

Real Time Student Attendance System Using Face Recognition

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Abstract - In this we propose an automated smart attendance system. This attendance system is based on face detection and recognition algorithms which automatically detects the students when he/she enters the classroom and marks the attendance by recognizing him/her. The system architecture and algorithms techniques used in each stage are described in this project. Different scenarios based on real time instances are considered to evaluate the performance of various face recognition systems. This project also proposes the techniques to be used in order to handle the threats like spoofing and reducing proxy. When compared to traditional attendance marking this system saves time and is efficient.

Index Terms - Attendance Management, Attendance System, Face Capturing, Face recognition, Local Binary Pattern Histogram, LBPH, Machine Learning.

I. INTRODUCTION

Recognition technique is one of the most efficient and effective biometric techniques used for identification of people. We can employ it in the field of education for managing the attendance of students. There are a lot of colleges and schools in which hundreds and thousands of students are taking the education. In every classroom there are around a hundred students. Also, every few days new schools or colleges are opened. To maintain the attendance and records of these huge numbers of students becomes a very difficult task. In a classroom with a large number of students, it is a very tedious and time-consuming task to take attendance manually by traditional old school approach.

Therefore, we can implement an effective system which will mark the attendance of students automatically by recognizing their faces as soon as one

enters class. The Local Binary Pattern Histogram (LBPH) algorithm

technique is a simple solution to the face recognition problem, which can recognize both front face and side face. However, the recognition rate of LBPH algorithm under the conditions of diversions/variations such as illumination diversification, expression variation and attitude deflection is decreased. To solve this problem, a modified LBPH algorithm based on the pixel of neighborhood gray median (MLBPH) is proposed.

The gray value of the particular pixel is replaced with median value of its neighborhood sampling value, and then the feature value is extracted by the sub blocks and the statistical histogram is established to form the MLBPH feature dictionary, which is used to recognize the human face identity compared with test image[3]. Various experiments are carried on FERET standard face database and the creation of new face database, and the results show that MLBPH algorithm is superior to LBPH algorithm in recognition rate.

II. METHODOLOGY

Module 1: GUI Based Menu System

In this module a GUI based menu system is shown for assisting the user with various functions available and using them in user friendly manner.

Module 2: Face Dataset Creation

In this module, the webcam captures the images of the student/user in order to create a dataset of 30 images of various positions of their face using Face Capturing technique.

Module 3: Train the Image Dataset

In this module, the dataset is trained using a machine learning algorithm and a training data file is created based on trained data.

Module 4: Facial Recognition and Attendance

In this module, the webcam captures the image of the student/user and identifies the person and marks the attendance as present/absent and the default created database is updated with the information.

Module 5: Attendance Sheet

In this module the information in the updated database is imported and converted into a Spreadsheet content such as .csv (comma separated file) and generation of the attendance report for that day with date and time takes place.

Module 6: Show Attendance Graph

Based on the information updated in the database for attendance of students during terms or session, performance of students is plotted in graphical representation which proves to be helpful for faculty to track the attendance record of particular students.

It

Module 7: Show Student Database

In this feature, teachers will be able to see all student data. List of all student data is crucial for student analysis.

Module 8: Show Attendance Database

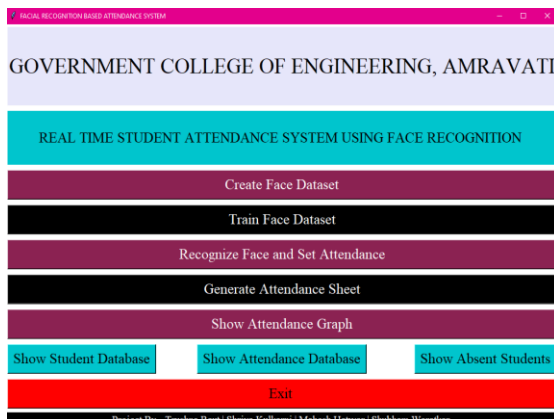
With this, teachers will be able to see attendance databases for the present day in the user interface.

Module 9: Show Absent Students

This database will show a list of absent students for the present day. Our proposed work not only shows present students but absent students too. It allows teachers to analyse student data accurately.

