International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 06 | June - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

Real Time Attendance Monitoring System using Face Recognition

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Abstract **- The management of the attendance can a huge burden on the teachers if it's done by hand. To solve this problem, a smart and auto attendance management system is being used. However, authentication is a significant issue in this system. The smart attendance system is commonly executed with the assistance of biometrics. Facial recognition is one of biometric methods to enhance this system. By using this framework, the situation of proxies and students being marked present despite their physical absence can easily be resolved. The main implementation steps used in these types of systems are facial detections and recognizing the detected faces. This paper suggests a model for implement an automated attendance management system for students of a class. The suggesting system makes the usage of Haar classifiers, OpenCV and LBPH algorithm. Following facial recognition, attendance reports will be produced and store in excel formats. The system is experimented under various conditions like illumination, head moves, the changes of distance between the student and cameras. After intensive testing, overall complexities and accuracies are calculated. The Suggested system demonstrated to be an effective and powerful device for taking attending in a classroom without any time use and manual works.**

Keywords – Face Recognition, Face Detection, OpenCV, Haar Classifiers.

INTRODUCTION

Traditional method regarding attending marking manually is tedious tasks within multiple schools and colleges. It also adds an extra burden to the, who have to manually call the names of students, taking approximately10 minutes of the entire session. This feels time consuming. There are some chances for proxy attendance. Thus, many institutes started deploying various other techniques for recording attendance such as using Radio Frequency Identification (RFID), iris recollection, fingerprint recollection, and so on. Face recognition has set an important biometric feature that can be easily acquirable and non-intrusive. Face recognition-based systems are relatively unaware to various facial expressions.

The face recognize system consists of two categories: verification and face identification. Face verification is a 1:1 matching process, comparing face images against the template face image. The purpose of this system is to construct an attendance system based on face recognition techniques. Here, the face of an individual will be used for marking attendance. Nowadays, face recognition is gaining popularity and widely using in many fields. In this document, we project a system that detects the faces of students from live streaming video of a classroom, and attendance will be marked if the detected face matches in the database.

Face recognition be a technique of biometric recognition That considered one of the most successful applications of image analysing and processing, which why it receives great attention it in the past several years. The facial recognition process, similar to the general biometric recognition process, in face-based biometric systems, detection; alignment, and feature extractions, matching be taking place.

PROBLEM STATEMENT

The lecturer or teaching assistant delays the start of each lecture, segment, or lab in order to register the attendance of the students. It takes a lot of time and work to complete this process, particularly when there are many kids involved. Additionally, it disrupts and interferes with exam sessions. Additionally, if the attendance sheet is transferred between students or faculty, it could be lost or damaged.

A fair student evaluation procedure is also compromised when lecturers call on a select few students at random from a large class of students. Lastly, the staff uses these attendance data to keep an eye on the attendance rates of the students. With fewer participants, this procedure may be simpler and more efficient.

Lastly, the staff uses these attendance data to keep an eye on the student's attendance rates. When dealing with a small number of students, this method might be simple and efficient, but handling the records of a big number of students frequently results in human mistake.

LITERATURE SURVEY

In [3] The writers suggested a sketch of an automatic presence system. The model concentrates on how facial recognition consolidated with Radio Frequency Identification (RFID) detects the authorized scholars as well as calculates as they enter as well as depart from the classroom. The system maintains the authentic record of each listed scholar. The

system also conserves the data of each student enrolled for a specific course in the presence record and offers essential information as per the necessity.

In this journal [4], writers have designed and executed a presence system that utilizes iris biology. Initially, the participants were invited to register their information along with their exclusive iris template. Throughout the attendance, the system automatically took course attendance by seizing the eye image of each participant, recognizing their iris, as well as investigating a match in the shaped database. The model was web centred.

In [5], writers recommended an attendance system centered on facial recognition. The calculations like Viola-Jones and Histogram of Oriented Gradients (HOG) qualities along with Endorse Vector Mechanism (SVM) classifier were employed to apply the system. Different real-time circumstances such as scaling, radiance, obstructions as well as pose was reflected by the writers. Quantity analysis was accomplished on the basis of Peak Sign to Noise Ratio (PSNR) values as well as was executed in MATLAB GUI.

The writers in [6] investigates to get the greatest facial recognition calculation (Eigenface and Fisher face) provided by the Open CV 2.4.8 through evaluating the Receiver Operating Features (ROC) curve and then executed it in the attendance system. Based on the trials transported out in this journal, the ROC curve showed that, Eigenface reaches better outcome than fisher face. System executed utilizing Eigenface calculation reached a correctness rate of 70% to 90%.

In [7], writers recommended an approach for scholar attendance system in classroom utilizing face recognition method through mixing Discrete Wavelet Transforms (DWT) as well as Discrete Cosine Transform (DCT). These calculations were implemented to extract the qualities of student's face pursued by applying Radial Basis Method (RBF) for classifying the facial stuffs. This system got a correctness rate of 82%.

