized biometric software which is suited for determining or validating a

person by performing comparison on patterns based on their facial appearances. Face recognition systems have upgraded appreciably in their management over the recent years and this technology is now vastly used for various objectives like security and in commercial operations.

Face recognition is a powerful field of research which is a computer based digital technology. Face recognition for the intent of marking attendance is a resourceful application of attendance system. It is widely used in security systems and it can be compared with other biometrics such as fingerprint or eye iris recognition systems.

Problem Definition

Taking and tracking students' attendance manually, losing attendance sheets, dishonesty, wasted time and high error scales are problems facing the lecturers use the existing attendance system. It is a hard process, take time and cause a lot of paper-based work. As a result in order to solve these problems and avoid errors we suggest computerizing this process by providing a system that record and manage student's attendance automatically without needing lecturer's interference.

LITERATURE SURVEY

In[1] 2017 Samuel John presented a Face

Recognition Attendance System with GSM Notification. This system uses the Viola Jones algorithm. This algorithm used for detect faces. Also, Fisher faces algorithm was used to create patterns of the faces which were caught. That created templates stored in the database. This system used library which is Open CV and used Software Development Kit(SDK)to create the graphical user interface.

In[2] other paper, Jenif D Souza introduces a Automated Attendance Marking and Management System by Facial Recognition. This system marked student's attendance automatically by the camera which captures the photo of student in the class. This system uses the algorithm called Histogram. Histogram algorithm used for face identification purpose. In this algorithm, The face image is converted to matrix form. Histogram are used for recognize of the exact faces. This system overcomes the problem of time consuming.

In[3] 2019 Nandhini R. introduced Attendance System based on face recognition. This system captures the video of the students, convert it into frames and store it in the database. Also, Convolution Neural Network (CNN) algorithmic used to detect faces. This

System helps in improving the accuracy and speed.

In [4] 2019, Shreyak Sawhney, karan kicker, Samyakjain introduced Real Time Smart Attendance Management System Using Face Recognition Techniques. In this system they use face detection and recognition method using convolution Neural Network and Principal Component Analysis(PCA) but using two camera some camera is used for the face detection and recognition at the door of classroom and the camera is used at inside the classroom for checking proxy attendance.

In[5] 2016, E Vardharajan, R Dharani, S Jeevitha,S Hemalata introduced Automatic Attendance Management System Using Face Recognition. In this system the use Eigen Faces, Eigen Weight method for face detection this system the camera detention the image and then system crop the faces of student and tie the faces with student database.

In[6] 2017, Poornima S, Sripriya N introduced Attendance Management System using Facial Recognition with Audio Output and Gender Classification. In this system they use Viola Jones algorithm and Principal Component Analysis (PCA) for the face recognition

and they also use the gender classification and Voice conversion module. After the face detection and recognition the system use the Microsoft Speech API for announce the absent student names this can serve as across check.

System Requirements

Operating system:- Windows 10

Coding language: - Python

Front-end :- Python

RAM :- 8GB(min)

Processor :- Pentium-IV

PROPOSED SYSTEM

The present system of attendance marking i.e., manually calling out the roll by the

faculty have quite satisfactorily served the purpose. With the change in the educational systems with the introduction of new technologies in classroom such as virtual classroom, the traditional way of taking attendance may not viable anymore.

Even with rising number of courses of study offered by universities, processing of attendance manually could be time consuming. Hence, in our project we aim at creating a system to take attendance using facial recognition technology in classrooms and creating an efficient database to record them.

