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# Electronic Attendance Management System in the Classroom Using "Face Recognition" Technology

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**ABSTRACT:** In our digital age, face recognition systems are used in almost every business. Face recognition is one of the most extensively used biometrics. It can be used for a variety of purposes, including security, authentication, and identity. It is widely used due to its non-invasive and contactless technique, despite its low accuracy when compared to iris and fingerprint identification. Face recognition systems can also be used in schools, colleges, and businesses to track attendance. Because the current manual approach is time consuming and difficult to maintain, this system aims to deliver a facial recognition-based class attendance system. There's also the option of having a proxy attend. As a result, there is a growing demand for this system. The four steps of this system are database construction, face detection, face recognition, and attendance updating. The database is created using images of the students in class. To detect and recognise faces, the Haar-Cascade classifier and the Local Binary Pattern Histogram method are utilised. Faces are discovered and recognised from the live streaming feed from the classroom. Attendance will be mailed to the appropriate faculty at the end of the session.

**KEYWORDS:** - Face recognition, NFC, camera, Infrared, face, and face dataset, attendance management system.

## I. INTRODUCTION

The old system of attendance marking is a time-consuming task at many institutions and universities. Professors' effort is also increased because they must physically call students' names to register attendance, which can take up to 5 minutes per session. This is going to take some time. There is a chance that a proxy will be present. As a result, numerous institutes began employing radio frequency identification (RFID) [3], iris recognition [4], fingerprint recognition, and other technologies for verifying attendance. These solutions, on the other hand, are queue-based, which might take a long time and be inconvenient. Face recognition has established itself as a valuable biometric feature that is both easy to learn and non-intrusive. Diverse facial expressions have little effect on face recognition algorithms.

Face recognition systems are divided into two categories: verification and identification. Face verification is a 1:N problem in which a query face image is compared to a template face image, whereas face verification is a 1:1 matching technique that compares a face image to a template face image [1]. The purpose of this system is to develop a face recognition-based attendance system. A person's face will be analyzed for attendance purposes. These days, face recognition is becoming increasingly prevalent and frequently used. In this paper, we propose a system that recognizes students' faces from live classroom video and stamps attendance if the detected face is found in the database. Diverse facial expressions have little effect on face recognition algorithms. Face recognition systems are divided into two categories: verification and identification. Face verification is a 1:N problem in which a query face image is compared to a template face image, whereas face verification is a 1:1 matching technique that compares a face image to a template face image [1]. This new system will save time when compared to current procedures. The attendance management system can be more effective in terms of managing college student attendance and guaranteeing that college students attend class sessions with facial recognition capabilities that can detect and identify someone based on their face [12].



## II. LITERATURE REVIEW

Customers The authors of [3] proposed a concept of an automatic attendance system. Face recognition paired with Radio Frequency Identification (RFID) is used to detect and count authorized students as they enter and exit the classroom in this model. Every legitimate record of every registered student is stored in the system. In the attendance record, the system also keeps track of every student enrolled in a certain course and provides pertinent information as needed. An iris biometric attendance system was devised and deployed by the authors of this research [4]. Initially, guests were asked to register their personal information as well as their unique iris template. The system took class attendance automatically at the time of attendance by collecting each attendee's eye image, recognizing their iris, and checking the database for a match. A web- based application served as the prototype.

A facial recognition-based attendance system was proposed by the authors of [5]. Viola- Jones and Histogram of Oriented Gradients (HOG) features, as well as a Support Vector Machine (SVM) classifier, were used to develop the system. Scale, lighting, occlusions, and position were all reviewed in real time by the authors. The quantitative analysis was carried out with the use of the MATLAB GUI and data from the Peak Signal to Noise Ratio (PSNR). The authors of [6] compared the Receiver Operating Characteristics (ROC) curve to discover the optimum facial recognition algorithm supplied by the Open CV 2.4.8 (Eigenface and Fisherface) and then integrated it into the attendance system. The ROC curve reveals that Eigenface outperforms Fisherface based on the findings of the studies in this study. The Eigenface algorithm-based system achieved a 70-90 percent accuracy rate. The authors of [7] proposed a method for using Discrete Wavelet Transforms (DWT) and Discrete Cosine Transforms in a classroom attendance system (DCT). The features of the student's face were extracted using these techniques, which were then categorized using the Radial Basis Function (RBF).

## III. PROPOSED ALGORITHM

All students in the class must register by filling out the required information, following which their images will be captured and kept in the dataset. During each session, faces will be discovered from live streaming video of the classroom. Faces in the dataset will be detected and compared to photos. The student's attendance will be recorded if a match is identified. At the end of each session, a list of absentees will be mailed to the specific faculty managing the session.