PROPOSED SYSTEM

In order to save time, effort, and minimize disruptions and distractions, we suggested solutions to all of the aforementioned issues by implementing an automated attendance system that requires all students to show up for a certain lecture, section, lab, or test at the designated time. Another benefit with exams is that if the adviser or instructor unintentionally loses any exam or student is telling lie that he gives the exam then lecturer have a proof that he is present at that time or not.

Each student enrolled in the course must register and submit the required details asked by the system. Following that, some pictures of them will be taken for training purpose and included in the dataset. During each session, faces will be recognized from the live streamed video from the classroom. The photos that are part of the dataset will be compared to the recognized faces. The student's attendance will be noted if a match is discovered. In order for the teachers to obtain the student attendance data, an excel file is generated at the conclusion.

We proposed solutions to all of the aforementioned problems by putting in place an automated attendance system that mandates that all students show up for a particular lecture, section, lab, or test at the appointed hour in order to save time, effort, and reduce interruptions and distractions.

We can divide this system in four main parts: -

1.Dataset Creation: Pictures of scholars are taking using a webcam. Multiples pictures of alone schoolboy will be obtained with changed gestures and angles. These pictures ensure pre-processing. The portrays are cropped for achieving the Field of Interest (FOI) which will be added used in recognition process. Successive phase is to resize the cropped pictures to precise pixel position. Then these pictures will be altered from RGB to silver, grey portraits. And then these pictures will be calendar as the titles of respective schoolboy in a file.

2.Face Detection: Face spying here is done using Haar-Cascade Classifier with OpenCV. Haar Cascade algorithm require to be trained to detecting humans faces before it could be used for face detection. This is titled feature extraction. The haar cascade training data used is an xml file- haar-cascade_ frontalface_default.xml. The waving features seen in Fig.1. will be used for feature extraction.

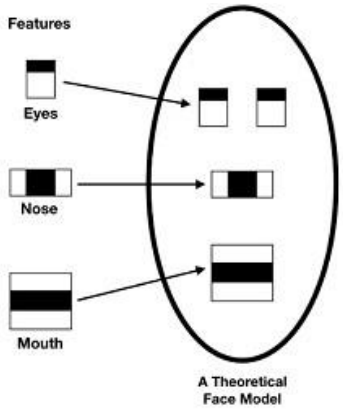


Fig.1 Haar Features

3. Face Recognition: Face recognition process can be divided into the Following steps- preparation of training data, training the face recognizer and predictions. Here the training data consists of the images that are in the dataset. These images are allocated an integer label of the student to which they are related. These images are subsequently

utilized in the face recognition process. The Face recognizer employed in this system is Local Binary Pattern Histogram. Initially, an array of local binary patterns (LBP) from the entire face area is achieved. These LBPs are transformed into a decimal figure, and then histograms are created for all those decimal values. Lastly, a histogram is created for each image within the training data set. Afterwards, during the recognition process, the histogram of the face that is to be recognized is computed and then equated with the previously computed histograms, eventually returning the best-matched label linked with the student to whom it corresponds [9].

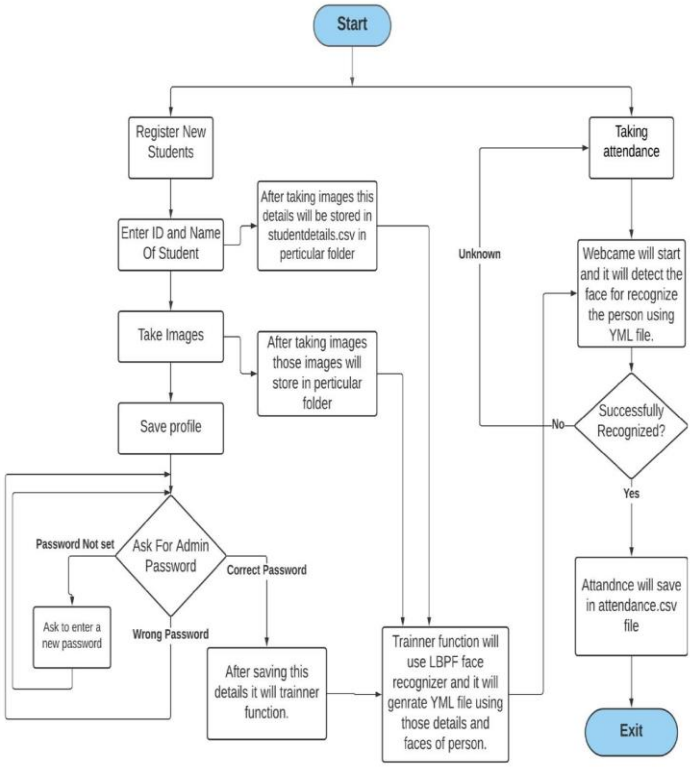


Fig 2. Flow Chart of system

RESULT AND DISCUSSION

The user can interact with this system using a simple GUI. Here user see a text field to enter his unique id and another field to enter name. After that user clicks on take photo button then the system automatically starts its webcam to capture the photos of the student to a specific limit and when the limit reached it automatically stops. After that the images will be pre-processed and saved into training image folder. After taking sample photos, user clicks on save profile and enter admin password. After that the student data is saved to the database. And another button is also there for taking attendance, when user clicks on it webcam started automatically to recognize the student if there is a match then attendance is taken and if no match it shows unknown. To stop the attendance taking screen we need to click Q.

