

Face Recognition Based Attendance Management System

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Abstract— This paper presents Automatic Lecture Attendance System Using Face recognition in a real time background for a Student to mark their attendance. It is tough to mark the attendance of a student in the large classroom, and there are many students attending the class. Many attendance management systems have been implemented in the current research. However, the attendance management system by using facial recognition still has issues that allow the research to improve the current research to make the attendance management system working well. We used OpenCV face detection which detect human face using haar cascade classifier for feature selection for classification. When compared to traditional attendance marking this system saves the time and also helps to monitor the students.

Key words: Face Recognition, Haar Cascade Classifier, OpenCV, Attendance Management System, Face Detection

I. INTRODUCTION

Human beings can distinguish a particular face depending on a number of factors. One of the main objective of computer vision is to create such a face recognition system that can emulate and eventually surpass this capability of humans. Though it is much easier to install face recognition system in a large setting, the actual implementation is very challenging as it needs to account for all possible appearance variation caused by change in illumination, facial features, variations in pose, image resolution, sensor noise, viewing distance, occlusions, etc. Basically, this research is aimed for implementing a system that is capable of identifying the students, marking their attendance in every lecture and handling their leave requests. This system also helps in some following features:

- 1) The system can be used also during exam sessions or other teaching activities where attendance is obligatory.
- 2) If the attendance of a student of classroom lecture is attached to the video streaming service, it is possible to present the video of the time when he was absent.
- 3) It is also possible to know whether students are awake or sleeping and whether students are interested or bored in lecture if face images are annotated with the students' name, the time and the place.

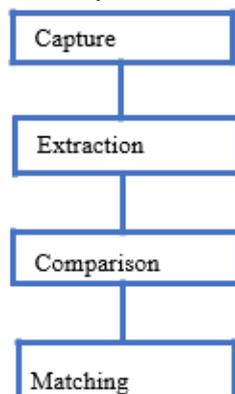


Fig. 1: The operate process of face recognition system

From the following above we can illustrate as Figure 1 above

II. RELATED WORK

A. Iris-Recognition Based Attendance System

Iris is another bio-metric technique that can be utilized for Attendance Frameworks. In the researchers have proposed Daugmans methodology based Iris recognition framework. This framework utilizes iris recognition administration framework that does extracting the picture of iris recognition, extraction, putting away and matching in. Be that as it may, the trouble occurs to lay the transmission lines in the places where the topography is not good. In researchers have proposed a framework in light of continuous face recognition which is dependable, secure and quick which needs change in various lighting conditions.

B. Ear Detection System for Attendance of Class' Students

Two scientists Visar Shehu and Agni Dika proposed in a framework which presents a attendance marking framework, which incorporates PC vision and ear recognition methodologies into the procedure of attendance management. The framework is designated utilizing a non-intrusive advanced camera introduced on a classroom, which filters the room, recognizes and extracts all ears from the gained pictures in. After ears have been extracted, they are contrasted and a current database of student pictures and upon fruitful recognition a student attendance list is created and saved money on a database. This paper tends to issues, for example, real time ear detection on conditions with numerous articles, ear recognition methodologies and also social and educational issues with the applied procedures.

III. LITERATURE SURVEY

Face recognition has a wide range of applications especially in security and commercial areas. The growing interest in reliable verification and identification systems leads to replace the conventional methods (e.g. ID card and passwords) with human biometrics such as fingerprint, iris, retina, voice and face. Face recognition offers several advantages over other biometrics in terms of its public acceptance and nonintrusive face is non rigid object and has a large variability so many challenges associated with face detection and recognition such as pose changes, facial structural features (e.g. beards, moustaches), facial accessories (e.g. glasses, scarves), facial expressions, occlusions, image.

IV. PROPOSED WORK

Systems design is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. Systems design could be seen as the application of systems theory to product development. The proposed automated attendance system can be divided into five main modules. The modules and their functions are

defined in this section. The five modules into which the proposed system is divided are:

A. Image Capture

The Camera is mounted at a distance from the entrance to capture the frontal images of the students. And further process goes for face detection.

