

FACE RECOGNITION ATTENDANCE SYSTEM

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Abstract:

In today's world of the latest technology, face recognition has become one of the best technologies for computer vision. It is a method to recognise a person's face from a still image or a video camera. In this paper, we have proposed a face-recognition attendance system. This application is based on facial extraction and face detection, which automatically detects a person's

face through the camera. We are using the Haar-cascade algorithm for face detection and the LBPH algorithm for face recognition.

Keywords: Face Recognition, Face Detection, Automation

1. Introduction:

The Attendance Monitoring System deals with the attendance of students in a class. The system will calculate the attendance of students based on their presence in class. Currently, the attendance for students is done manually. So, we have come up with a solution to make an attendance system that will mark the attendance of students through face recognition and keep a history of all attendance.

In this age of rapidly evolving new technologies, attendance should not be taken through old and tedious manners. In the older method of taking attendance, it is difficult to manage large groups of students in a classroom. It takes precious lecture time, and it is also possible that the data entered is not correct.

Our project will eliminate the conventional method of taking attendance, give us the correct information with high accuracy, and record the arrival time of students in the classroom. This project is very easy to use. Like in every application, there are some drawbacks to this

application. Our application does not guarantee complete accuracy. Various factors, such as image quality and a poor background, can decrease the efficiency.

The face recognition process can be divided into two categories: face detection and face recognition. Face detection is a 1:1 matching process, whereas face recognition is a 1:N problem that compares a query face image.

The Face Recognition Attendance System is an effective method for taking the attendance of students on a regular basis. The Face Recognition Attendance system uses the Haar cascade algorithm for face detection and the LBPH (Local Binary Pattern Histogram) algorithms for face recognition [1]. We have implemented all these algorithms in Python and the OpenCV library. For the user interface, we have used Tkinter. An effective attendance monitoring system will save a lot of time for both students and faculty.

2. Proposed Work:

In a face recognition attendance system, first we need to detect the facial features from images stored in a database. The algorithm will process the captured image and identify the number of faces in it. The image processing uses various algorithms that compare facial features with stored databases .

The objective behind the Face Recognition Attendance System is to simplify the process of taking student attendance during lectures. The current attendance system consumes a lot of

precious lecture time. It is not an efficient method to take attendance through manual calling. Our project will be able to detect the number of students who are present in the class and will mark them as present on an Excel sheet. To implement our system, we need to capture the facial features of each student and store those details in the database for their attendance. Facial features should be captured in a way that postures, seating patterns, and different variations in facial expressions can be detected.

3. Methodology:

The Face Recognition Attendance System process can be divided basically into four stages:

1. Creation of a Database: We need to capture the images of students through a webcam. We will capture almost 100 images of each student with different gestures so that the accuracy of our attendance system will increase. These

2. Face Detection: After the creation of the database, the next step is face detection. Here, face detection is performed using the Haar-Cascade algorithm. The Haar-Cascade Algorithm is defined in the OpenCV library. We

captured images will go through preprocessing. Then, images are cropped to obtain a region of interest (ROI), which will later be used for the face recognition process. We also need to resize the cropped images to a particular pixel position. These cropped images will be converted from RGB to grayscale images [2]. And finally, these images will be saved in our database.

need to train the Haar cascade algorithm so that it will be able to detect human faces. This haar cascade training data is an xml file which is `haar cascade_frontalface_default`