The system architecture of the recommended system is illustrated below. Typically, this procedure is divided into three stages:

1. Creating a Dataset
2. Recognition of faces
3. Facial recognition Attendance Reporting

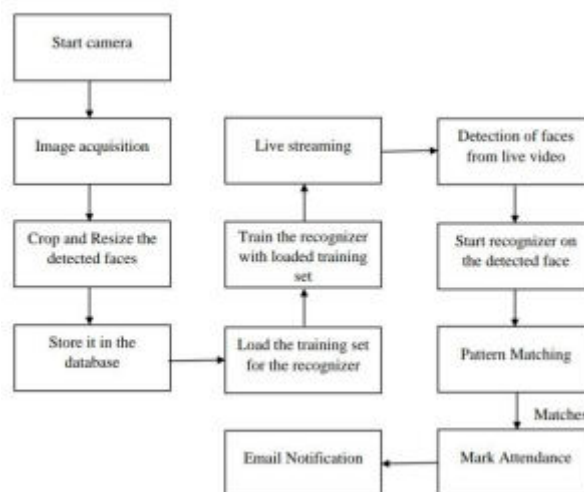


Fig.1 System Architecture





### III. RESULT ANALYSIS

The goal of this project is to provide a useful class attendance system by using face recognition techniques. Face recognition will be used in the proposed technology to track attendance. Face detection and recognition will be done via webcam. It will record the attendance of the acknowledged student and update the attendance record.

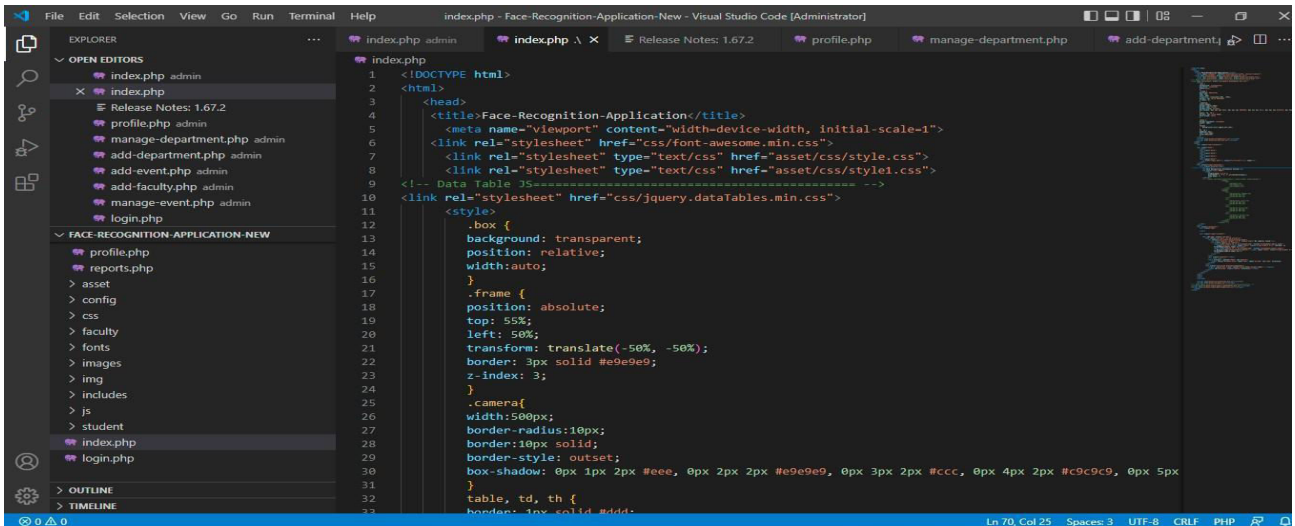


Fig5. Project Structure

First, in the Visual Studio, create a project structure. After that create a database file to create and connect to the MySQL database by using PHP code.

MySQL is the most popular database management system for PHP online applications due to its speed, stability, and variety. All of the data generated by this application is stored in the MySQL database system.