Module 10: Exit

The last module is the exit module in which program will be closed when teachers are done with their attendance work.



III.EXISTING WORK

At present attendance marking involves traditional manual attendance on paper sheet by professors and teachers, but it is very time-consuming process and chances of proxy is also one problem that arises in such type of attendance marking, also there are attendance marking system such as RFID, Bio metrics etc. but these systems are currently not so much popular in schools and classrooms for students as they have their own advantages and disadvantages. The problem with this approach is that we have to manually take and maintain the attendance records and it is a very inconvenient task. Traditionally, students attendances are taken manually by using attendance sheet given by the faculty members in class, which is a time consuming event. Moreover, it is very difficult to verify one by one student in a large classroom environment with distributed branches whether the authenticated students are actually responding or not the ability to compute the attendance percentage becomes a major task as manual computation produces error and also wastes a lots of time this method could easily allow for impersonation and the attendance sheet could be stolen or lost[5].

According to the Literature Student Attendance System by Face Detection, maintaining attendance is a very important and compulsory criteria in all the institutes for checking the performance of students. As a result, every institute has its method in this regard. Some are taking attendance manually using the old paper old file-based approach and some have adopted methods of automatic attendance using some biometric techniques [1].

Automated attendance systems are more fast, reliable, rigid, and efficient than the traditional attendance systems and other biometric attendance systems, leading to better productivity and output of both the teachers and students, as well as better consumption of time [2].

IV. PROPOSED WORK

Traditional student attendance marking method is often facing a lot of trouble. The face recognition student attendance system emphasizes its simplicity by eliminating classical student attendance marking techniques such as calling individual student names or checking respective identification cards. They are not only hampering the teaching process but also cause

distraction for students during exam sessions. Apart from calling names, attendance sheets are passed around the classroom during the lecture sessions. The lecture class especially in colleges, the class with a large strength of students might find it difficult to have the attendance sheet being passed around the class. Thus, a face detection and recognition student attendance system is proposed in order to replace the manual signing of the presence of students which is burdensome and causes students to get distracted in order to sign for their attendance. Using Local Binary Patterns Histograms (LBPH) algorithm in OpenCV the student's faces are trained and recognized. Python automates the tasks by providing for the execution of the programs in Computer Vision and GUI of the system along with managing the database of the student attendance.

Furthermore, the face recognition based automated student attendance system is able to overcome the problem of fraudulent or mischievous approach and lecturers do not have to count the number of students several times to ensure the presence of the students [4]. Our proposed work clears all the malpractice that happens during attendance. Our work not only captures attendance but also helps teachers on further analysis.

Our work shows a complete graph of student attendance and also shows the list of absent students and all student databases in just one click.

Advantages of proposed work

1. Eliminating the risk of Manual Errors: Facial recognition software gives users a means of tracing their student's attendance, by further removing human mistakes.
2. Automated cum Accurate: Face recognition precisely reports all the features of attendance, absenteeism, and also over time. The identification procedure is spot-on every single time at a speed that is now practically possible. This scheme can match thousands of operators in less than a second, plus the software offers info that is 100% precise without you lifting a finger.
3. Time Saving: Facial recognition permits employees to waltz in and out inside seconds, instantly removing the inconvenience of swiping cards otherwise singling badges around. This saves time and effort, resulting in a satisfactory working environment.

4. Quick and accurate identification: Students should only look at the device for less than a second until they are identified.
5. Reduced contagion: Facial recognition technology does not require any physical engagement. Unlike the fingerprint hardware that employee should use his finger, the face terminals does not require body punch.
6. Elimination of Proxy attendance: Attendance is taken automatically by the camera placed in the classroom therefore there will be no chances of proxy attendances.
7. Simple Algorithm & Flowcharts: This system uses a simple algorithm and flowchart which is easy to understand as there are no complicated sections, information flow is simple as there is less hardware's components used therefore each section is clearly understood.
8. 8.Virtual Classroom: Virtual classrooms are the classrooms without the lecturers to teach as students will be learning online. This system is very useful in virtual classrooms where there will be no lecturers to take attendance. This system will automatically manage the attendances of the students.

