

Attendance Monitoring System Using Face Recognition

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Abstract – Initially the database which contains the images of all the student's will be created. The model is fixed in the class in such a way that all the student's faces are captured clearly. Once the teacher enters/finishes the class then they have to login to the model then the camera will take the picture of whole class. Then image will be cropped into individual student and cropped image will be updated on the main server automatically. So that every student has the clarity of their attendance. In other words there is a transparency between student and teacher about attendance. Including to this, model also provide several features such as Automatic attendance percentage calculation and if a student absent for one class automatic message will be sent to the respective proctors and if a student absent for consecutive three classes automatic message will send to the respective proctors as well as parents. Status of attendance will be sent to the parents as well as students for every month. This system is more secure than the existing system and also requires less time to take the attendance.

INTRODUCTION

Face recognition is an important application of Image processing owing to its use in many fields. Identification of individuals in an organization for the purpose of attendance is one such application of face recognition. Maintenance and monitoring of attendance records plays a vital role in the analysis of performance of any organization. The purpose of developing attendance management system is to computerize the traditional way of taking attendance. Automated Attendance Management System performs the daily activities of attendance marking and analysis with reduced human intervention. The prevalent techniques and methodologies for detecting and recognizing face fail to overcome issues such as scaling, pose, illumination, variations, rotation, and occlusions. The proposed system aims to overcome the pitfalls of the existing systems and provides features such as detection of faces, extraction of the features, detection of extracted features, and analysis of students' attendance. The system integrates techniques such as image contrasts, integral images, color features and cascading classifier for feature detection. The system provides an increased accuracy due to use of a large number of features of the face. The system is tested for various use cases. It consider a specific area such as classroom attendance for the purpose of testing the accuracy of the system. The metric considered is the percentage of the recognized faces per total number of tested faces of the same person. The system is tested under varying lighting conditions, various facial expressions, presence of partial faces (in densely populated classrooms) and presence or absence of beard and spectacles.

1. SYSTEM DISCRIPTION

The system consists of a camera that captures the images of the classroom 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 Figure2. At the time of enrolment templates of face images of individual students 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. This system uses a protocol for attendance. A time table module is also attached with the system which automatically gets the subject, class, date and time. Teachers come in the class and just press a button to start the attendance process and the system automatically gets the attendance without even the intensions of students and teacher. In this way a lot of time is saved and this is highly secure process no one can mark the attendance of other. Attendance is maintained on the server so anyone can access it for it purposes like administration, parents and students themselves. Camera takes the images continuously to detect and recognize all the students in the classroom. In order to avoid the false detection we are using the skin classification technique [19]. Using this technique enhance the efficiency and accuracy of the detection process. In this process first the skin is classified and then only skin pixels remains and all other pixels in the image are set to black, this greatly enhance the accuracy of face detection process. Two databases are displayed in the experimental setup Figure 2. Face Database is the collection of face images and extracted features at the time of enrollment and the second attendance database contains the information about the teachers and students and also use to mark attendance. Including to this, model also provide several features such as Automatic attendance percentage calculation and if a student absent for one class automatic message will be sent to the respective proctors and if a student absent for consecutive three classes automatic message will send to the respective proctors as well as parents. Status of attendance will be sent to the parents as well as students for every month. This system is more secure than the existing system and also requires less time to take the attendance.

