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STUDENT ATTENDANCE SYSTEM USING FACE RECOGNITION: A Web-Based Platform for Scalable and Secure Academic Assessments

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A B S T R A C T :

The traditional method of recording student attendance is time-consuming, prone to manipulation, and inefficient for large classrooms. This project proposes an automated Student Attendance System Using Face Scanning with Email Notification, which leverages facial recognition technology to streamline the attendance process. The system uses computer vision and machine learning algorithms to accurately identify and verify students' faces in real time through a camera feed. Once a student is recognized, their attendance is automatically marked and updated in the database. To enhance communication and accountability, the system is integrated with an email notification feature that sends real-time updates to students and/or their guardians regarding attendance status. This not only ensures transparency but also helps in keeping track of absenteeism. The solution is designed to operate with minimal human intervention, improving accuracy, reducing administrative workload, and promoting punctuality among students. This system demonstrates the potential of artificial intelligence in educational institutions, offering a secure, scalable, and efficient method to manage attendance records while keeping all stakeholders informed.

Keywords:Student Attendance System, Face Recognition ,Face Detection ,Student Attendance, Data Base.

Introduction:

Accurate and efficient student attendance tracking is a critical aspect of educational management. Traditional methods, such as roll calls or ID card systems, often suffer from inefficiencies, manual errors, and possibilities of proxy attendance. To address these challenges, this project presents a "Student Attendance System Using Face Scanning with Email Notification to Parents" a modern, AI-powered solution aimed at automating attendance while keeping parents informed in real time. The system uses facial recognition technology to identify students as they enter the classroom, marking their attendance automatically without the need for manual input. This is achieved through the use of a camera interface and machine learning algorithms that detect and recognize faces with high accuracy. What sets this system apart is its parental communication feature. Once a student's attendance is recorded, an automated email notification is sent to the parent or guardian, providing daily updates on their child's presence or absence. This enhances transparency between educational institutions and families, encourages accountability, and helps reduce truancy. Overall, this project aims to improve attendance monitoring, minimize human error, prevent attendance fraud, and strengthen the connection between schools and parents using smart technology. It represents a significant step toward smarter, more connected classrooms..

The objectives of this study are to:

- To improve communication between schools and parents by sending real-time email notifications regarding student attendance. Automate exam evaluation and results.
- To enhance security and accountability within the school environment through biometric verification. Maintain academic integrity through secure user authentication.
- Develop a facial recognition system that accurately detects and verifies student identities during attendance.

Literature Review

1. Face Recognition Technology in Attendance Systems

Several studies have demonstrated the effectiveness of facial recognition in automating attendance processes. According to Patel et al. (2021), face recognition offers a contactless, fast, and secure way to identify students. It reduces the chances of proxy attendance, which is common in manual and ID-based systems. The study implemented a facial recognition system using OpenCV and Haar Cascade classifiers, showing a 92% accuracy rate under

good lighting conditions. Another study by Ranjan & Mehta (2020) emphasized the use of deep learning models such as CNN (Convolutional Neural Networks) for improved facial recognition accuracy. Their system achieved more than 95% recognition accuracy using a dataset of 500 student images, even under varying angles and lighting conditions.

2.Systematic Review of Online Examination Solutions

Muzaffar et al. (2020) conducted a comprehensive systematic literature review, analyzing 53 studies related to online examination solutions in e-learning. The review highlights key features such as authentication mechanisms, security protocols, and user interface designs. It also discusses the global adoption of various tools and techniques, providing valuable insights for developing effective online examination systems.

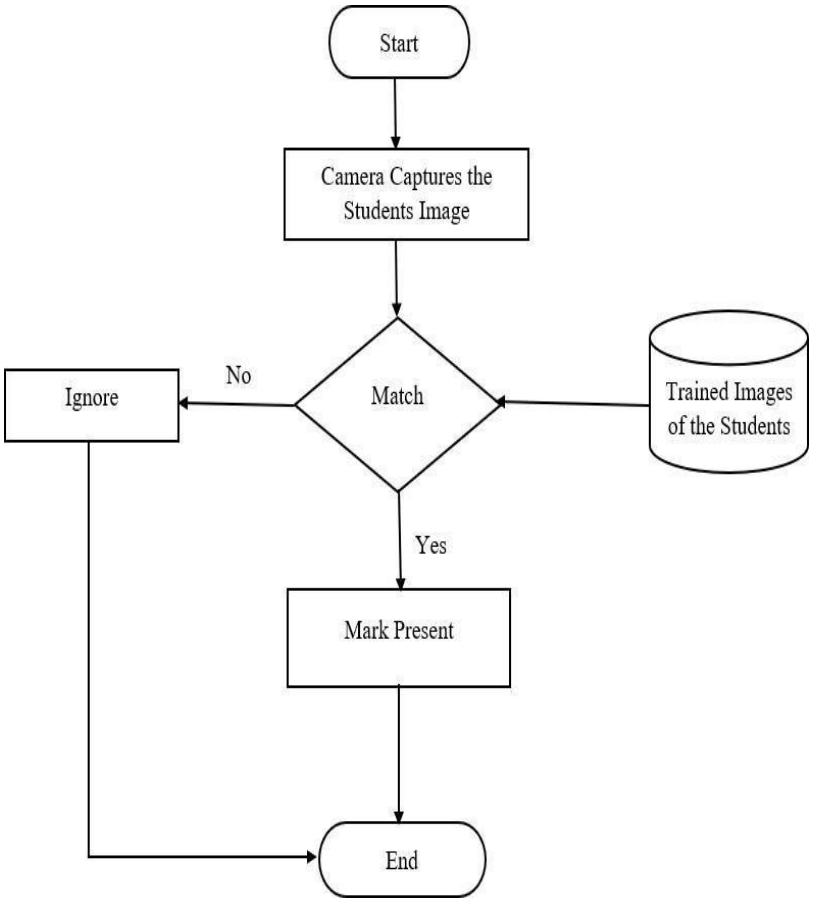
3.Attendance Automation Benefits

An automated system minimizes administrative workload and improves time management. According to Sharma et al. (2019), digital attendance systems not only improve accuracy but also save time, especially in large classrooms. These systems also facilitate record keeping and easy access to historical data. A study conducted by Kumar and Rao (2018) found that automating attendance reduced manual effort by 75% and minimized errors by 90%, especially when integrated with student databases.

