Attendance System Based on Face Recognition Using HOG Feature Extraction and SVM Classifier

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ABSTRACT

Face recognition system plays a vital role in almost every sector in this new era. Face recognition is one of the famous biometrics' techniques. It can be used for security, authentication, identification of a person and so on. It is having low accuracy when compared to fingerprint recognition, but it is being worldwide used due to its contactless process. Face recognition technique can also be used for attendance marking field. This system targets to building a class attendance system which is used the technique of face recognition. We all know existing manual attendance system is taking more time and difficult to maintain. And having chances of proxy in attendance. That's why, the need for this system occurs. This system consists of four phases- registration module, database creation, face detection, face recognition, attendance updating, attendance sending. Database consist of the image of the students in class. Face detection and recognition is performed using HOG feature extraction and SVM (Support Vector Machine) classifier. Faces will be detected and recognized from video streaming of the classroom. Attendance will be mailed to the respective faculty at the end of the lectures.

Keywords—Face Recognition; Face Detection; SVM classifier; HOG feature extraction; attendance system;

INTRODUCTION

Traditional method of attendance marking is a hectic job in many institutions. It is also an extra task to the employee who must mark attendance by calling the names of students manually which may take minimum 5 minutes of whole session. This is time taking. There are some possibilities of proxy in attendance. That's why, many institutes using many other techniques for taking attendance such as Radio Frequency Identification (RFID), iris scanner, fingerprint recognition, and list goes on. Face recognition has placed a very important biometric feature, which can be easily acquirable. Face recognition-based systems are relatively insensible to lots of facial expression. Face recognition system consists onf two categories: verification and face identification. Face verification is a 1:1 matching process, it compares face image against the template face images and whereas is a 1:N problem that compares a single face image. The purpose of this system is to build an attendance system which is based on face recognition techniques. Here face of an individual will be used for marking attendance. Nowadays, face recognition is getting more popularity and has been widely used. In this paper, we proposed a system which finds the face of students from live streaming video and attendance will be marked if the detected face is found in the database. This new system will take less time than compared to old methods.

LITERATURE SURVEY

Author in [1] proposed a model of an automated attendance system based on face recognition. The model focus on how face recognition incorporated in attendance system. it will find the students in class using live camera and recognize with there faces by finding the faces of them. They are using haar cascade and local binary histogram in this system. The system

marks attendance by matching the faces with the faces from database and attendance will mail to faculties.

In this paper [2], author have designed and implement an attendance system on raspberry pi using face recognition technology. This system used dlib library for face recognition. The system mark attendance and update in excel file. After the attendance marking is done the attendance sheet would send to employee or to parents of students.

Author in [3], this paper is an automated attendance system using face recognition which is using different types of machine learning algorithms like principal component analysis and linear discriminant analysis and neural network. this system is a web-based attendance system which mark attendance by matching face obtain from live video camera from web cam and matches from database. And attendance is mark in online database and students can see their attendance

In paper [4], author have developed a face recognition system using haar cascade PCA (principal component analysis) and LDA (linear discriminant analysis). The system is based on OpenCV python library. The use of eigenfaces for dimension reduction for eigen value and feature extraction. And author just shows the working of face recognition in this project

Author in [5], develops a face recognition-based system for attendance author use OpenCV 3.4(A python library) which are EigenFaces, FisherFaces, and Local Binary Patterns Histograms (LBPH). The recognizer that will be focused in this project will be the EigenFaces recognizer. If the face matches the attendance is mark as present in excel file and excel file is mailed.