V. FLOW CHART OF PROPOSED WORK

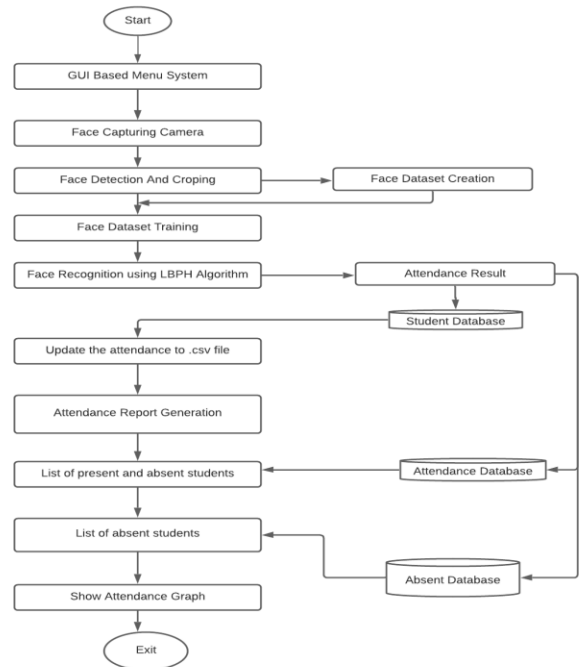


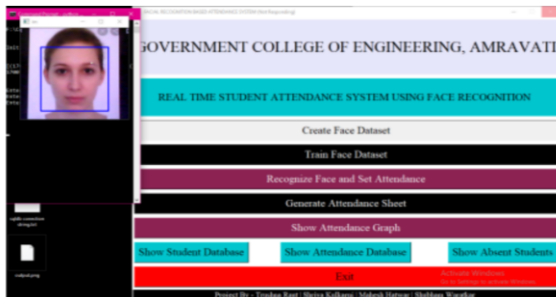
Fig: Real Time Student Attendance System Using Face Recognition Flowchart

VI. RESULTS AND DISCUSSION

The students can interact with the Attendance System using the GUI. There are ten modules as mentioned earlier in methodology. In the Create Face Dataset module, we need to write the name and id of the student and then the webcam starts automatically. The face of the respective student is captured. In the “Train Face dataset module”, the cropped images are trained and stored in a database.

In the Recognize module, the faces are recognized for attendance. At last the attendance sheet is generated for the present and absent students and also the graph is displayed for the attendance which displays the complete data of the whole month and shows whether the student is having attendance above 75%.

