



GROUP IMAGE RECOGNITION FOR ATTENDANCE MANAGEMENT

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Abstract

Manual way of marking attendance is a typical situation where the students sitting in a classroom and the teacher calling out their names individually to mark their attendance. This method requires some considerable amount of time and efforts. The attendance is usually marked using hard resources pen and paper. It is then transmitted to the administration often by hand. As the numbers of students are increasing day by day, it is a complex task for college's or universities to screen and maintain the student records. The entire process is tedious, time consuming and subject to human error. Further there is always a chance of proxy attendance. Also, most of the students never get regular updates related to their attendance and the paper-based record keeping mechanism is always vulnerable to theft of physical damages. The huge attendance records that maintained are then used for later references. Automated systems involving use of biometrics like fingerprint and iris recognition are well developed in the recent year's however, it is intrusive and cost required for deployment on large scale gets increased substantially. To overcome these issues, facial recognition with deep learning approach is used here which involves the phases like image acquisition, face detection, feature extraction, face classification, face recognition and eventually marking the attendance. This project aims to achieve face recognition with both individuals as well as the people in group photos.

Index Terms—Face detection, feature extraction, Face Recognition, feature matching, database.

I. INTRODUCTION

Face Recognition has received a lot of attention from both research and industry communities due to its fascinating range of scientific challenges as well as rich possibilities of commercial applications.

Deep Learning is one of the interesting field that enables the machine to train itself by giving some datasets as input and provides a suitable output during testing by applying different learning algorithms. Nowadays Attendance is considered as an important feature for both the students as well as the teacher of an educational organization. With the evolution of the deep learning technology the machine automatically detects the attendance performance of the students and maintains a record of those collected data.

In general, the attendance management system can be maintained in two different methods, namely

- Manual Attendance Management System (MAMS)
- Automatic attendance management system (AAMS)

Manual Attendance Management System or a traditional way of taking attendance is a time consuming process, where the students sits in a class and the teacher need to call the names of the student and mark the attendance. Sometimes there is a chance of proxy attendance and sometimes the teacher may miss some names to call. This paper based record keeping mechanism is always exposed to theft of physical damages. To solve this problem, we go with automatic attendance management system (AAMS).

Automatic Attendance Management System is a method to automatically estimate the presence or absence of the students sitting in the class by using face recognition technology.

A. Overview of proposed system

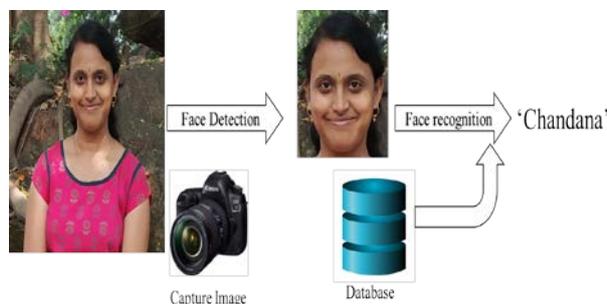


Figure 1: Overview of Face detection and Face Recognition Process

The general face recognition process is illustrated on figure 1. In this it will first find whether it's a face or not (face detection) and if it is a face the question arises is who's face is that? (face recognition).

II. LITERATURE SURVEY

A. Automatic attendance system using machine learning approach.

In this paper, the author's idea has been implemented the automatic attendance system using machine learning method. Here the author used Viola-Jones and HOG features algorithm along with SVM classifier to acquire the desired outcomes. This method is automatically detects the students and mark the attendance as per the students presence or absence.

B. Students attendance marking system using face recognition for highly efficient signal transfer system applications.

In this paper, the author has been implemented the face recognition system, here the author tried to recognize the overlapping faces. The author used DRLBP algorithm to identify the overlapping faces and also to extract the student's face features. This feature extraction results are compared with the test images. Finally classification is done to classify and validate the attendance results.

C. Smart technique for attendance system to recognize faces through parallelism.

In this paper, the author has been implemented the smart technique for attendance

system to recognize the faces, using image processing techniques the authors exploit the characteristic appearance of a student. In this paper, the authors were presenting impulsive presence for students in classroom. Initially they took the picture of the student of whole classroom and that was stored in a database and then applied system algorithm for the image that are stored in database. This includes histogram classification, noise removal, face detection and face recognition methods. The authors were used these methods to detect the face and compare it with the stored images. Finally the attendance will be marked.

D. Automatic attendance management system using face recognition.

The purpose of this research paper was to automatically record the attendance by fixing the camera in the classroom and it will capture the image. The faces are detected and recognized with the database and marked the attendance, if attendance is marked absent then the students absent is send to their parents phone, here the author used the eigen face algorithm to recognize the faces. Eigen faces is a set of eigen vectors which are used in computer vision difficulties of face recognition.

III. EXISTING RECOGNITION SYSTEMS

A. Fingerprint based recognition system.

In the fingerprint based student attendance management system, the student's needs to go to the reader to record the fingerprint to ensure their presence for the day before or on the class hours. The difficulty with this methodology is that it will distract the student's devotion during the class time and it will consume more time to mark the attendance of the students.

B. Iris based recognition system.

In this system, the students should stand in front of the camera, the camera scans the iris of the student to mark the attendance. The device will check whether the scanned iris will match with the data set of student's database and if it is matched, the attendance is marked correspondingly. This will reduce the effort of faculty member and also it will reduce the proxy attendance of the student and also it helps in maintaining the students record safe and protect from physical damage.

