

Face Recognition Based Attendance System

Trupti Mate¹, Sohail Khan², Mahesh Bhosale^{3*}, Rishabh Ahire⁴, Kumar Dolase⁵

¹Professor, Department of Electronics and Telecommunication Engineering, Shalaka Foundation's Keystone School of Engineering, Pune, India

^{2,3,4,5}Student, Department of Electronics and Telecommunication Engineering, Shalaka Foundation's Keystone School of Engineering, Pune, India

*Corresponding author: mahesh18121998@gmail.com

Abstract: To detect real time human face are used and a simple fast Principal Component Analysis has used to recognize the faces detected with a high accuracy rate. The matched face is used to mark attendance of the students. Our system maintains the attendance records of students automatically. Our module enrolls the student's face. This enrolling is a onetime process and their face will be stored in the database. During enrolling of face we require a system since it is a onetime process. You can have your own roll number as your id which will be unique for each student. The presence of each student will be updated in a database. Attendance is marked after student identification.

Keywords: Biometric attendance, Image capture, Face detection, Face recognition, Haar cascade, LPBH, OpenCV.

1. Introduction

Maintaining the attendance is very important in all the institutes for checking the performance of students. Every institute has its own method in this regard. Some are taking attendance manually using the old paper or file based approach and some have adopted methods of automatic attendance using some biometric techniques. But in these methods students have to wait for long time in making a queue at time they enter. Many biometric systems are available but the key authentications are same is all the techniques. Every biometric system consists of enrolment process in which unique features of a person is stored in the database and then there are processes of identification and verification. These two processes compare the biometric feature of a person with previously stored template captured at the time of enrollment. Biometric templates can be of many types like Fingerprints, Eye Iris, Face, Hand Geometry, Signature, Gait and voice.

Our system uses the face recognition approach for the automatic attendance of students in the classroom environment without students' intervention. Face recognition consists of two steps, in first step faces are detected in the image and then these detected faces are compared with the database for verification. A number of methods have been proposed for face detection i.e. Ada Boost algorithm, the Float Boost algorithm, the S-Ada Boost algorithm Support Vector Machines (SVM), and the Bayes classifier. The efficiency of face recognition algorithm can be increased with the fast face detection algorithm. In all the above methods SURF is most efficient. Our system utilized

this algorithm for the detection of faces in the office room image. Face recognition techniques can be Divided into two types Appearance based which use texture features that is applied to whole face or some specific Regions, other is Feature based which uses geometric features like mouth, nose, eyes, eye brows, cheeks and Relation between them.

2. Block Diagram

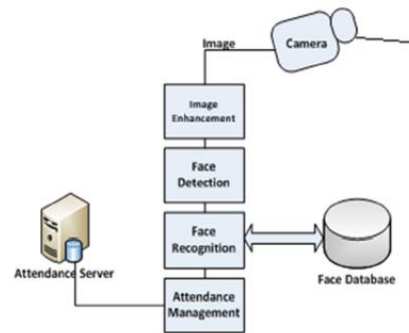


Fig. 1. Block diagram

The system consists of a camera that captures the images of the student and sends it to the image enhancement module. After enhancement the image comes in the Face Detection and Recognition modules and then the attendance is marked on the database server. This is shown in the experimental setup in Figure.

At the time of enrolment, templates of face images of individual student are stored in the Face database. Here all the faces are detected from the input image and the algorithm compares them one by one with the face database. If any face is recognized the attendance is marked on the server from where anyone can access and use it for different purposes.

A. Image Capture

We need some HD camera in order to get results. We can capture the images from the video stream or by capturing each and every image from the webcam manually. Doing the frame capture from the stream of video will give us results in less time but we won't be able to capture the face properly in case we lose light or something and if the face is not captured properly.

B. Face Detection

For face detecting, we can do it using the object cascading class and we use the b-box method. The detection of the face using the object cascading is bought from the most popular facial recognition model. In here, there are several objects are present. These are there in the form of small blocks containing them. They are taken through an image and are moved through each and every block of the image and are checked for overlapping through them. First we will convert the image from the red blue green to gray scale image. The faces from the image captured is to be collected. The captured faces are cropped into small images of resolution 112x92. It would be around 11 KB of size.

C. Face Recognition

The faces taken in the database are needed to loaded into our workspace. We will load the gallery images into that now we need to split the data of each and every person into testing and training data. Let us take it in the ratio of 0.2:0.8 from the database. Now we will be extracting the face features of all the training individuals and store them in the form of bits and bytes. We need to fetch the cropped and gray scaled images.

3. Algorithm

- Step 1: Take an image of a normal expression pic1 (say) of a human face.
- Step 2: Converts the color image to grayscale.
- Step 3: Crop the 3 facial image region of interest (ROI) (eyes, eye brows and lip) from the image by defining region.
- Step 4: Find edges of all image region.
- Step 5: Take an image of a faces and create dataset
- Step 7: Train the dataset.
- Step 8: Recognize the faces in video camera.
- Step 9: Mark the attendance accordingly.

4. Flow Chart

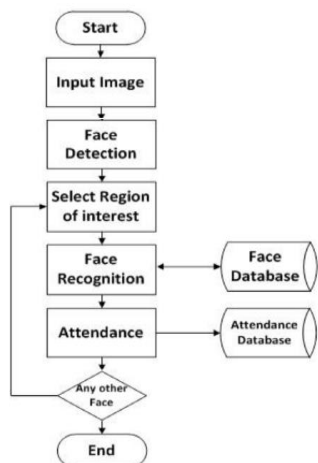


Fig. 2. Flowchart diagram

5. Experimental Results

The implementation of the “Face Recognition based attendance System” is done successfully. The attendance system for student is done without any error in the system. The proposed system output is shown below.