4. Attendance Updating: Following the facial recognition procedure, acknowledged faces are going to be denoted as being there in the excel sheet and the others are going to be denoted as absent. The faculty gets new attendance sheet every day.

The working scene of the system can be understood by following flow chart given below in fig.2:

Fig.4 showing the attendance taking process.

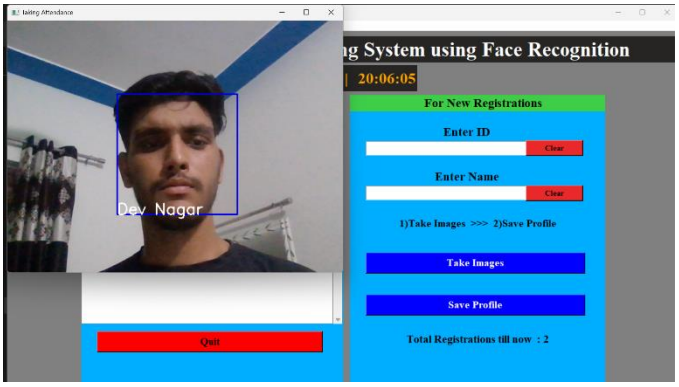
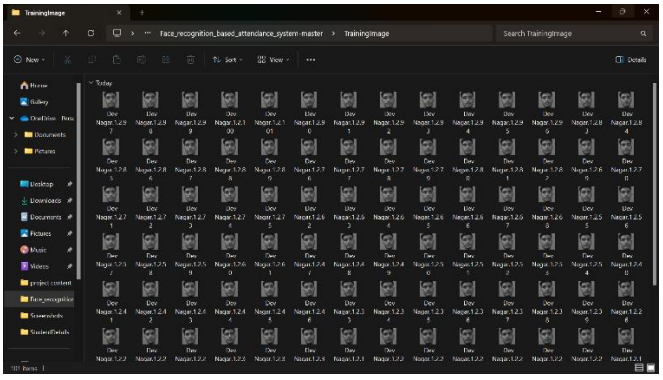


Fig.5 shows the sample images taken for the training purpose of the system.



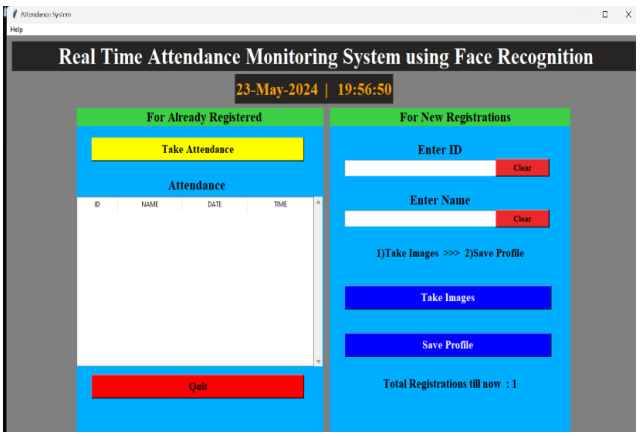
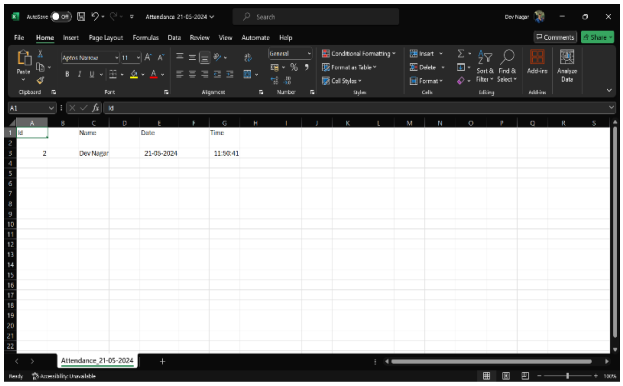


Fig.3 Home Screen

Fig.6 showing the attendance sheet.



CONCLUSION

The goal of the automated attendance system is to reduce errors that occur with the manual, traditional method of taking attendance. The goal is to automate processes and develop systems that are beneficial to institutions like these. The accurate and effective technique of taking attendance in an office setting, which could replace the outdated manual methods. This approach is usable, dependable, and sufficiently safe. There is no requirement for specialized hardware to install the system in the office. A computer and a camera can be used to construct it. We have incorporated an attendance mechanism in this system that allows the lecturer or teaching assistant to track students' attendance during a lecture, session, or laboratory. It saves a lot of time and effort, particularly in large class lectures.

Automated Attendance System was visioning for purposes of reducing the drawbacks in the traditional (manual) system. This system for attendance demonstrates the use of imaging processing techniques in the classroom. It can not only merely help in the attendance system but also improve the goodness of an institution.

Future work in face recognition-based attendance systems may focusing on diverse parts to enhance accuracy, reliability, security, and user experience.

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