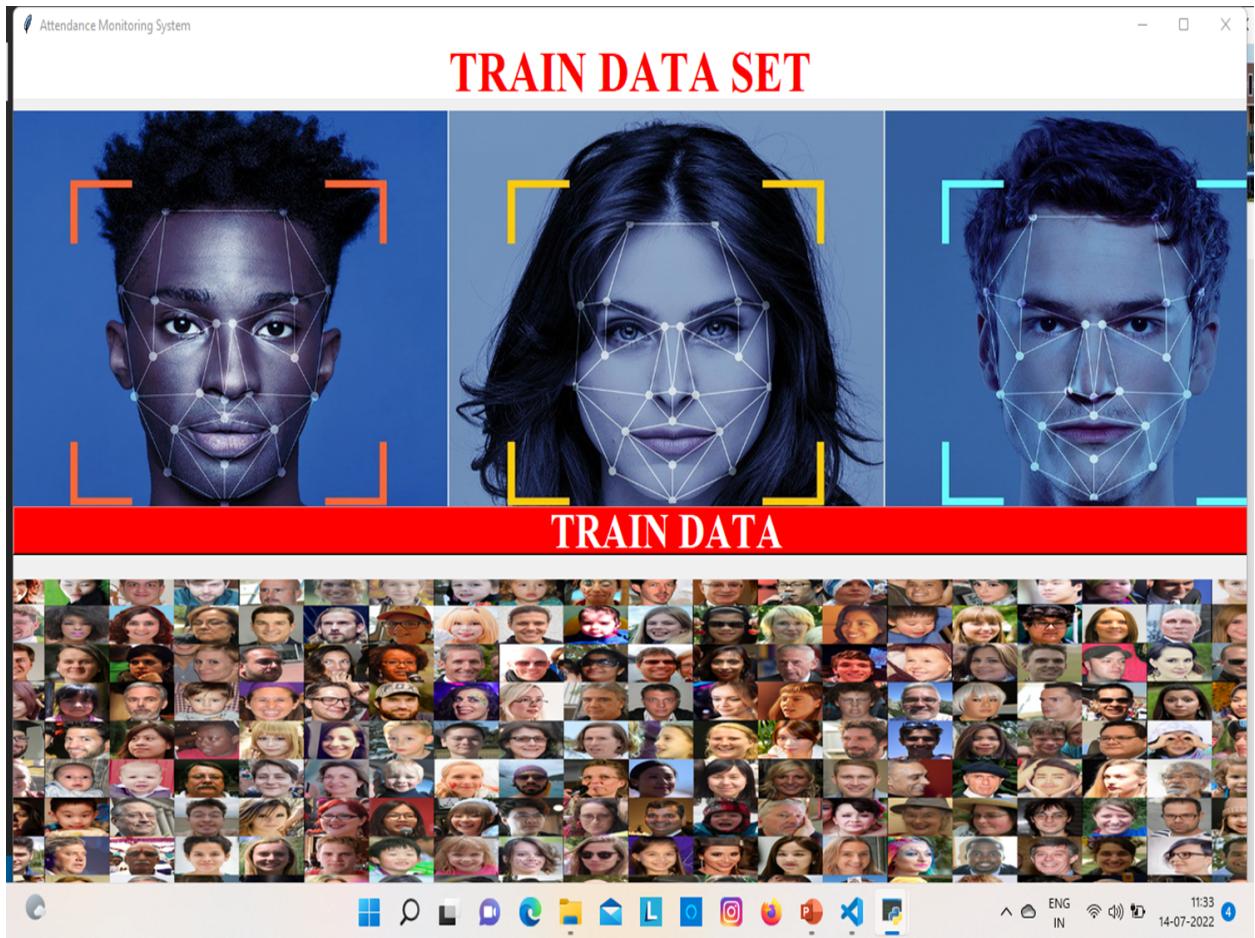


Fig. 1.1 Snapshot of Project

3. *Face Recognition:* We have divided the face recognition into three steps: In the first step, we need to prepare the training data. Training data means images of students that are stored in our database. In the second step, we train our training data. And in the last step, we make a prediction. We are using the Local Binary Pattern Histogram (LBPH) algorithm for the face recognition process. Our system must be able to uniquely identify a student's face by

comparing it with an already stored database. In the LBPH algorithm, the initial list of local binary patterns is obtained. Then, we convert these LBPs into a decimal number. Histograms of all those decimal numbers are made. Lastly, one histogram will be made for each image of our training data. During the face recognition process, we calculate the histogram of the face and then compare it with already computed histograms to find the best match.



Fig. 1.2 Snapshot of Project

4. *Updation of Attendance:* After the face recognition process, we mark the attendance of students. Students whose faces are recognised

are marked as present, and the rest of the students are marked as absent on the excel sheet.

4. Back-End Details:

The database is a collection of face images and extracted features for this project. It also includes names and roll numbers for each student. For face recognition, we have to take images of students at different times and with varying facial expressions. These images will be

stored in our database. In face recognition, the face images detected will be compared with those stored in databases, and attendance will be marked accordingly. We are using MySQL for storing our database details.