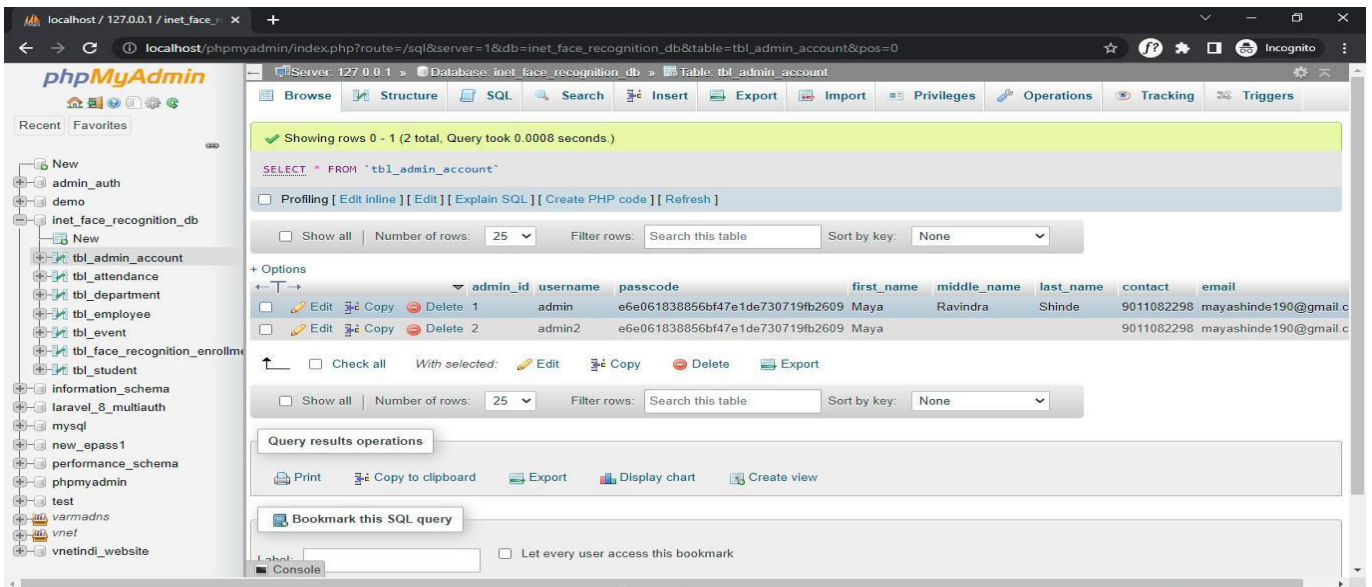


Fig.6.Database Structure



### Administrator Account – Face Recognition Enrollment Page:-

Face Recognition Enrollment — This module will allow you to enrol using your face. Photographs of students, faculty, or staff are taken and stored on a server as a face detection reference.

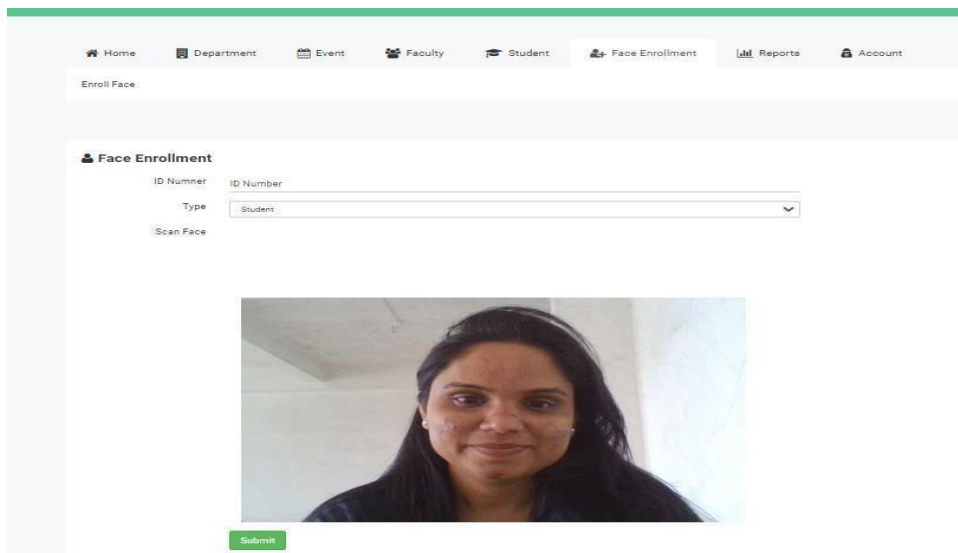


Fig7. Administrator Account – Face Recognition Enrollment Page

## V. CONCLUSION AND FUTURE WORK

This system attempts to provide a useful class attendance system by using face recognition techniques. Face recognition will be used in the proposed technology to track attendance. Face detection and recognition will be done via webcam. It will record the attendance of the acknowledged student and update the attendance record. We can make the following improvements to the system in the future to improve its functionality and reliability:

1. Make a defaulter list for any student whose attendance falls below 75% after a particular period of time.
2. The system must distinguish between known and unknown faces, with unfamiliar faces being recorded in a separate database.

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