ABSTRACT

Daily attendance marking is a common and important activity in schools and colleges for checking the performance of students. Manual Attendance maintaining is a difficult process, especially for a large group of students. The conventional method of calling the name of each student is time consuming and there is a chance of proxy attendance. The following system is based on face recognition to maintain the attendance record of students. The daily attendance of students is recorded subject wise which is stored already by the administrator. As the time for corresponding subjects arrives the system automatically starts taking snaps and then applying face detection and recognition techniques to the given image and the recognized students are marked as present and their attendance updated with corresponding time and subject id.

This proposed system will be implemented with 5 phases such as Image capturing, Face Detection, Feature Extraction, Face Recognition and updating of attendance in the database. Our system is capable of identifying multiple faces in real time. The main objective of this work is to make the attendance marking and management system efficient, time saving, simple and easy. For the case of Face Detection, we opted for the Haar Cascade algorithm, while for the case of Face Recognition, we opted for the LBPH algorithm. We can view the attendance in the form of an excel sheet.

Keywords: Face Detection, Face Recognition, Harr cascade, LBPH, Pre-processing, Attendance.

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1.1 MOTIVATION FOR WORK

The motivation behind this proposed work comes from the advancement of technologies like image processing, AI and machine learning and Face unlock feature given by smart-phone manufacturers. The classroom often consists of huge number of students which usually takes a lot of time for taking attendance manually by the faculty or the authorized person. This consumes a lot of time for the person taking attendance and they should make sure no error happens in the marking of attendance. There are also chances for the proxy attendance. The Records of the attendance should also be maintained carefully. Thus creating a system which will automatically detect the present students and then marking the students accordingly will be very helpful, just like staff Id scanning but way too easier than that. This system will also reduce manipulation of attendance records by the students i.e. avoiding proxy attendance, saves the time and provides the administrative department a productive way to store the attendance records in an efficient way.

1.2 PROBLEM STATEMENT

To maintain the attendance record with day to day activities is a challenging task. The conventional method of calling name of each student is time consuming and there is always a chance of proxy attendance. The main aim of the project is to deviate from traditional methods of attendance monitoring system and introduce a new approach to identify a student using a face recognition system.

CHAPTER 2

LITERATURE SURVEY

2.1 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. There are many automatic methods available for this purpose i.e. biometric attendance. 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. There are also different techniques available based on face recognition. In this survey we analyzed different methodologies adopted for taking attendance.

2.2 EXISTING METHODS

2.2.1 Automated Attendance Management System Based On Face Recognition Algorithms

On this paper they propose an automated attendance management system. This system is basically based on face detection and recognition algorithms, automatically detecting the student when he enters the classroom and marks the attendance by recognizing him. Because LBPH outperforms other algorithms with better recognition rate and low false positive rate the system is based on this algorithm. The system uses SVM and Bayesian as a classifier because they are better when compared to distance classifiers. The workflow of the system

architecture is when a person enters the classroom his image is captured by the camera at the entrance. A face region is then extracted and pre-processed for further processing. As not more than two persons can enter the classroom at a time, face detection algorithm has less work. The future work they are saying on this paper is to improve the recognition rate of algorithms when there are unconscious changes in a person like tonsuring head, using a scarf, facial hair. The limitation of the system is it only recognizes face up to 30 degrees angle variations which have to be improved further. Gait recognition should be combined with face recognition systems in order to achieve better performance of the system.

2.2.2 A Counterpart Approach to Attendance and Feedback System using Machine Learning Techniques:

In this paper, the idea of two technologies namely Student Attendance and Feedback system has been implemented with a machine learning approach. This system automatically detects the student performance and maintains the student's records like attendance and their feedback on the subjects like Science, English, etc. Therefore the attendance of the student can be made available by recognizing the face. On recognizing, the attendance details and details about the marks of the student is obtained as feedback.

2.2.3 Automatic Attendance System Using Image Processing

In this system they have implemented an attendance system by which lecturers or teaching assistants can record student’s attendance. In this paper, they use Viola-Jones algorithm for face detection. The system captures images of the students and compares the images with the Database images. Both of the images identify and recognize a student. Finally, the student is marked present only if he/she is recognized in both the images. The aim is to develop the automated system for detection and recognition of faces using their images from videos and recording the attendance of the students by identifying him/her from their variant facial features. This helps to maintain and handle the attendance

system automatically without any human intervention. This new system can ease the hectic attendance maintenance and handling the attendance will be more precise and efficient. The proposed system contributes to human face detection with the help of Viola Jones algorithm and face recognition with Fisher Face algorithm and achieves accuracy of 45% to 50%.

