

Smart System for Attendance Management

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Abstract –Students attendance within the school or college is very important task and if taken manually wastes lots of time. There are many ways that in the market for this purpose i.e. biometric attendance. All these ways are time consuming as a result of students have to stand in queue to find their thumb scanner. The analysis describes the economical rule that marks the attendance automatically while not human intervention. This system consists of 4 phases: produce database, face detection, face recognition and marking attendance. This attendance is captured by employing a CCTV camera connected within the room that's continuously capturing snaps of scholars. From this snaps. We'll take screenshot. The system 1st stores the faces within the information, then the faces square measure detected in the images. The detected faces square measure compared to the faces keep within the information throughout face recognition. If the system acknowledges face, the attending gets marked instantly of recognized face.

Keywords- Attendance, detection, video conversion, recognition, Screen

I. Introduction

Education in today's world has become the most important thing and in any school or institute taking attendance is a very time consuming and hectic task. Every institute or school has its own way of taking attendance. Some do it manually using the old way of attendance mark sheet and some use advance method of using biometric i.e., Thumb print. But these methods are very time consuming i.e., students need to stand in a queue for marking their attendance and also needs human intervention. Our system uses the face recognition method for automatically marking attendance without students/teachers intervention. This system uses CCTV camera present in a classroom which continuously records the video of a

classroom to take screenshots at specified time and compares it with the database. If the face matches with the database attendance is marked and the absent students name is displayed on the screen for verification.

II. Proposed Plan of Work

The system consists of a CCTV camera that continuously captures the video of the students sitting in the classroom and takes screenshots at a specified time and sends it to the image enhancement module. In the image enhancement module, images are enhanced so that matching can be performed easily. After enhancement, the image comes in the Face Detection and Recognition modules and then the attendance is marked in the database. At the time of admission, 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 in the database. And the absent students name is displayed on the screen which is also located in the classroom. In this way if some students shown absent are present they can give their attendance. This system doesn't need any intervention of teacher nor the student. In this way a lot of time is saved and this is highly securing process no one can mark the attendance of other. Video is recorded continuously and the screenshots are taken to detect and recognize all the students in the classroom.

2.1 Enrolment of Student Faces:

Opening move in each biometric system is the enrolment of a person using general data like their name and their distinctive biometric features as templates. Enrollment method Image is captured from the camera so student face is detected. Once the face is detected, that face is cropped and then it is

enhanced using histogram equalization and noise filtering in order that precise options will be extracted. These distinctive features are then stored in the face database with certain id of that person.

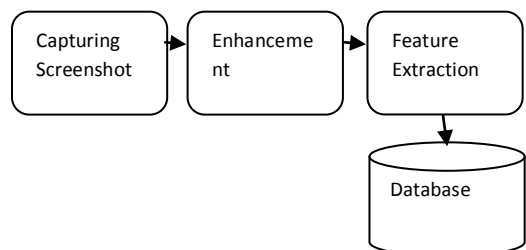


Fig : Enrollment Process

2.2 Capturing the Images of Student:

CCTV camera hooked up within the room captures screenshot of scholars, discover the faces in pictures and compare the detected faces with the info and mark the attendance.

How capture works:-

The first step is recording of the CCTV camera attached the classroom. During this video recording we specify some time when the screenshots are taken from that CCTV camera. The captured images are then enhanced in the Image Enhancement Module.

2.3. Face Detection:

Face localization aims to work out the image position of one face. This can be a simplified detection drawback with the belief than associate degree input image consists just one face. The procedure below explains the planned face localization technique.

2.3.1) Image Conversion:

The input image is first converted into the gray-scale image. The gray-scale image is then converted into its binary form.

2.3.2) Dilation:

The dilation method removes the noise encountered within the binary image. Hence, the dilation operation is performed on the binary image

obtained. The gray-scale image is then born-again into its binary type. Then, the expanded image is mapped on to the grey scale image.

2.3.3) Image Cropping:

The mapped image is converted into binary image and the required face region is cropped from the binary image and is saved to the database. The execution sequence of image cropping is as follows:- The Feature Extraction is carried out by taking the features such as eyes, mouth, nose, ears etc. In this paper, the two features, eyes and mouth are taken into consideration. The proposed feature extraction algorithm is explained below.