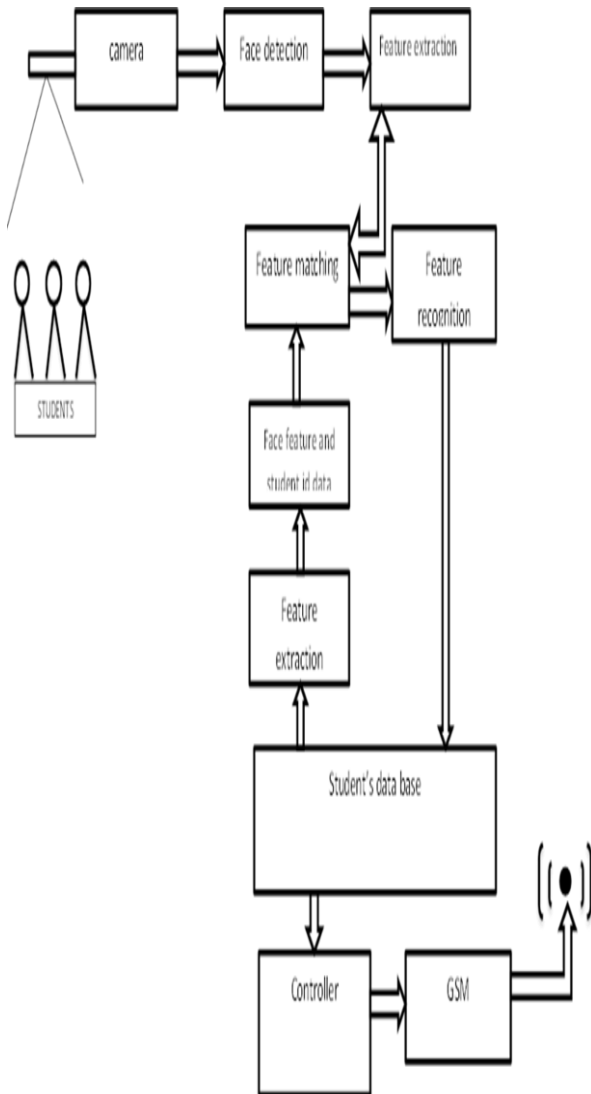


Fig -1: Experimental setup

2.1 Technical Requirement

2.1.1 Hardware Requirements

- Camera must be positioned in the class room
- Resolution: 1200 by 1200 pixels
- Secondary memory to store all the images and database
- GSM System

2.1.2 Software requirements

- Python
- Embedded C

2. SYSTEM ALGORITHM

This section describes the software algorithm for the system.

The algorithm consists of the following steps

- Image acquisition
- Histogram normalization
- Noise removal

- Skin classification
- Face detection
- Face recognition
- Attendance

In the first step image is captured from the camera. There are illumination effects in the captured image because of different lighting conditions and some noise which is to be removed before going to the next steps. Histogram normalization is used for contrast enhancement in the spatial domain.

3.1 Image Acquisition

Image is acquire from the camera that is connect above the board. A camera capture image after every two minutes and send this image to the computer for processing as shown in fig 2



Fig -2: input image

3.2 Histogram Normalization

Color image is converted to grace scale image for increasing contrast. As shown in fig 3



Fig -3: Histogram Normalization

3.3 Noise Filtering

in this system use the median filter for the removal of noise and other filter like FFT ,low pass filter this also remove the noise in the input image

3.4 Skin Classification

it is use for the increasing the efficiency of the face detection algorithm its related with binary image use the thresholding of skin colors

3.5 Face Detection

In this stage faces are detected by marking the rectangle on the faces of the student as shown in fig

4. After the detection of faces from the next step is cropping of each detected face.

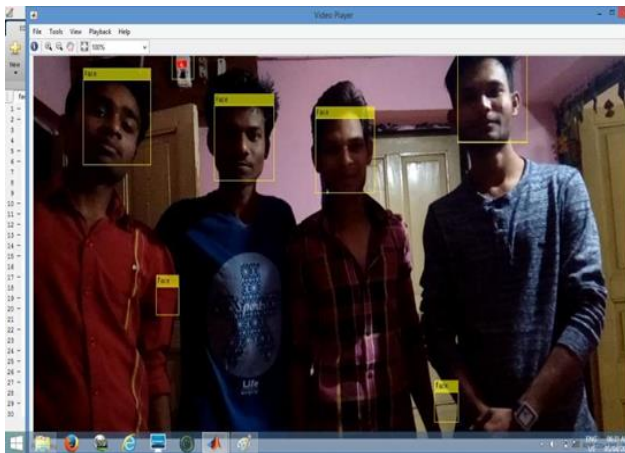


Fig -4: Face Detection

Initially face detection algorithm tested on variety of images algorithm was applied to detect face in real time video is shown in fig 5.