2.2.4 Class Room Attendance System Using Facial Recognition System

This paper aims to introduce a new approach to identify a student using a face recognition system in the classroom environment, i.e. the generation of a 3D Facial Model. This research is to attempt to provide an automated attendance system that recognizes students using face recognition technology from an image/video stream to record their attendance in lectures or sections and evaluating their performance accordingly.

2.2.5 Face Recognition-based Lecture Attendance System

In this paper, a system is proposed that takes the attendance of students for classroom lecture. The system takes the attendance automatically using face recognition. However, it is difficult to estimate the attendance precisely using each result of face recognition independently because the face detection rate is not sufficiently high. In this paper, they proposed a method for estimating the attendance precisely using all the results of face recognition obtained by continuous observation. Continuous observation improves the performance for the estimation of the attendance. They constructed the lecture attendance system based on face recognition, and applied the system to classroom lecture. This paper proposes that the system takes the attendance automatically recognition obtained by continuous observation. Continuous observation helps in estimating and improving the performance of the attendance. To obtain the attendance, positions and face images of the students present in the classroom are captured. Through continuous observation and recording the system estimates seating position and location of each student for attendance marking. The work is focused on the method to obtain the different weights of each focused seat according to its

location. The effectiveness of the picture is also being discussed to enable the faster recognition of the image.

2.2.6 Face Recognition Based Attendance Marking System

This paper is based on the identification of face recognition to solve the previous attendance system issues. This system uses a camera to capture the images of the student to do face detection and recognition. The captured image is compared one by one with the face database to search for the students face where attendance will be marked when a result is found in the face database. The main advantage of this system is where attendance is marked on the server which is highly secure where no one can mark the attendance of others. Moreover, in this proposed system, the face detection algorithm is improved by using the classification technique to increase the accuracy of the detection process. Although more efforts are invested in the accuracy of the face detection algorithm, the system is yet not portable. This system requires a standalone computer which will need a constant power supply that makes it not portable. This type of system is only suitable for marking staff‟s attendance as they only need to report their presence once a day, unlike students which require to report their attendance at every class on a particular day, it will be inconvenient if the attendance marking system is not portable. Thus, to solve this issue, the whole attendance management system can be developed on an portable module so that it can be work just by executing the python program.

2.2.7 Automated Attendance System Using Face Recognition

Automated Attendance System using Face Recognition proposes that the system is based on face detection and recognition algorithms, which is used to automatically detects the student face when he/she enters the class and the system is capable to marks the attendance by recognizing him. Viola-Jones Algorithm has been used for face detection which detect human face using cascade classifier and PCA algorithm for feature selection and SVM for classification. When it is compared to traditional attendance marking this system saves the time and also helps to monitor the students.

2.2.8 Attendance system Based On Face Recognition Using Eigen Face and PCA Algorithms

Wagh, P., Thakare, R., Chaudhari, J., & Patil, S. proposed this system. The attendance maintaining system is difficult process if it is done manually. The smart and automated attendance system for managing the attendance can be implemented using the various ways of biometrics. Face recognition is one of them. By using this system, the issue of fake attendance and proxies can be solved. In the previous face recognition based attendance system, there were some disadvantages like intensity of light problem and head pose problem. Therefore to overcome these issues, various techniques like illumination invariant, Viola and Jones algorithm, Principle component analysis are used. The major steps in this system are detecting the faces and recognizing them. After these, the comparison of detected faces can be done by crosschecking with the database of student's faces. This smart system will be an effective way to maintain the attendance and records of students.

2.2.9 Face Recognition based Attendance System

In the field of image analysis and computer vision, one of the most arduous tasks presently considered is Face recognition. The biometric system which basically works on the principle of face recognition is used for the identification or verification of a person from a digitalized image preferably used in surveillance, security and attendance purpose. Diving into matter of concern, to preserve the record generated by attendance of the student and co-operating ordinary activities becomes a tedious task all together. The run-of-the-mill method of calling the name of each student is time ingesting and there is always a risk of proxy attendance. The defined system is based on real-time multiple face recognition to maintain the attendance record of students. The variation in illumination and posing as well as focus issues and blurring are important factor to be considered during face identification process in the classroom using real-time videography. This above-mentioned problem can be nullified to some extent by the proposed system. The execution is performed with the help of Histogram of Oriented Gradients algorithm for detecting the faces, which is done by its excellent performance in differentiating feature descriptor of individuals. The training data sets comprises of different qualities of images. These data sets are fed to