4.Email/SMS Notification to Parents

Real-time communication with parents has become a crucial aspect of student monitoring. A paper by Thomas et al. (2019) discussed a system that sent SMS notifications to parents when students were absent. The feedback from parents was positive, with 85% stating it helped them keep better track of their children's school activity. However, SMS-based systems have limitations such as cost and character restrictions. In contrast, email-based notifications allow more detailed information, attachments, and better formatting. According to a 2020 study by Gupta et al., integrating email alerts with attendance systems significantly improved parent engagement and reduced unexplained absenteeism.

System Architecture



Result and Discussion

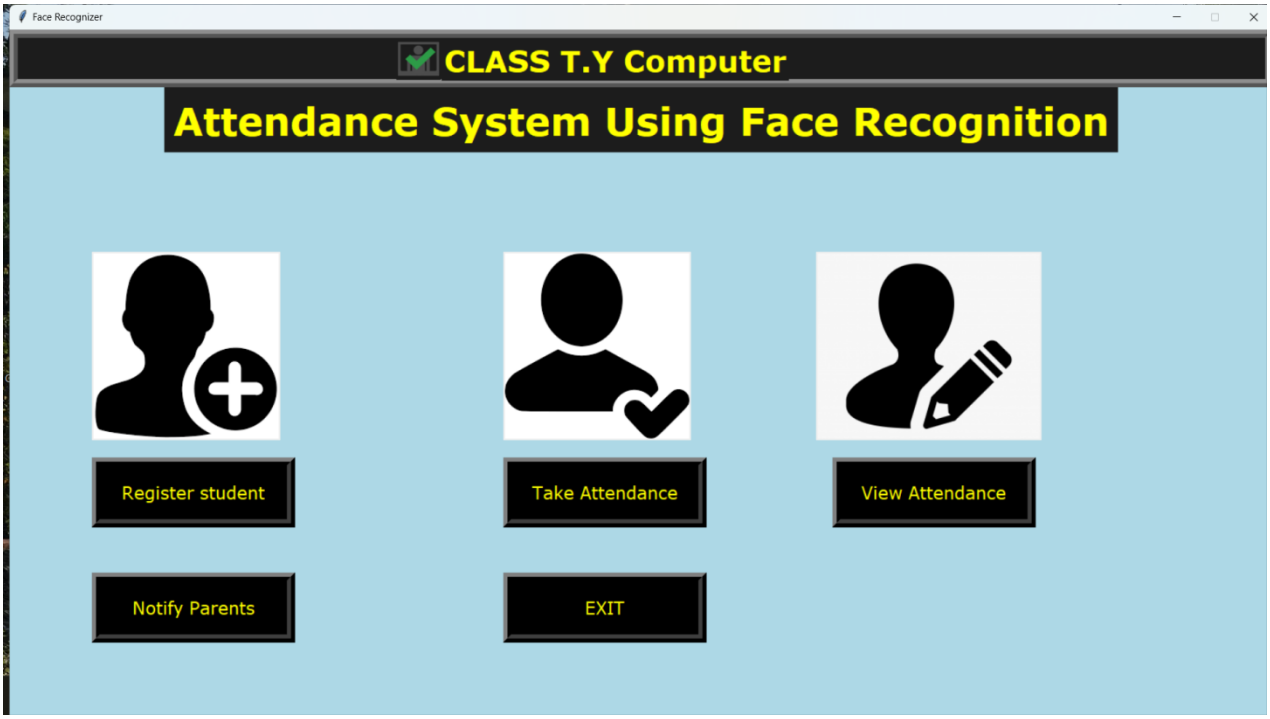