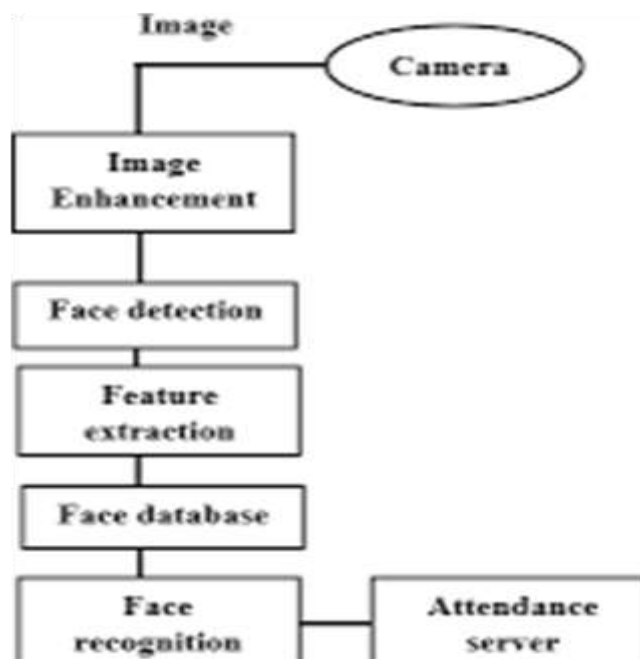


Figure 1: Proposed Systems

METHODOLOGY

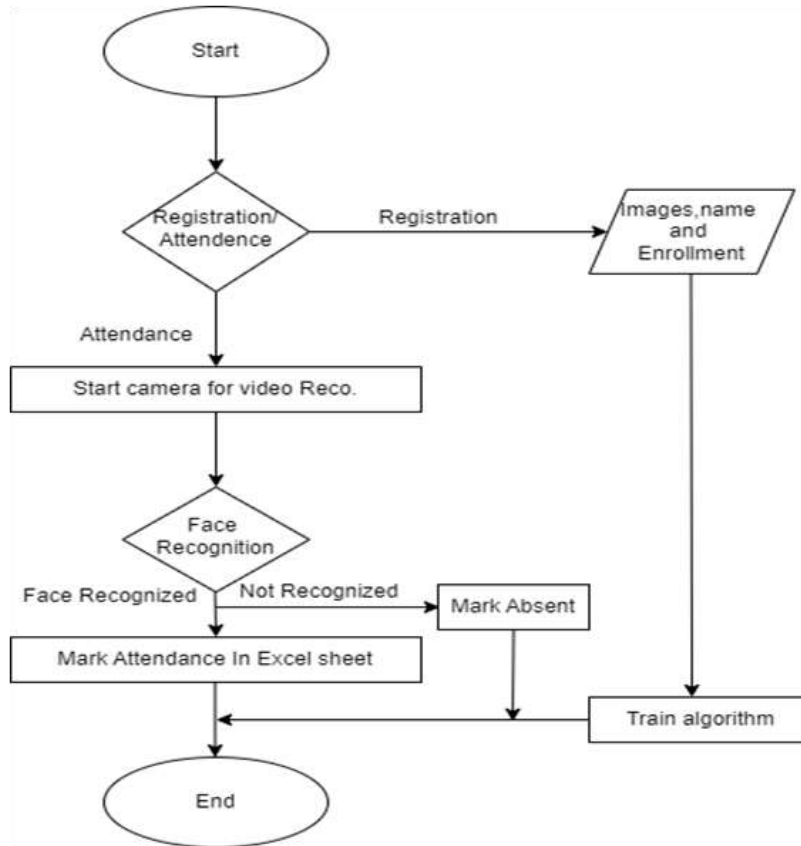


Figure 2: Proposed Systems

The proposed system is designed for automating the attendance of the different organization and reduces the flaws of existing manual system. The system calculate the attendance subject wise, that is the data of students and subjects as well as branch and year of study are added manually by administrator, and whenever time for corresponding subject arrives the system automatically starts taking snaps and find whether human faces are appear in the given image or not. We have used Histogram of Oriented Gradient for face detection and deep learning techniques to calculate and compare face features for

face recognition. Once faces are detected and recognize with the existing database, system calculate attendance for the recognize students with the respective subject id in real time. And an excel sheet generated and saved by the system automatically.

Face detection and Extraction

Face detection is important as the image taken through the camera given to the system, face detection algorithm applies to identify the human faces in that image, the number of image processing algorithms

are introduced to detect faces in an image and also the location of that detected face.

Face Positioning

There are 68 specific points in a human face. In other words we can say 68 face landmarks. The main function of this step is to detect landmarks of faces and to position the image. A python script is used to automatically detect the face landmarks and to position the faces as much as possible without distorting the image.

Face Encoding

Once the faces are detected in the given image, the next step is to extract the unique identifying facial feature for each image. Basically whenever we get localization of face, the 128 key facial points are extracted for each image given input which are highly accurate and these 128-d key facial points are stored in a data file for face recognition.

Face Matching

This is the last step of the face recognition process. We have used one of the best learning techniques that is deep learning which is highly accurate and capable of outputting a real value feature vector. Our system ratifies the faces, constructing the 128-d embedding for each. Internally, a face function is used to

compute the Euclidean distance between a face in an image and all faces in the dataset.

CONCLUSION

Smart attendance management system is designed to solve the issues of existing manual systems. We have used face recognition concept to mark the attendance of students and make the system better. The system performs satisfactorily in different poses and variations. In the future, this system needs to be improved because this system sometimes fails to recognize students from some distance, also we have some processing limitations, working with a system of high processing may result in even better performance of this system.

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