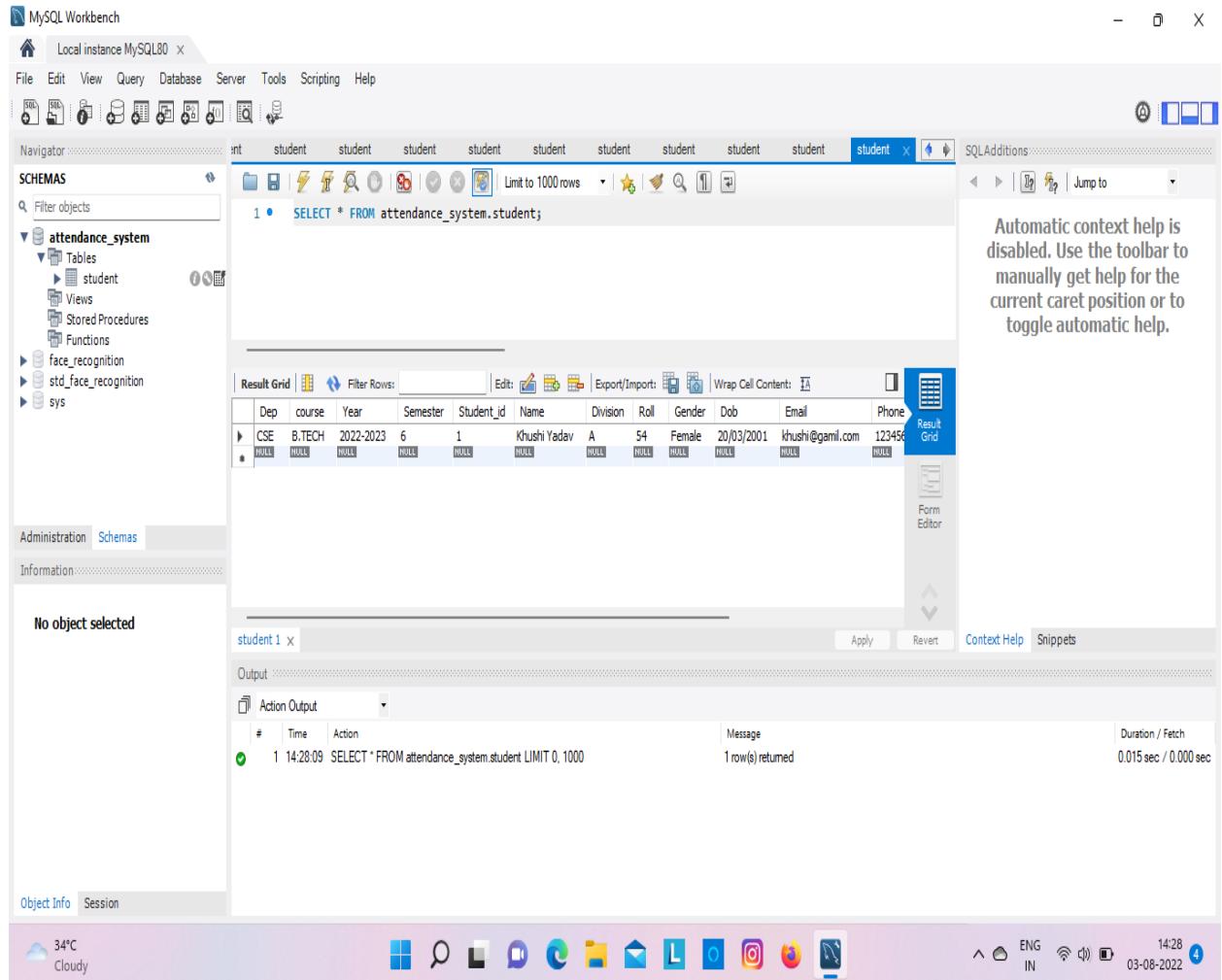


Fig. 1.4 Database Table

5. Result:

The proposed "Face Recognition Attendance System" will mark the attendance of students as present if they are present in the class through student name and branch; otherwise, they will be marked as absent. For face detection, the Haar-cascade algorithm is used, and for

recognition, the LBPH algorithm is used [1]. It will detect faces with the help of a webcam and then recognise the faces. It will mark the attendance of the recognised student and update the attendance record.