C. RFID (Radio Frequency Identification) based recognition system.

In this RFID based system, the students need to carry the Radio Frequency Identity card with them to give their presence for the day, they should place this card ID on the card reader to record their attendance. The problem in this system is that there are some risks for the fraudulent access, that is some students make use of other students ID card to record their attendance too even though the student is absent.

D. Face based recognition system.

The facial recognition system is used to recognize the face and mark the attendance through the high-resolution camera, this camera detects and recognize the students faces in the classroom. This system compares the captured faces with the faces in the database with stored images. Once the face of the student is matched with the stored image, the attendance is marked as present. In this system, there are some risks that the camera will miss some of the faces to capture or it may not recognize some faces while recognizing.

IV. METHODOLOGY

The Automatic Face Recognition System is managed in two steps as shown in figure 2 based firstly on facial feature extraction and second on facial feature classification or matching against an available face database.

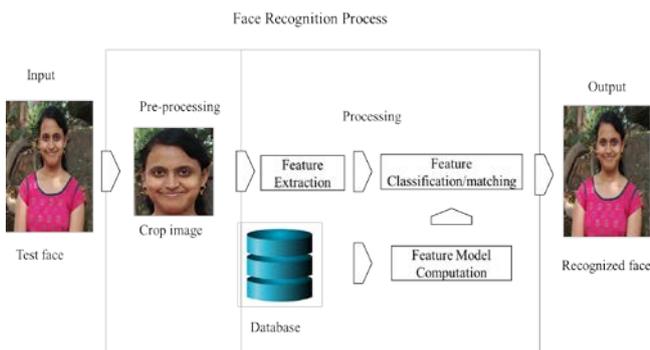


Figure 2: Face recognition process.

Initially the database of all individual student faces with unique Id are created. Generally the database contains 10 to 15 images of same unique Id of different angle of faces. The database should be created as it will contain all the angular photos of the individual student. It will help to recognize the student efficiently.

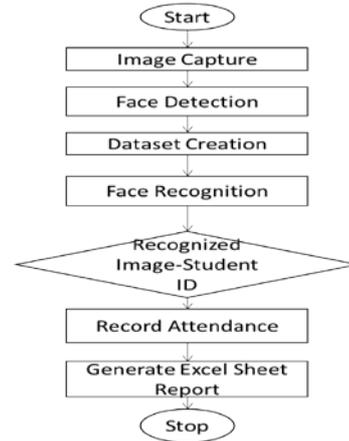


Figure 3: Workflow of proposed

The proposed system workflow is shown in figure 3. Firstly, the image of whole class students are taken individually to create an database by detecting the faces of those students with giving unique ID for individuals. Then for the sake of marking attendance, the picture of whole class is taken to recognize the students and mark the attendance in an excel sheet. The excel sheet contains the student name, register number, date and the attendance of the students.

V. RESULTS AND DISCUSSIONS

The main principle of this research is to recognize and mark the student attendance automatically. Initially the video is captured to take the frames of the video to create the database of students. The software used for this project is python and OpenCV.

Python code is written to collect the training dataset by recording the video. Unique user ID is used for a person to recognize the faces. The image is stored as jpg format as, the person unique number and the number of images of same person collected from the video (ex. User.1.1). This unique user ID and respective images in the dataset are trained using the haar-cascade classifier. Using numpy library, the stored dataset and the respective ID's are trained and classified, this classifier is saved as classifier.yml file. Local Binary Patterns Histograms (LBPH) is used to detect the faces in the dataset.

A snapshot of the dataset has been displayed below in figure 4:



Figure 4: Database of students

Python code is written to detect and recognize multiple student faces, this will recognize the faces as per the unique Id corresponding to the respective names. This multiple recognition is shown in figure 5 as below:



Figure 5: Recognition of multiple faces.

The attendance is marked corresponding to the face recognition as in figure 5. The attendance is marked in an excel sheet which contains students name, register number, date and the attendance of the student as in figure 6.

	A	B	C	D
1	chandana	1BM17LDC01	28-09-2019	Present
2	Harini	1BM17LDC02	28-09-2019	Present
3	Jahnvi	1BM17LDC03	28-09-2019	Present
4	Kavya	1BM17LDC04	28-09-2019	Present
5	Latha	1BM17LDC05	28-09-2019	Absent
6	Rakesh	1BM17LDC06	28-09-2019	Absent
7	Shwetha	1BM17LDC07	28-09-2019	Present
8	Sudhindra	1BM17LDC08	28-09-2019	Absent

Figure 6: Attendance marked with respect to figure 5.

VI. CONCLUSION

The proposed attendance monitoring system using image processing is a solution to reduce the numerous irregularities in manual record keeping.

The student attendance management system estimates the student attendance by clicking the

image of the class and recognize, who are all present in the class. The face detection is done by continuously clicking the images of a student for certain period to train the faces and stored in a database. This system allows the teacher to check the student attendance automatically without any effort and cost. This system is very easy to use, it is reliable and it is very secure. The overall system is written in a python code. This research aims to achieve face recognition with both photos of individuals, as well as the students in a groups.

VII. FUTURE SCOPE

The proposed system shows that it is useful for the schools and colleges to take the accurate attendance automatically. But there are some limitations, which are listed below. These provide a scope of further investigation.

- This study focused on face detection and face recognition for attendance management, but this study doesn't detect the overlapping faces in the classroom.
- This system can also be implemented in examination halls to detect and identify the candidates.
- Improve this technology to prevent the frauds in the ATM's, airports etc. For this, already an huge database is present with the government ie, Adhar database to recognize the frauds.

VIII. REFERENCES

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