PROPOSED SYSTEM

All students must have to register in this system. And provide basic information like year, semester, branch, name, mobile number and image of their face. And image will store in database folder. In the time of class, student will have to come and see in the camera

Fig.1. System Architecture

the face will be detected automatically and compare with image stored in the database if both face and image found attendance will mark for respective student and end of the session admin have to stop the attendance marking and the attendance will automatically send to respected faculties by mail. The architecture of proposed system is given in Fig.1, This process is divided into five parts

1. Database creation

Image of students is capture using our system with the help of web cam. Single image of student single student will acquire and this image will save in database without preprocessing which will be used for encoding findings. This image will be stored as the name of respective student and with roll no of student in database folder. And other information like name, roll no, phone number, branch, year, gender and semester will save in excel file name as "record.csv"

2. Face and Encodings Finding

The primary job is to detect the face, feature Extraction. Using landmarks of the face using Dlib and OpenCV. The state-of-the-art face recognition method build using deep learning technique 68 different points could be applied to any of the ranges from chin to eyes etc.as shown in fig 2. The transformations are rotation and scaling the preserve parallel lines known as affine transformation.
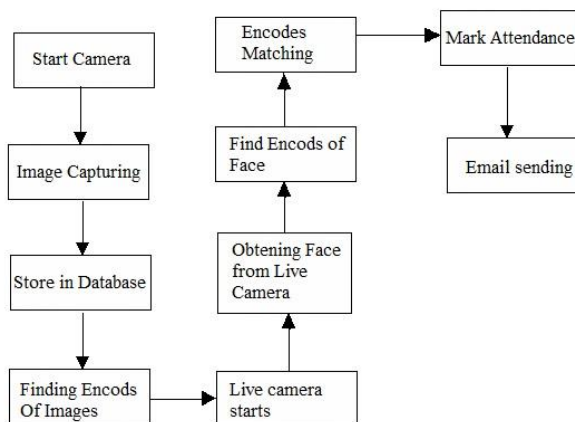
Fig. 2. Depiction of 68 points of face

After finding face the next step is to find the encodings of that face using find encodings function present in face-recognition library of python and store it in text file by using pickle library of python, so that we can use it again and again to match the faces

3. Face recognizing

This module is divided into two parts first is finding face in live streaming camera and find the encodings. Second is to matching the encodings of given face with the encodings present in text file created using pickle library. If the face is matched with database encodings the system goes to next module i.e. 4th module

4. Attendance marking

If given face matches with face from database then the students attendance will mark as present along with their name and roll-no. It will save in .csv file (excel file). After the lecture ends the .csv file will send to respective faculties

RESULT

The admin is the only person who can access the whole system. Admin can register student and activate the attendance system. Admin also can send the attendance file by clacking a button. When admin register the student fig.3, the information will store in excel file shown in fig. 4 and going to take image of student then webcam

will appear on computer's window shown in fig. 5. The image will store in database folder. When all class is starting the admin will enter the subject name and start the attendance system and automatically attendance will mark when system will detect the face in front of camera and save the information in "attendance.csv" file and then admin will send the attendance to respective faculty after marking is done by simply clicking the send button and attendance will send