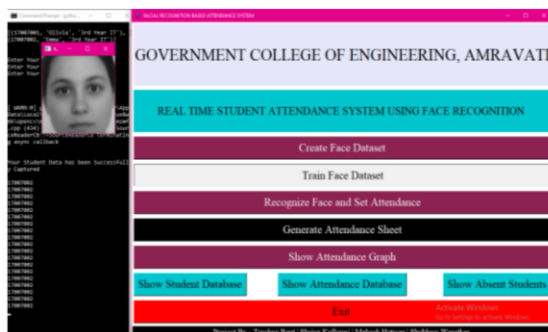
CREATING FACE DATASET



STUDENT DETAILS ENTERED WHILE DATA CAPTURE



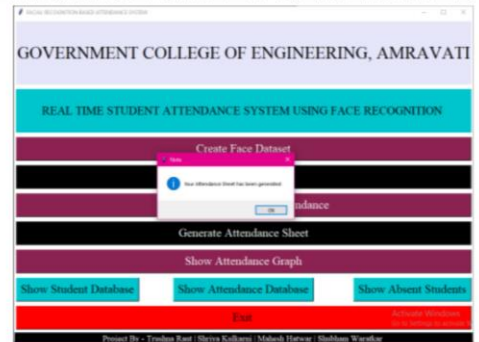
TRAINING FACE DATASET



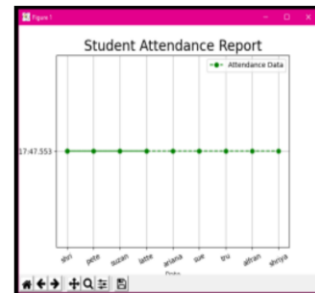
RECOGNIZING FACE WITH NAME ROLLNO CLASS



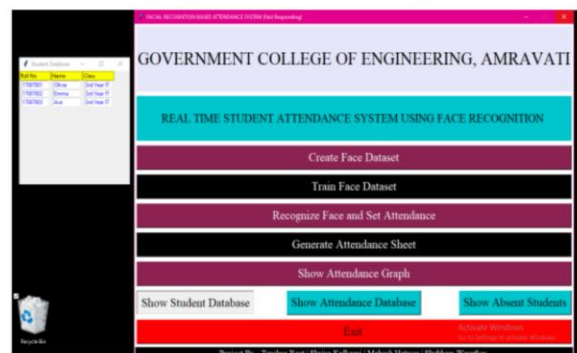
NOTIFICATION POPUP WHEN ATTENDANCE SHEET GENERATED



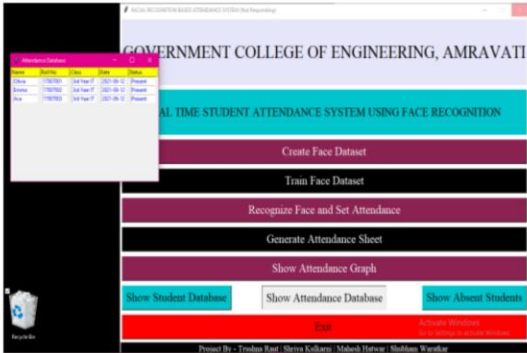
STUDENT ATTENDANCE GRAPH REPORT



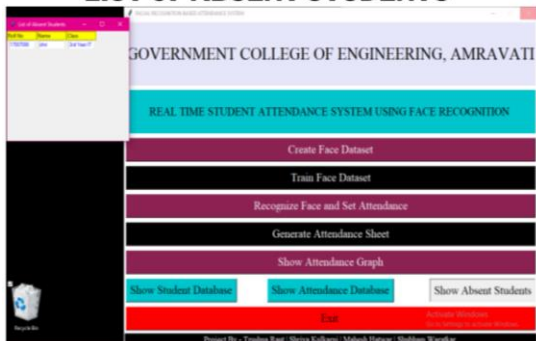
ALL STUDENT DATABASE



ATTENDANCE DATA OF PRESENT DAY



LIST OF ABSENT STUDENTS



AUTO GENERATED ATTENDANCE SHEET

Roll No.	Name	Date	Time	Status
1	AD	27/05/20	8:30 am	Present
2	AD	27/05/20	8:30 am	Present
3	AD	27/05/20	8:30 am	Present
4	AD	27/05/20	8:30 am	Present
5	AD	27/05/20	8:30 am	Present
6	AD	27/05/20	8:30 am	Present
7	AD	27/05/20	8:30 am	Present
8	AD	27/05/20	8:30 am	Present
9	AD	27/05/20	8:30 am	Present
10	AD	27/05/20	8:30 am	Present
11	AD	27/05/20	8:30 am	Present
12	AD	27/05/20	8:30 am	Present
13	AD	27/05/20	8:30 am	Present
14	AD	27/05/20	8:30 am	Present
15	AD	27/05/20	8:30 am	Present
16	AD	27/05/20	8:30 am	Present
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18	AD	27/05/20	8:30 am	Present
19	AD	27/05/20	8:30 am	Present
20	AD	27/05/20	8:30 am	Present
21	AD	27/05/20	8:30 am	Present
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23	AD	27/05/20	8:30 am	Present
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25	AD	27/05/20	8:30 am	Present
26	AD	27/05/20	8:30 am	Present
27	AD	27/05/20	8:30 am	Present
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97	AD	27/05/20	8:30 am	Present
98	AD	27/05/20	8:30 am	Present
99	AD	27/05/20	8:30 am	Present
100	AD	27/05/20	8:30 am	Present

VII. CONCLUSION

This Smart attendance system based on face recognition techniques thus proved to be time saving and fast. This system can also reduce the risk of proxy and manual errors. In real time scenarios LBHP technique algorithms with better recognition rate can prove to be efficient in schools, colleges, organizations, etc.

VIII. ACKNOWLEDGMENT

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