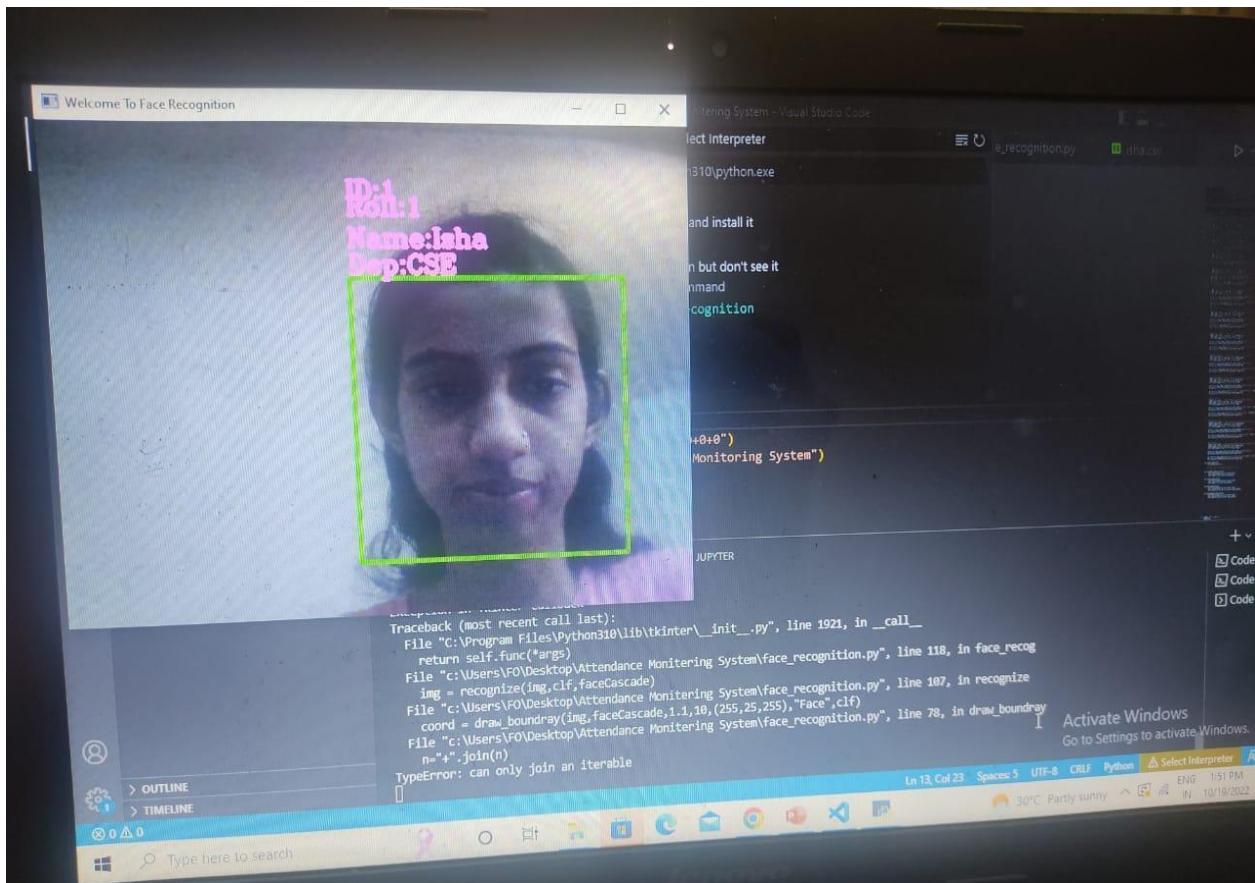


Fig.1.5 Snapshot of Project Function

The result of the project was a successful prototype of a facial recognition system where the admin could create a teacher account and add students and their information to the database. Teachers can then log in to the system

and take the student's attendance. The student's face is detected by a camera, and attendance is recorded in the database. The faculty can see the attendance of each student.

6. Conclusion

Overall, the project was successful in showcasing how LBPH can be implemented to create a web application. Once implemented, it can be used to take the attendance of students and keep track of their attendance records. This

project has the potential for further development in the future by adding more features for students and teachers. More features such as assignments, results, and grades could be added. The facial recognition attendance system helps increase accuracy. It is an efficient method of

taking attendance in the classroom that would replace the traditional method. Automatic attendance has many advantages. Most of the

existing systems are time-consuming. Our system seeks to solve these issues by using face recognition in the process to save time and labor.

References:

[1]. Shivam Singh, Face Recognition, International Journal of Research and Technology.

[2]. Awais Ahmed, LBPH based Improved face recognition at low resolution, University of Electronic Science and Technology of China, 2018 IEEE.