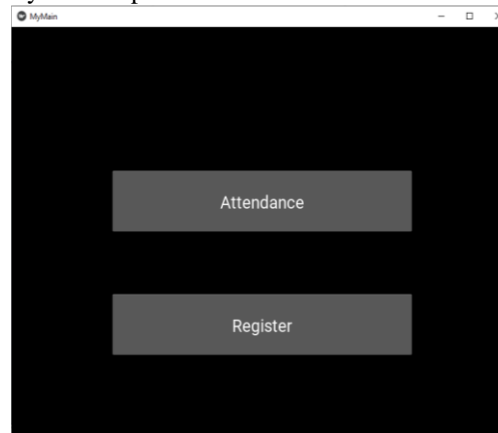


Fig. 3. At the time of register, templates of face images of individual student are stored in the Face database

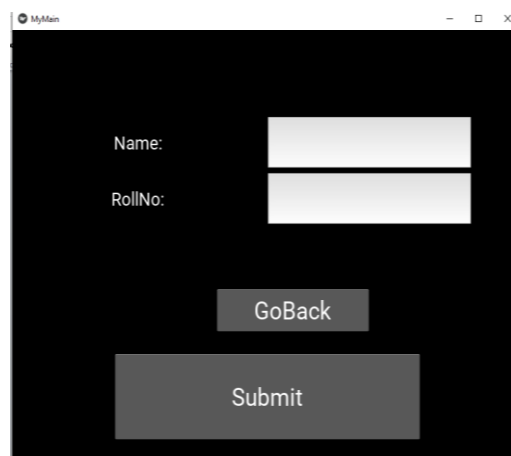


Fig. 4. The ID and Name entered is stored in excel file



Fig. 5. Images are captured using HaarCascade File as recognizer file. Images are stored in gray format in Dataset. LPBH face recognizer is used for training Dataset

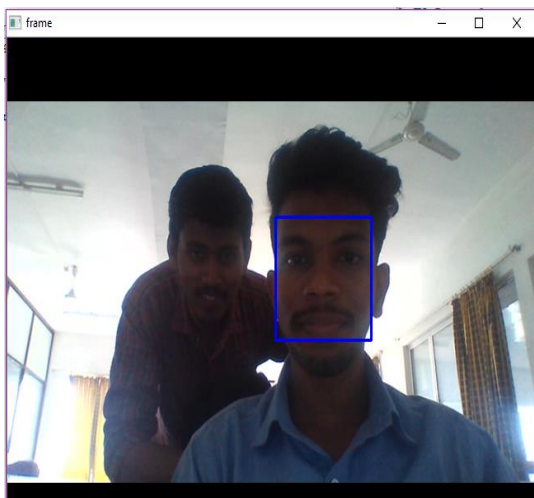


Fig. 6. Results for untrained data i.e. Just detected image is the untrained image

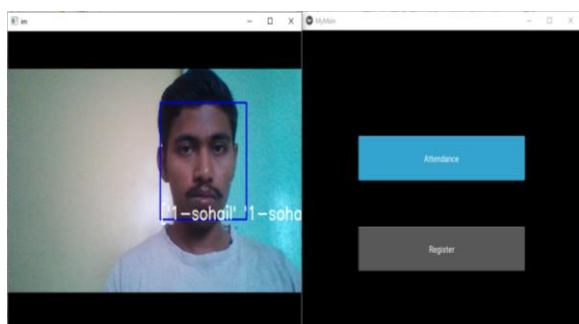


Fig. 7. Result of trained data i.e. The detected and recognized image is the trained one

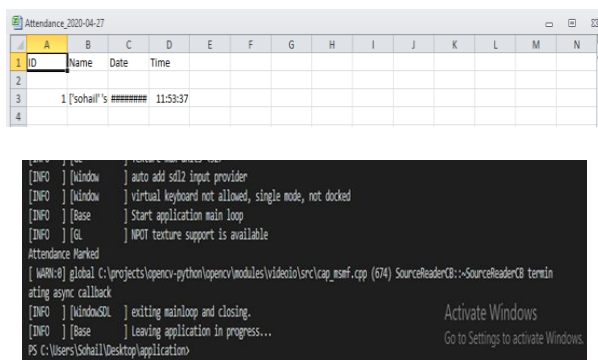


Fig. 8. The Id and Name of the person in attendance Excel file with the time and date

6. Conclusion

Capturing the images from camera or cc camera and applying

techniques face detection and recognition can decrease the manual work from human and increase the security safety, taking the decision from this recognition result. Based on this face detection and recognition can used in implement so many applications like automatic attendances system based on face recognition, worker attendances, security, safety, police application like finding thief in image that help to catching thief. In this system we have implemented an attendance system for a lecture, section or laboratory by which lecturer or teaching assistant can record student's attendance. It saves time and effort, especially if it is a lecture with huge number of students. The complete system is implemented in python.

7. Future Scope

- The Project can be converted into APK file.
- Can be used to check Location.
- The project has been done in Kivy and Python which makes it possible to run on different platforms like ios, Android etc.

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