B. Face Detection

A proper and efficient face detection algorithm always enhances the performance of face recognition systems. Various algorithms are proposed for face detection such as Face geometry based methods, Feature Invariant methods,

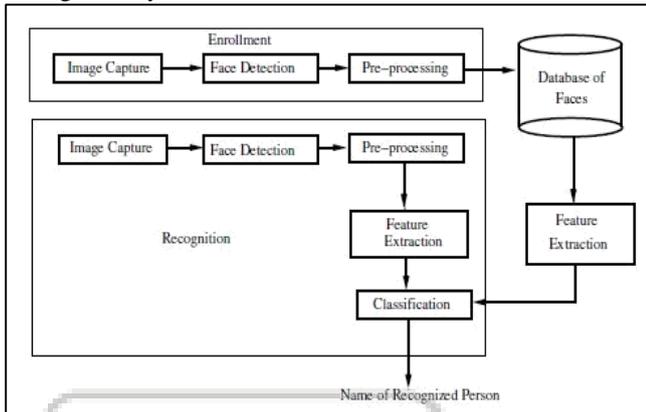


Fig. 1: System Diagram

Machine learning based methods. Out of all these methods Viola and Jones proposed a framework which gives a high detection rate and is also fast. Viola-Jones detection algorithm is efficient for real time application as it is fast and robust. [9] Hence we chose Viola-Jones face detection algorithm which makes use of Integral Image and AdaBoost learning algorithm as classifier. We observed that this algorithm gives better results in different lighting conditions and we combined multiple haar classifiers to achieve a better detection rates up to an angle of 30 degrees.

C. Pre-Processing



The detected face is extracted and subjected to pre-processing. This pre-processing step involves with histogram equalization of the extracted face image and is resized to 100x100. Histogram Equalization is the most common Histogram Normalization technique. This improves the contrast of the image as it stretches the range of the intensities in an image by making it clearer.

D. Database Development

As we chose biometric based system enrolment of every individual is required. This database development phase consists of image capture of every individual and extracting the bio-metric feature, in our case it is face, and later it is enhanced using pre-processing techniques and stored in the database.

E. Post-Processing

In the proposed system, after recognizing the faces of the students, the names are updated into an excel sheet. The excel sheet is generated by exporting mechanism present in the database system. The database also has the ability to generate monthly and weekly reports of students attendance records. These generated records can be sent to parents or guardians of students. At the end of the class a provision to announce the names of all students who are present in the class is also included. This ensures that students whose faces are not recognized correctly by the system have the chance to send a ticket to staff. And thus giving them the ability to correct the system and make it more stable and accurate. The announcement system is implemented using text to speech conversion. Many algorithms and applications are available that can convert text to lifelike speech. Amazon polly is one such service which includes 47 lifelike voices spread across 24 languages. Amazon Polly delivers the consistently fast response times required to support real-time, interactive dialog. API's are provided which return the audio stream to the system. The system also has the ability to send notification emails to staff and erp operators. The email would be sent using one of the many Web API's available like Amazon SES. The system would use email API's to send daily reports to every authorized staff. Push notifications can also be implemented in the system, notifications can be sent to both staff and students. Push notifications are real-time and can help improve the accuracy of the proposed system.

F. Proposed Algorithm

- 1) Capture the Student's Image
- 2) Apply Face detection algorithms to detect face
- 3) Extract the Region Of Interest in Rectangular Bounding Box
- 4) Convert to gray scale, apply histogram equalization and Resize to 100x100 i.e. Apply pre-processing
- 5) if Enrollment Phase then Store in Database
 - else
 - Apply PCA/LDA/LBPH (For feature Extraction)
 - Apply Distance Classifier/SVM/Bayesian (for Classification)
 - end if
- 6) Post-processing

V. RESULT DISCUSSION

Pattern Recognition Letters, vol.28, issue 15, pp.1885-1906, Oct 2007

Face detection and recognition has been a challenging task due to unconstrained condition In our project “Automated Attendance Management system” using Viola Jones face detection method; Local Binary Pattern algorithm for face recognition and Yale database techniques are being used which will give us an overall efficiency of 83.2%.

No of faces	No of successfully detected faces	No of successfully recognized faces	% of correct recognition	No of false acceptance	% of false acceptance	No of false rejections	% of rejections
10	10	9	90%	0	0	0	0%
20	19	18	90%	0	0	1	5%
30	29	28	93.33%	0	0	1	3.33%
40	38	36	90%	0	0	2	5%
50	47	45	90%	0	0	2	4%
60	55	52	86.66%	1	1.92%	2	3.33%
70	63	60	85.71%	1	1.67%	3	4.23%
80	69	67	83.75%	2	2.98%	5	6.25%
90	78	75	83.33%	2	2.67%	6	6.67%

Table 1: Performance evaluation of proposed system

VI. CONCLUSIONS

It can be concluded from the above discussion that a reliable, secure, fast and an efficient system has been developed replacing a manual and unreliable system. This system can be implemented for better results regarding the management of attendance and leaves. This system will save time, reduce the amount of work the administration has to do and will replace the stationery material with electronic apparatus. Hence a system with expected results has been developed but there is still some room for improvement. Under future development of face recognition, it should be capable of detecting any faces under any light conditions.

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