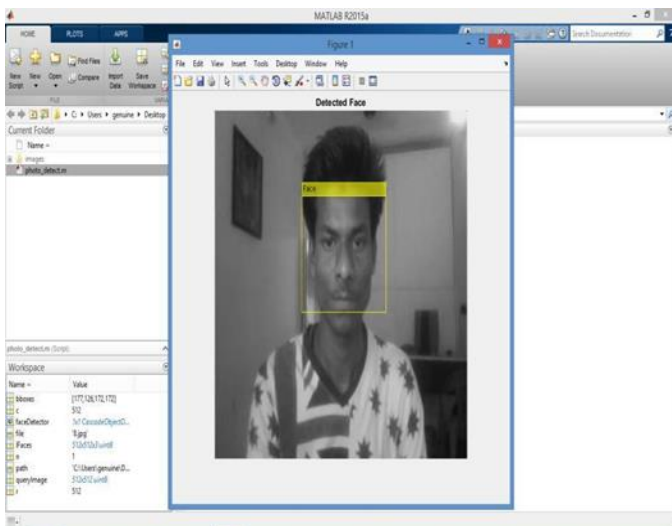


Fig -5: Real time face detection

The algorithm use the technique of increasing the speed of algorithm each crop image is assign to a separate thread for the recognition purposes as shown in fig 6.

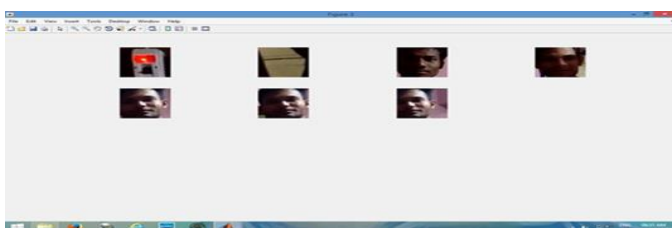


Fig -6: cropped faces

After the face detection next step is face recognition this can be done by cropping the detected face and compare

with the database. In this way face of student. Verified one by one and attendance is marked on the computer screen as shown in fig 7

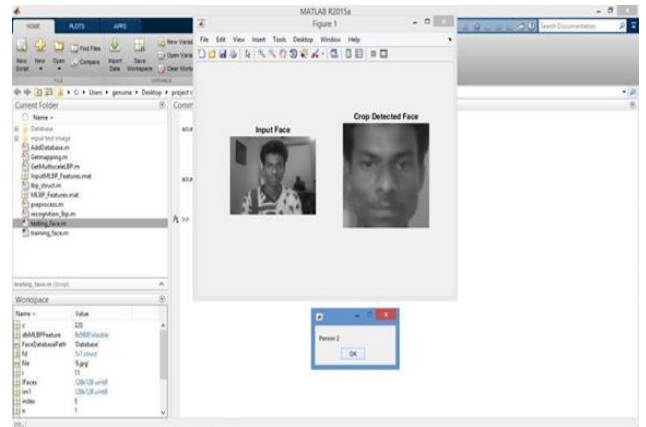


Fig -7: face recognition and attendance

3. SYSTEM FLOWCHART

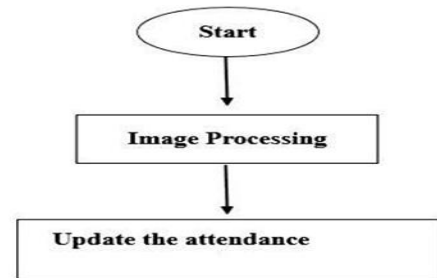


Fig -8: System flowchart

5. ADVANTAGES

- It saves there time and efforts.
- The software stores the faces that are detected and automatically marks attendance.
- The system is convenient and secure for the user.
- The software can be used for security purposes in organization and secured zones.

6. DISADVANTAGES

- It can only detect face from a limited distance
- The system don't recognized properly in poor light so may give false results.

7. CONCLUSIONS

This face recognition based attendance management system provides accurate attendance information of the students in easy way and upload the attendance into server using Ethernet cable. This system is convenient to user, easy to use and gives better security. This system gives the student details and if any absentees, information will be shared to the respective proctors and parents

8. FUTURE SCOPE

A mail which contains the information about absent as well as attendance percentage is mailed to the respective parents instead of messages using face recognition based attendance management system. Process of taking attendance is done module by module, it is possible to update attendance in one click or touch instead. Parents can also get the information about the internal assessment marks through messages if their children.

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