Fig. 1 Login Page

Fig. 2. Register student1 (Roll no, Name, Email Id, Image

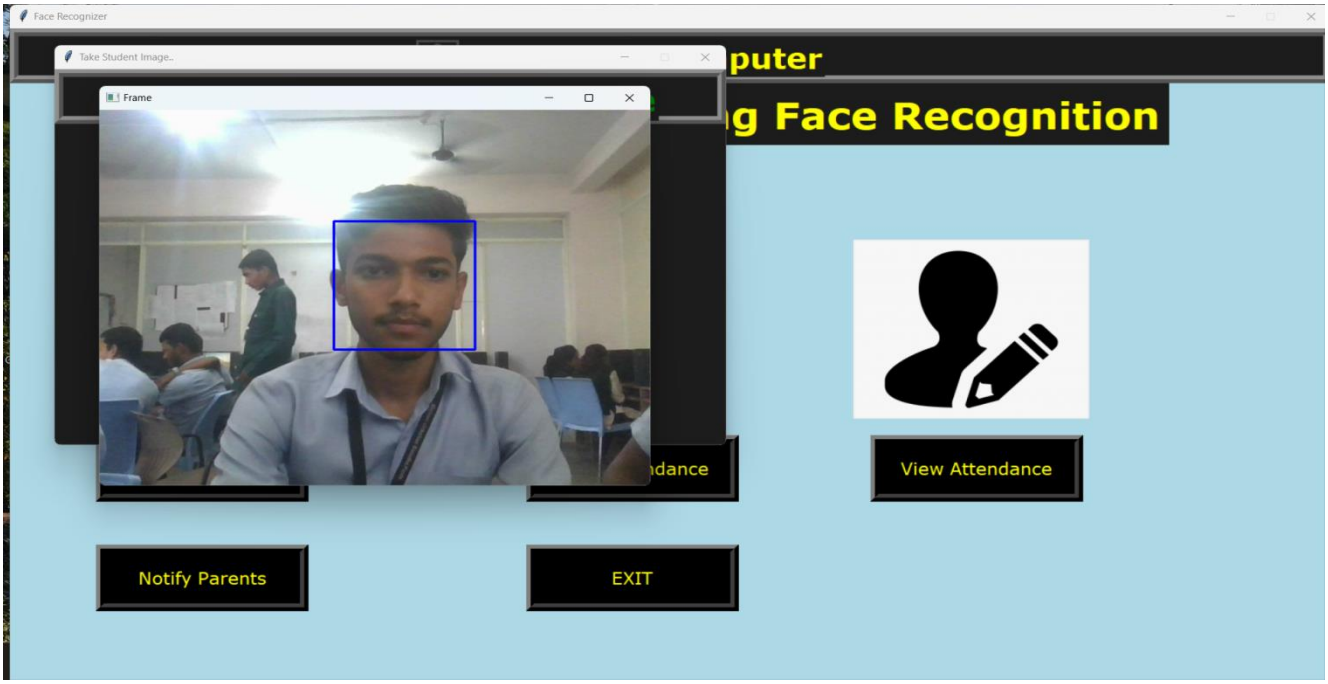


Fig. 3 Take Student Image

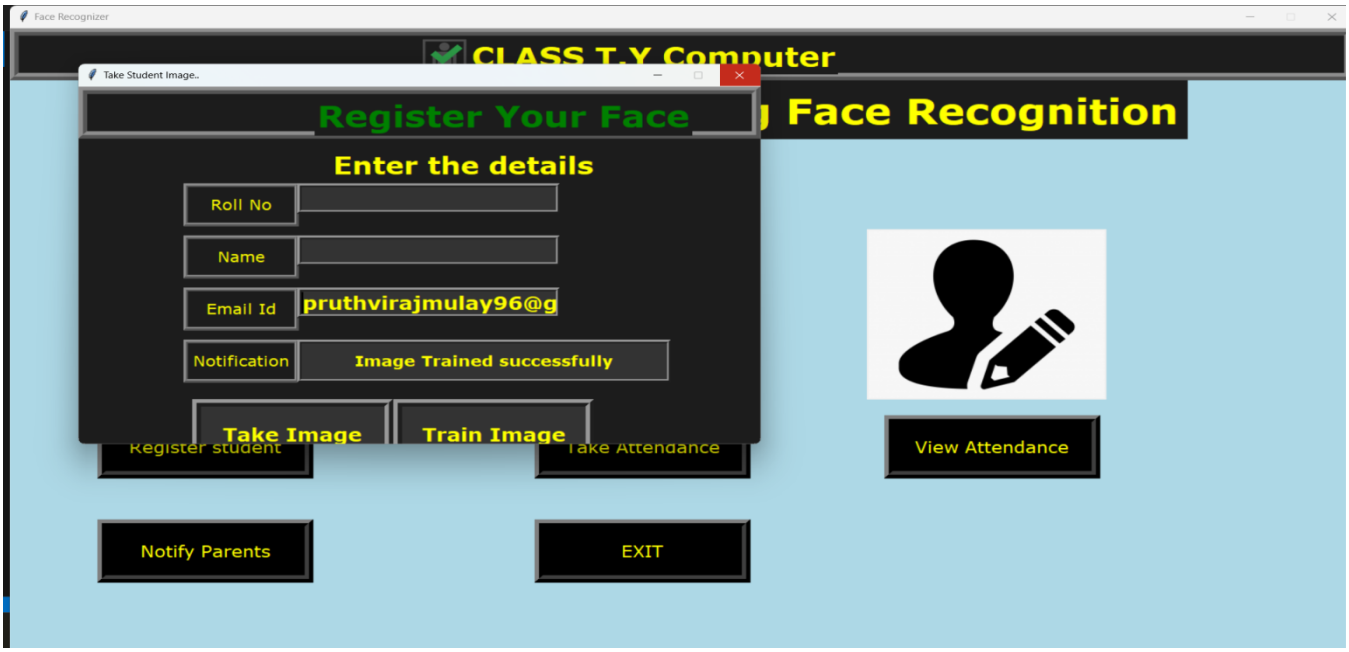


Fig. 4 Train Student Image

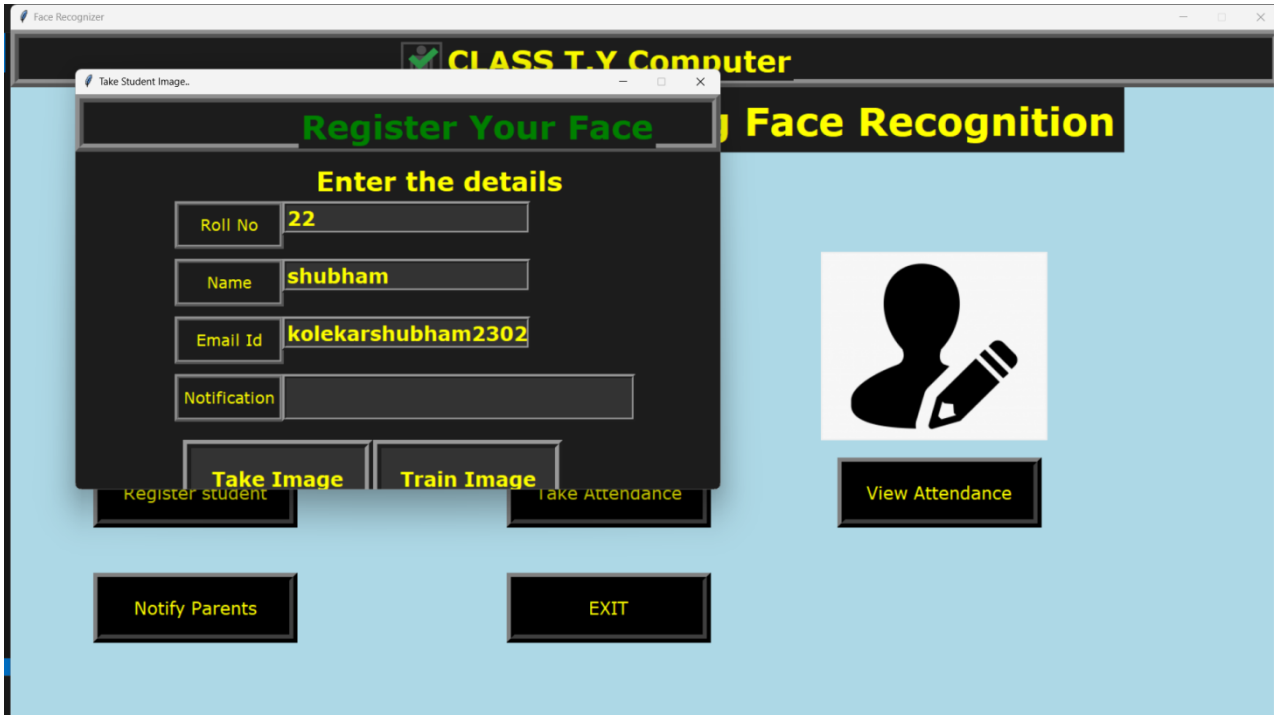


Fig. 5 Train Student Image

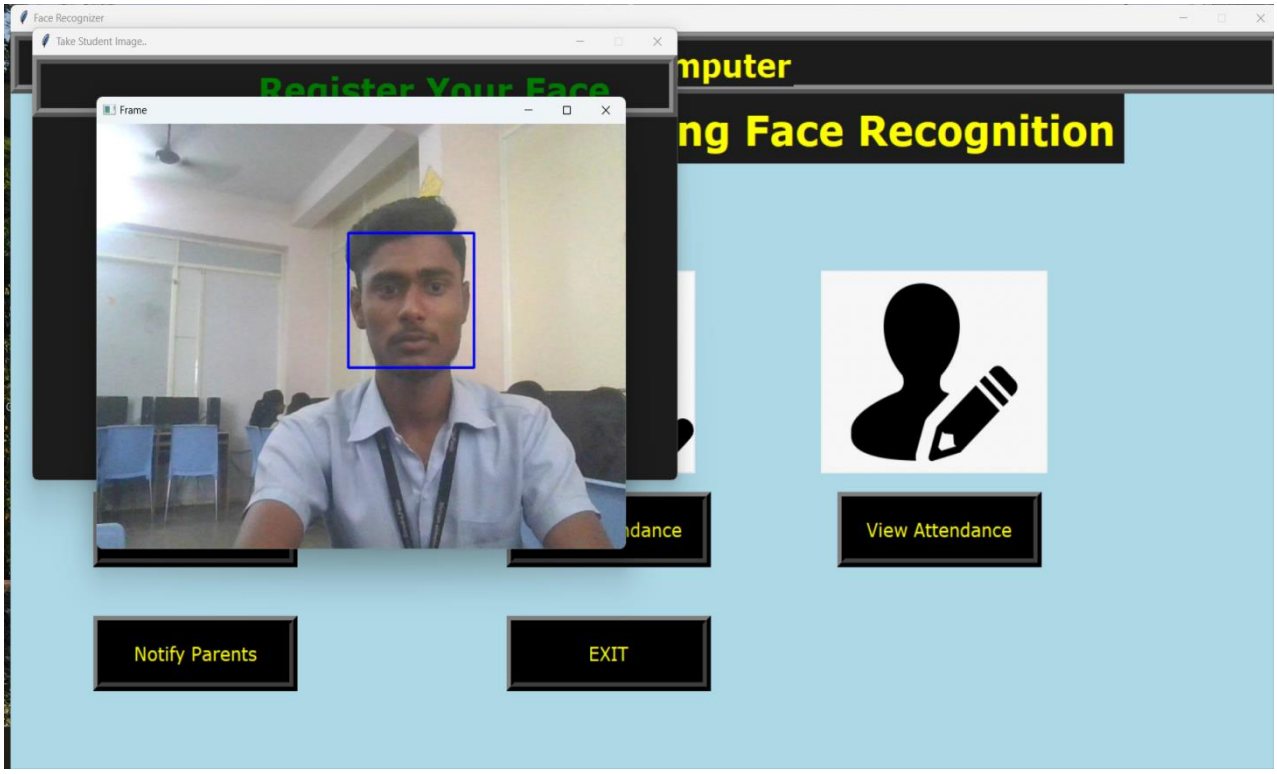


Fig. 6 Take Student Image