1. Divide the localized face column wise into two equal parts.
2. For each row „r“ do steps 3 and 4.
3. The first black pixels encountered on either side are taken as (x_1, y_1) and (x_2, y_2) respectively.
4. Calculate the distance between those points using the formula:

$$Distance = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

5. From step 4, two sets of non-zero distance values corresponding to eyes and mouth are obtained.
6. Find the maximum of the distances for each non-zero set. They represent the distance between the eyeballs and the distance between the mouth end points.
7. using the pixels corresponding to that maximum distance, calculate the following:
 - I. Distance from the left eyeball to the right eyeball.
 - II. Distance from the left mouth end point to the right mouth end point.
 - III. Distance from the left eyeball to the left mouth end point.
 - IV. Distance from the right eyeball to the right mouth end point.
 - V. Distance from the left eyeball to the right mouth end point.
 - VI. Distance from the right eyeball to the left mouth end point.
8. The six values calculated above are given as the inputs to the neural network recognizer.

2.3.4) Face Recognition & Marking Attendance:

After extracting the features from the given face image, a recognizer is needed to recognize the face image from the stored database. After the face detection step the next is face recognition. This can be achieved by cropping the first detected face from the image and compare it with the database. This is called the selection of region of interest. In this way faces of students are verified one by one with the face database using the Eigen Face method and attendance is marked in the database.

2.4 Cross-Verification of Attendance:

After the complete process of attendance the absent students name is being shown on the Screen. If a student is shown absent even though he/she is present, that student can then give just go in front of the camera and give his/her attendance.

III. Implementation

The proposed plan for Attendance monitoring using face recognition includes:

- Enrolment of student faces.
- Capturing the images of students.
- Face localization and face detection.
- Face recognition and marking attendance.
- Cross verification of attendance

The following are the screenshots for the implementation of this project

Login form:

The Login Form is a gateway for using and configuring the Word Press publishing platform. It controls access to the Administration screen allowing only registered users to login. Simply by entering user id and password, the user can login into the system.

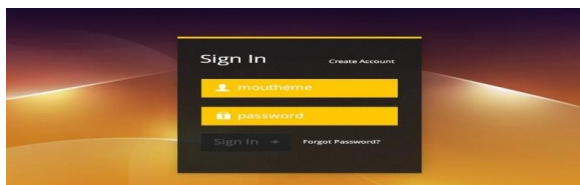


Fig.1 Login Form

Menu form: This window contains the list of menu items. The menus are file, attendance and report. In file menu there is an option for exiting the system. Through attendance menu, we can go to the attendance system where the faces are recognized and attendance is marked.

Attendance system: This window consists of the main screen. First the camera gets on by clicking on the detect and recognize button. Here by clicking on the add face option, we can create our database consisting of faces.

Face detection: This window consists of the detecting faces. Whenever a new face is detected, it can be saved into the database with the corresponding new name.



Fig.4 Face Detection

Face Recognition: First the faces on the screen are traced out and the recognition process starts. During the recognition phase, the detected facial features are compared to the features stored in our database. If the system recognizes the features, the corresponding face is recognized and the attendance is made.



Fig.5 Face Recognition

Report: This window shows the report of the marked attendance. Attendance is marked along with the date and the time for each student for that particular lecture.

IV. Defect is using CCTV

- After attending lecture it can be possible that attendance of student may not be captured.
- CCTV may fail in recognizing some student due to overlapping of two students.
- Database may confuse to identify faces of two or more student
- To solve such problem we need camera with high end resolution
- Background may create a problem to recognize the face of student
- Technology used for CCTV may fail due to many reasons like less brightness or cut of power
- Unknown faces or similar faces may create the problem
- CCTV camera can't take multidimensional images or they can't take it back.

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V. Conclusion

This system helps to reduce the manual work of attendance. Using this system we can automatically take the attendance without the intervention of the student and the teacher. This system can also be used in office for keeping the records of the employees.

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