



## SMART FACE ATTENDANCE SYSTEM

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### Abstract

Monitoring attendance is an important administrative activity in educational institutions and organisations. Conventional paper registers make the attendance process a time-consuming one, putting it at risk for errors and proxy attendance. A facial recognition-based smart face attendance system is proposed in this paper. The system receives live video input from a webcam, detects human faces and compares them with a pre-trained dataset. Attendance is marked and saved automatically after successful identification. The program is built on the Python programming language and employs OpenCV for face detection and recognition as well as PyQt5 for the interface. The OpenPyXL library saves attendance records in excel file. The system is meant to reduce the manual work required in taking attendance, stop proxy attendance, and also provide a cost-effective, accurate, and efficient system to schools, colleges and corporations.

**Keywords** Face Recognition, Attendance System, OpenCV, Python, PyQt5, OpenPyXL, LBPH.

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### 1. Introduction

Attendance management is an important issue faced by schools, colleges, and organizations. Customary methods of handling attendance, such as taking attendance through paper registers, are time-consuming, error-prone and can allow proxy attendance. However, technology makes attendance easier to monitor, and computerised or automated systems further improve its accuracy.

The Smart Face Attendance System automatically records attendance using face recognition technology. A webcam captures the image of a person standing in front of the system. The system then detects the face and compares it with the stored face data to identify the individual.

The system is built using Python programming. OpenCV is used to detect and recognise faces, while PyQt5 is used to create a simple and user-friendly graphical interface. The attendance records are stored digitally, which makes the process faster, more organised, and more reliable.

### 2. Problem Statement

In many schools, colleges, and organisations, attendance is still taken manually by filling out a paper register or sheet. This traditional method of attendance is a time-consuming and error-prone method. This method is also

prone to errors like proxy attendance, where one person takes attendance for another person. It is a cumbersome task to store attendance records manually as well.

Hence, there is a need for an automatic system that can take attendance quickly and efficiently. A Smart Face Attendance System using face recognition technology can be a solution for all the above problems.

### 3. Literature Review

| Technology       | Accuracy | Contactless Speed | Cost        |
|------------------|----------|-------------------|-------------|
| RFID             | Medium   | No                | Medium      |
| Fingerprint      | High     | No                | Medium/High |
| Face Recognition | High     | Yes               | High        |

Face Recognition-Based Attendance System” – Shubh Agarwal (2023) Automate Classroom Attendance.

Procedure: For face detection, OpenCV was utilised with Haar particles. Gained 92% recognition accuracy.

Limited: Problems with numerous faces in a busy classroom.

Automated Attendance Using Face Recognition by Pavithra S. Hegde and Afshin.

Aim: Cut down proctored attendance. The LBPH (Local Binary Pattern Histogram) algorithm was used. The attendance was scanned faster and 95% accurate.

Needs sufficient lighting conditions

### 4. Methodology

It is easy to automatically check attendance using a face recognition-based system. To begin with, it keeps the image of faces in a database to be used as a point of reference. The webcam takes live images when any person comes in front of the camera, and using face detection, it is able to identify the face. Once the face is detected, the system searches the images stored in the database and identifies the person. The system recognises a person when their face resembles the one that is stored. When a person is recognised, the system automatically registers the attendance and saves it in a digital file. The attendance data are stored in an Excel file using OpenPyXL. The face data management and attendance data viewing graphical interface is created using PyQt5. The method being used automatically takes the attendance, which makes it faster and more accurate

### 5. System Architecture

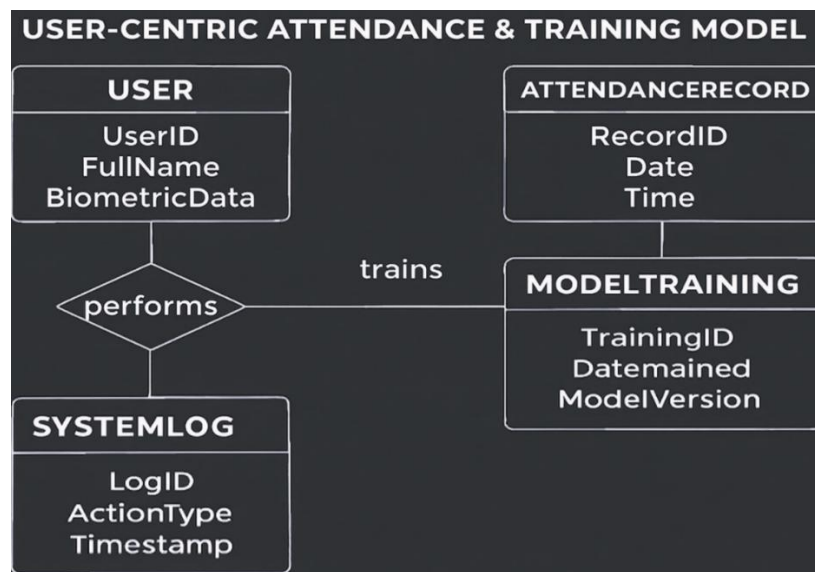
The Smart Face Attendance System has several functional parts that are used to automate the process of recording attendance.