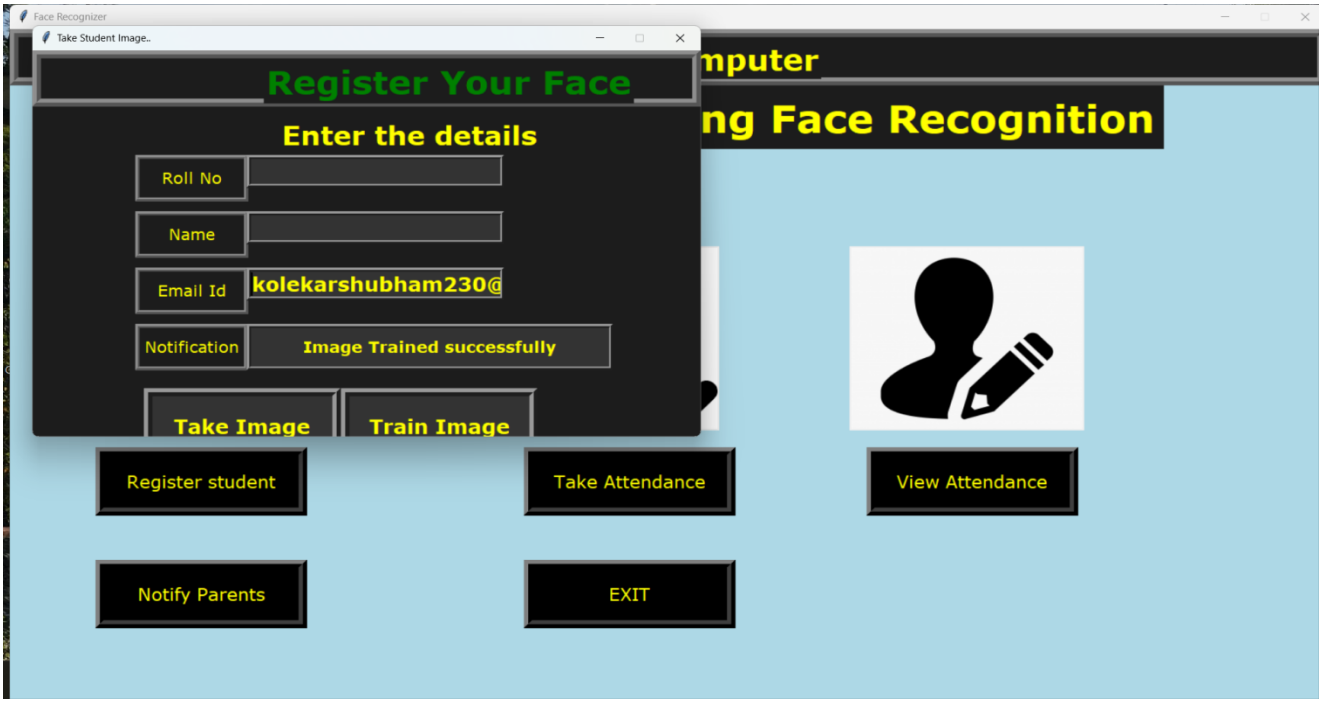


Fig. 7 Train Student Image

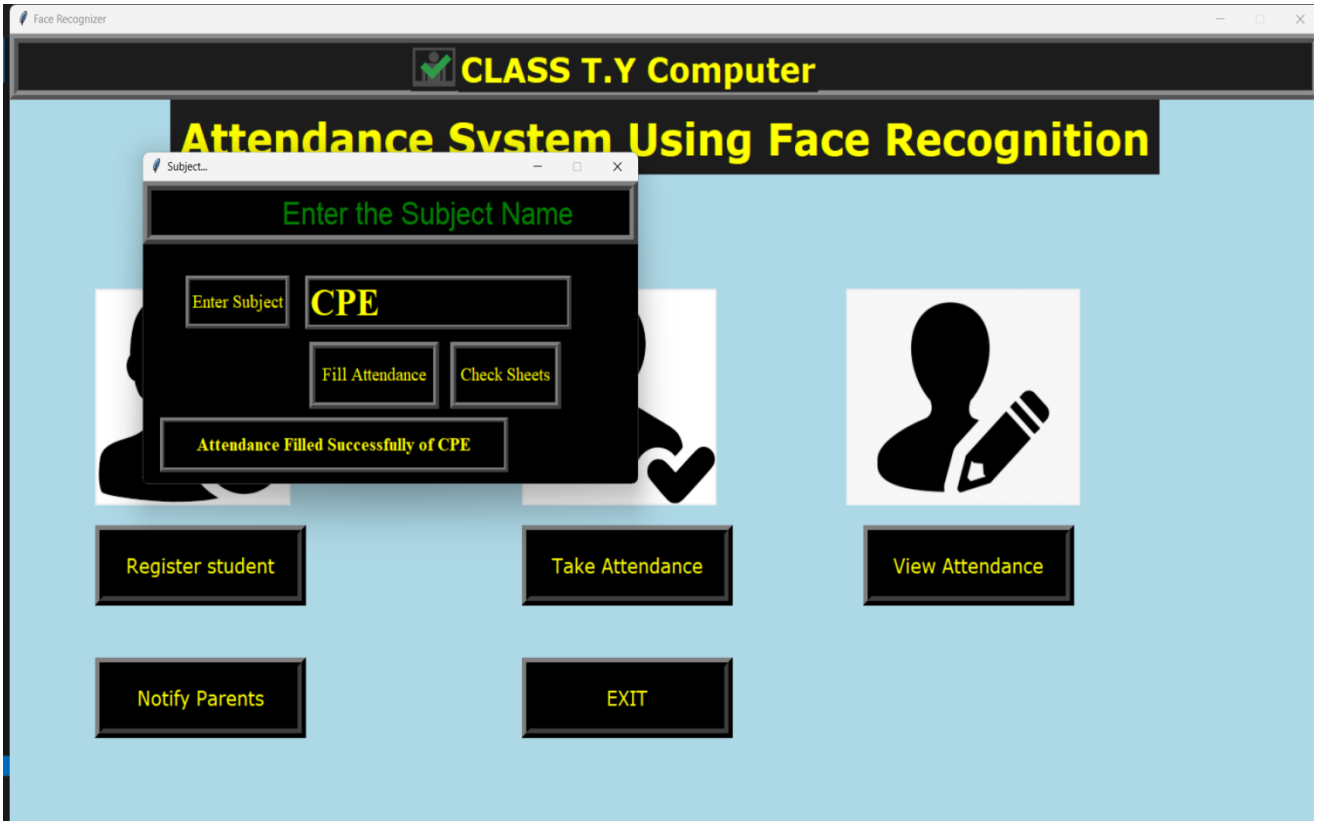


Fig. 8 Filling Attendance with subject name

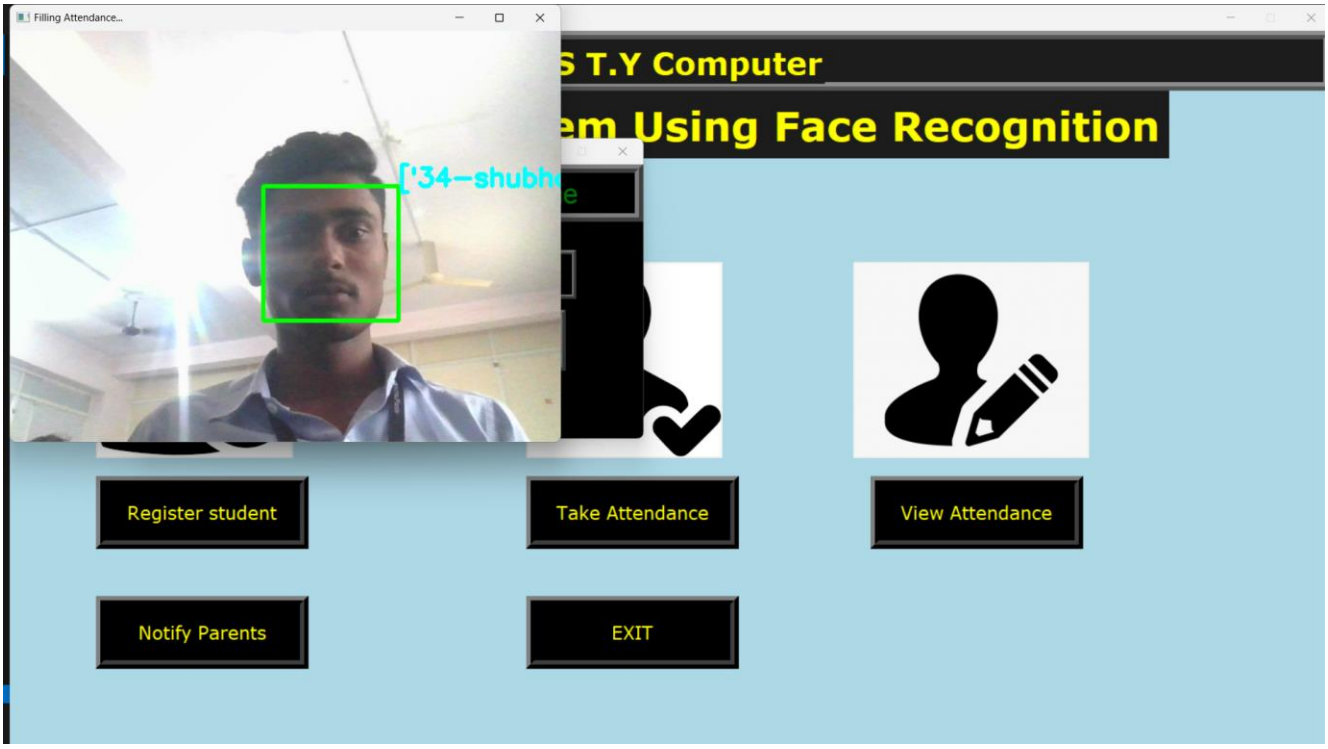


Fig. 9 Filling Attendance of student

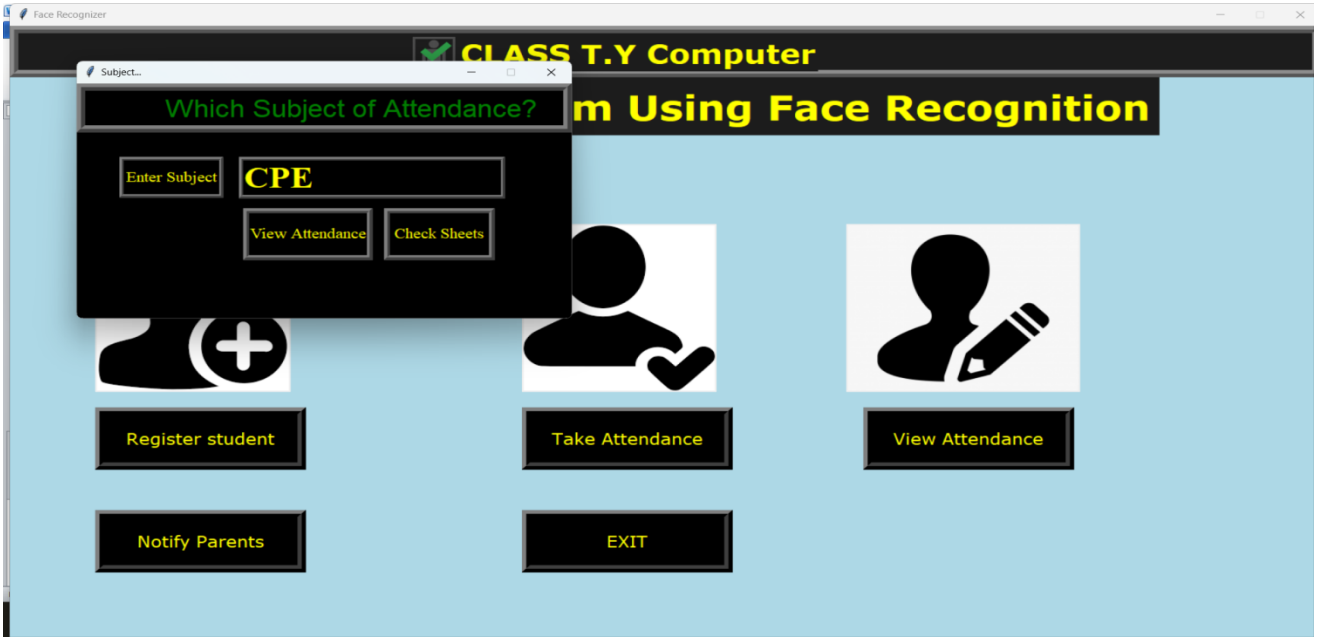


Fig. 10 Check Attendance with subject name

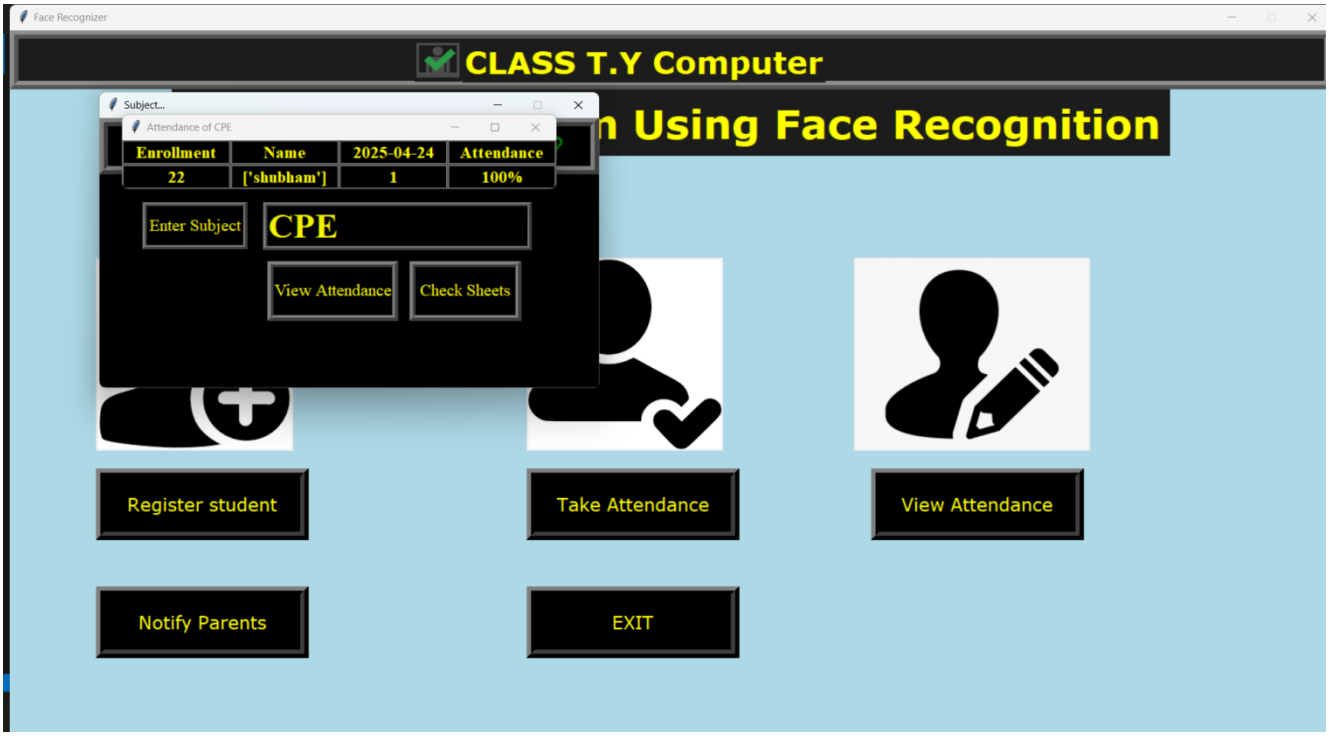


Fig. 11 Check Attendance sheet