CONCLUSION

This system targets to build an efficient automated attendance system using face recognition technology. The proposed system will be able to mark the attendance via face biometric feature. It will detect faces using webcam and then recognize the faces. And it will mark attendance of recognized student face.
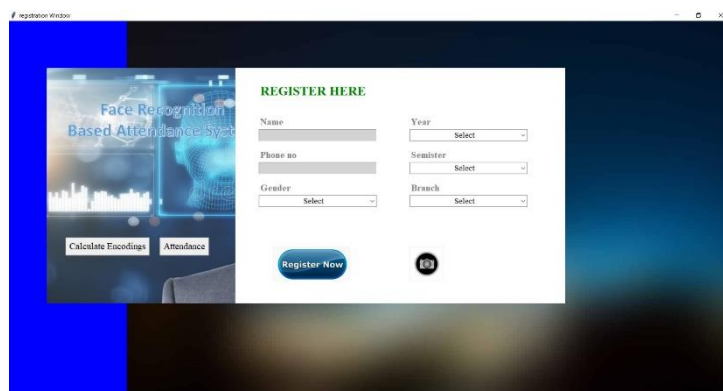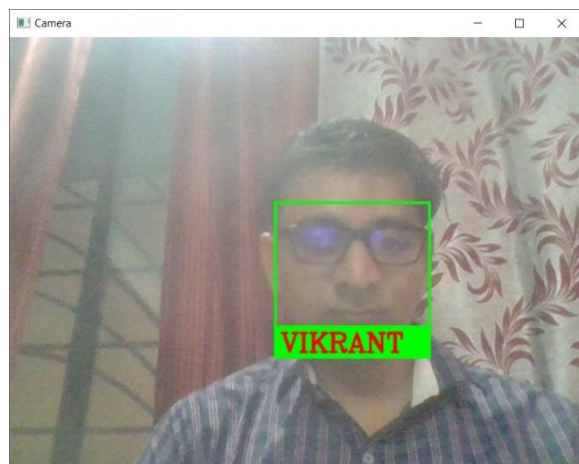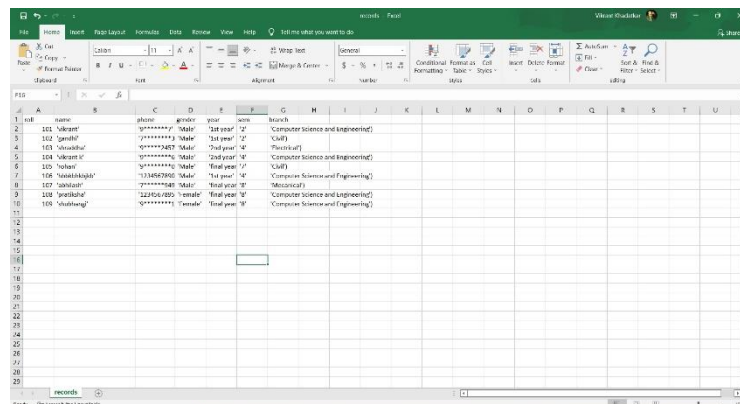

Fig. 3 main registration window

Fig. 4 Student Records

Fig.5 capturing the images of students for database

Fig. 6 matching the face and marking attendance

Fig. 7 Attendance sheet

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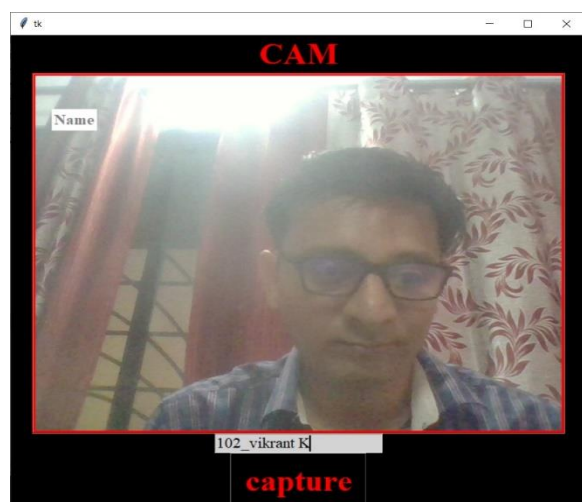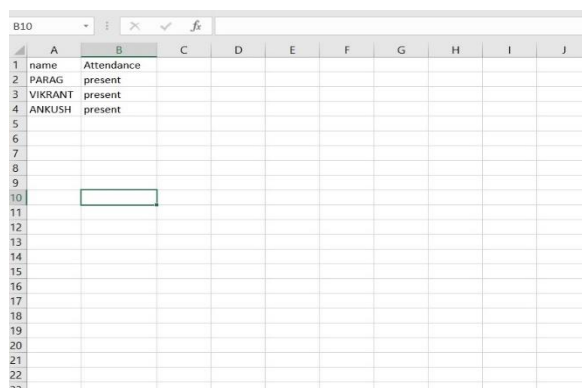
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