The using layer takes pictures with a webcam when a person stands in front of the camera. The picture that is captured is forwarded to the processing system.

In the processing layer, the system identifies and recognises the face through computer vision techniques with OpenCV. The found face is checked against the stored face images in the dataset. When the face is recognised, the system proceeds to the application layer, where the graphical user interface is built using PyQt5 controls, system elements, including the login panels, face data management, and attendance viewing.

Eventually, the output layer stores data of attendance in the Excel format using OpenPyXL and end-users and admins are able to easily view and manage records of attendance.

## 6. Diagram



**Fig:1 User-centric attendance & training model**

### Features of the System

#### 1. Face Recognition Attendance

The system takes attendance using the webcam and face recognition. When a face is identified, the system will record the attendance automatically.

#### 2. System-Admin Login

There is a different login page for the admin. The admin can add new faces, edit the data and delete the faces of the people who quit the organisation.

#### 3. User Login Panel

The user login panel of the system is also available. The users can access the system and log their presence through face recognition.

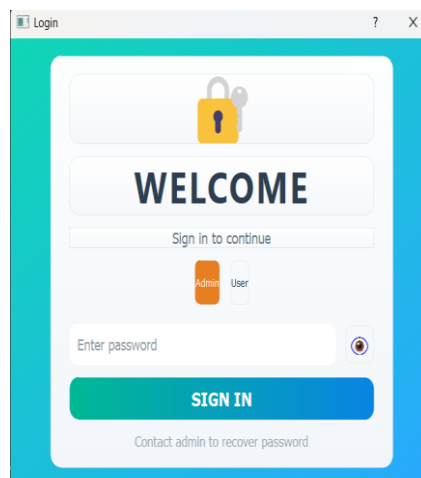
#### 4. Cleanup of data

The facial data set can be modified by the administrator, who can add or remove faces at any time.

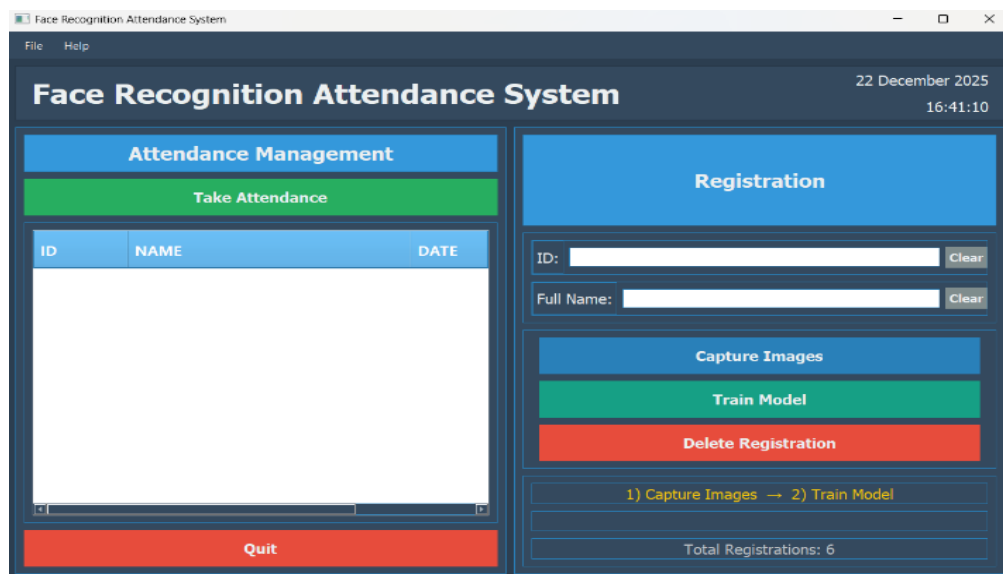
#### 5. Automatic attendance recording.