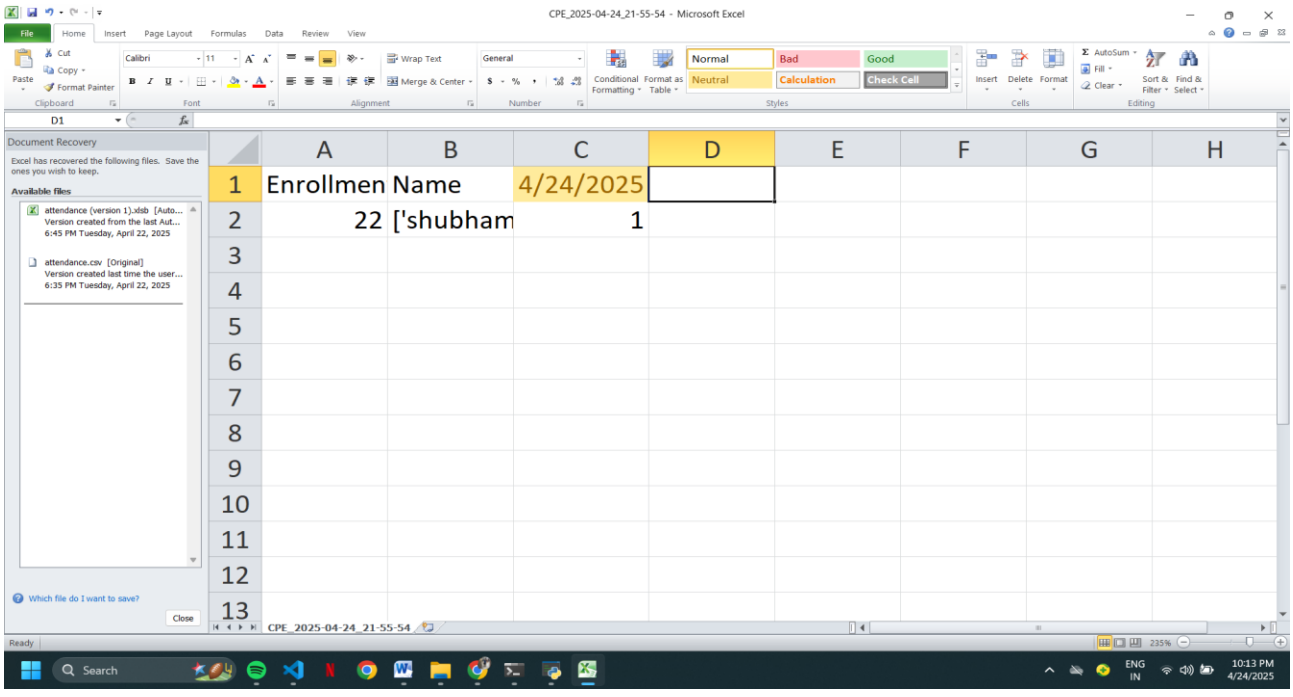


Fig. 12 Store Attendance in Excel Sheet

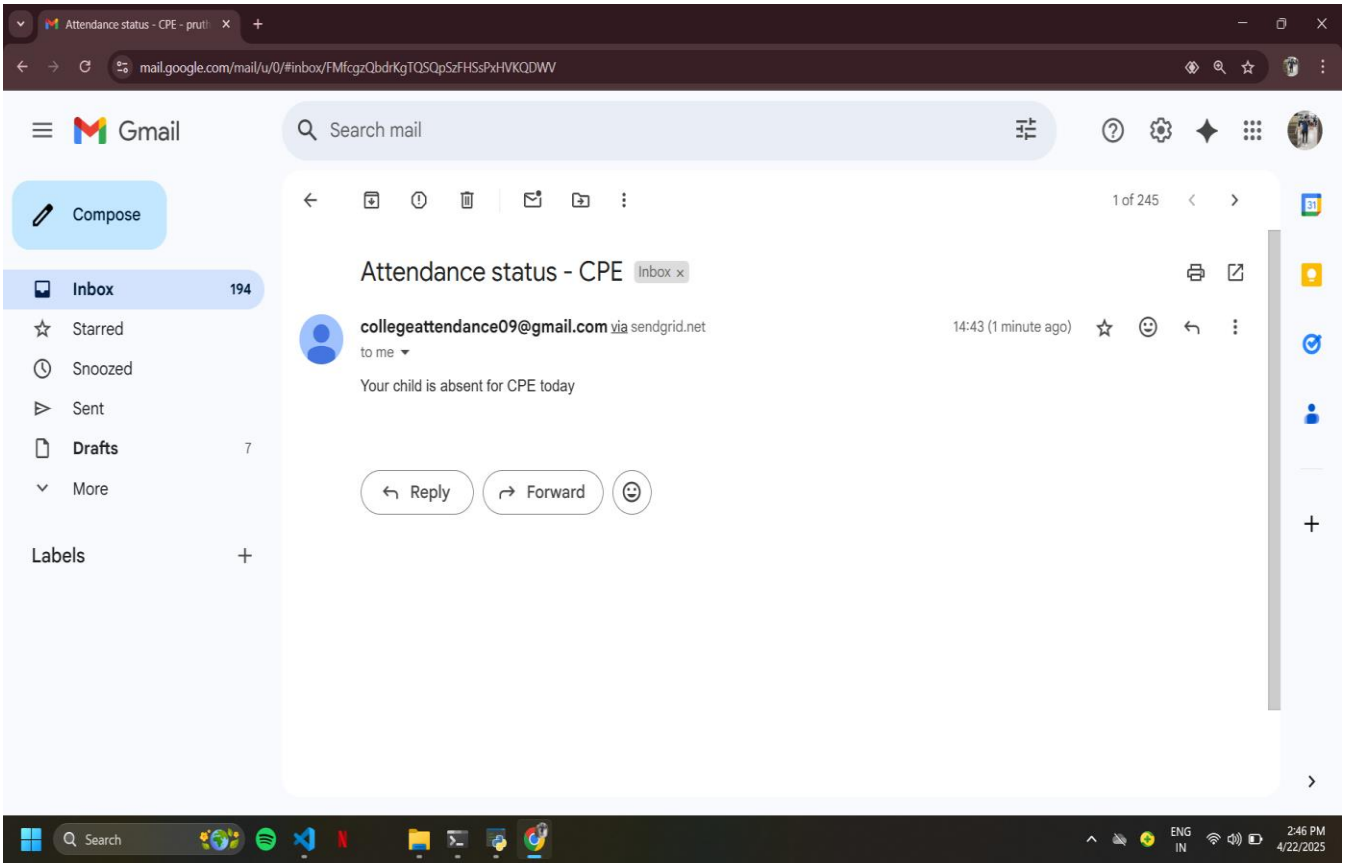


Fig. 13 Sending email to parent of absent students

5.Conclusion:

The development of the Student Attendance System using face scanning and automated email notifications marks a significant step forward in modernizing academic administrative processes. By replacing traditional and manual methods of attendance tracking, this system offers a more efficient, accurate, and tamper-proof solution. The integration of facial recognition ensures swift and contactless attendance marking, while the automated email feature keeps parents or guardians informed in real-time, promoting transparency and accountability. This not only saves valuable classroom time but also reduces the chances of proxy attendance and human errors. Through this project, we have demonstrated the practical application of biometric technology in educational environments, paving the way for smarter and more secure classroom management. With further improvements and scalability, such systems have the potential to become a standard in educational institutions worldwide.

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