The attendance data is saved in an Excel file by OpenPyXL, which provides a convenient way to save and retrieve data.

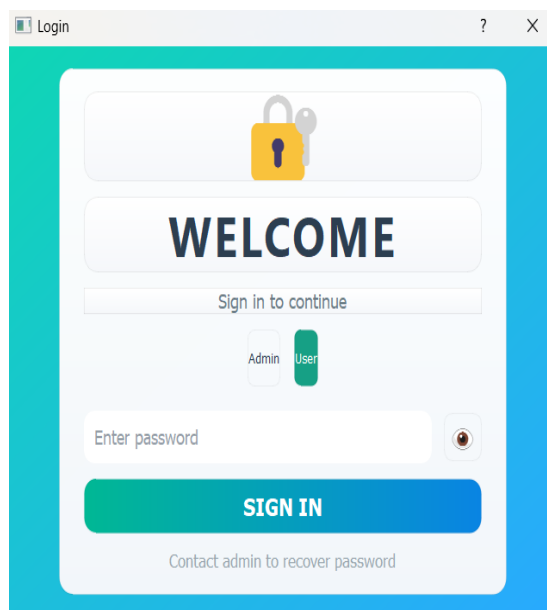
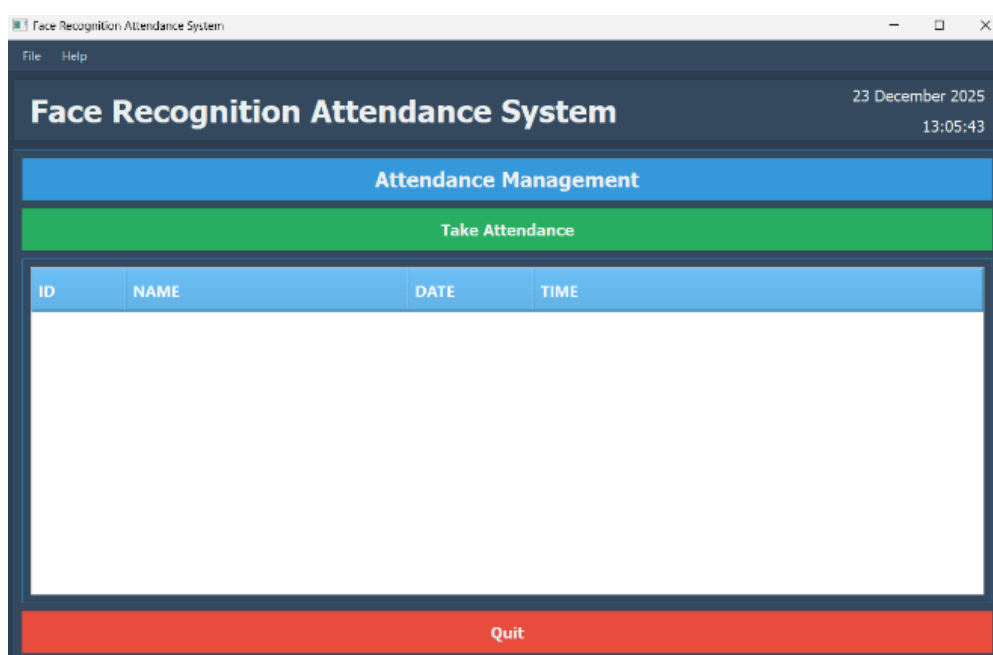
### 7. Result



**Fig:2**



**Fig:3**

**Fig:4****Fig:5**

## 8. Discussion

The Smart Face Attendance System automates the process of checking attendance, allowing students not to manually check in. The program employs OpenCV to identify faces captured by the webcam. When the projected face matches the preloaded data, the attendance will be approved automatically. It allows the admin and user to log in separately. The administrator can manage the dataset as per the requirement. Also, either data can be added, or data can be deleted when people leave the organisation. Since the attendance records are online, the system is quick and easy to use and can be more accurate.

## 9. Conclusion

This attendance management system is efficient as well as automated. The system will automatically mark attendance using face recognition instead of regular manual registers. Using OpenCV, the system can quickly and accurately detect and recognise faces. Through the admin panel and user login panel, the admin can manage face data, and users can mark attendance quite easily. In all, it reduces manual work and saves time. It avoids proxy attendance while storing the record in digital format. Thus, it can offer a dependable and contemporary solution for attendance management in schools, colleges, and organizations.

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