Nile University
جامعة النيل الأهلية
RESEARCH OFFICE

17TH UNDERGRADUATE RESEARCH FORUM

RESEARCH FORUM 17TH UGRF

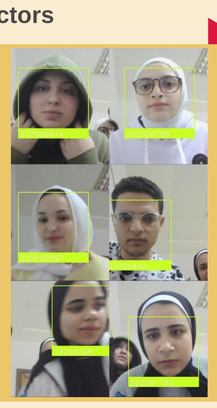
01 INTRODUCTION

Transforming the landscape of student attendance tracking, our system utilizes a more technological business solution by real-time capturing students faces, with higher efficiency and accuracy than traditional paper-based / QR current methods.

Emphasizing *efficiency, privacy, redundancy and error handling,* it offers a more reliable, robust and solution.

Built with a user-friendly interface, we can experience the future of attendance management systems in the universities around Egypt

Raspberry Pi-based Internet of Things (IoT) solution. The system combines ease of use with advanced technology to redefine How attendance is managed, offering a seamless experience for both students and instructors



02 DISCUSSION

PERFORMANCE

Our system efficiently captures real-time students' faces while entering the lecture This approach outperforms traditional paper-based / QR methods offering a more efficiency, fair and less time-consuming for instructors and students, Adding we were able to reject the photos shown to the camera by the smart phone of the students, this is done by *not* up sampling the input image to the face recognition model.

PRIVACY

To ensuring the privacy of the students' attendance rate and time, the excel file will be eliminated along with the students' taken photos for this section from the file system after sending the instructor the attendance by mail. Which can be accessed though an OTP send only to the instructor, the system does not have the name rather the system uses the ID to reduce the sensitive information on the system and the unauthorized use.

ERROR HANDLING

The system can detect multiple types of errors, as the following.

1. *Internet Connection Error.*
2. *Camera Not Found*
3. *No Images Found.*
4. *Wrong Images Format*

With multiple outputs of error codes are shown on both the LCD and the LEDs Moreover, the solution for each is given in the system documentation file.

REDUNDANCY

The system was designed to have a back-up of every essential component like camera or the Internet connection as well as a USB camera, in case of the failure in the Pi-Cam system. Adding we also took advantage of the uninterruptible power UPS systems along with a built-in rechargeable battery, to prevent data loss in case of a power outage, as well as visual and hearing confirmation in case of a successful attendance record.

Ektibni fi el Attendance

STEP I

The instructor register a section by scanning the QR in front of each room

STEP II

This activates the camera Thus, passing by relative students will be recoded

STEP III

Then the instructor ends the section by the OTP and receives an excel file with the attendance and the attendance rate

SYSTEM SIMPLE USAGE

03 MATERIEL

➔ Raspberry Pi 4: The core computing unit, serving as the brains of the system and facilitating seamless integration with other components.

➔Camera: Integral for the face recognition feature, capturing and processing facial data to accurately record attendance during sessions.

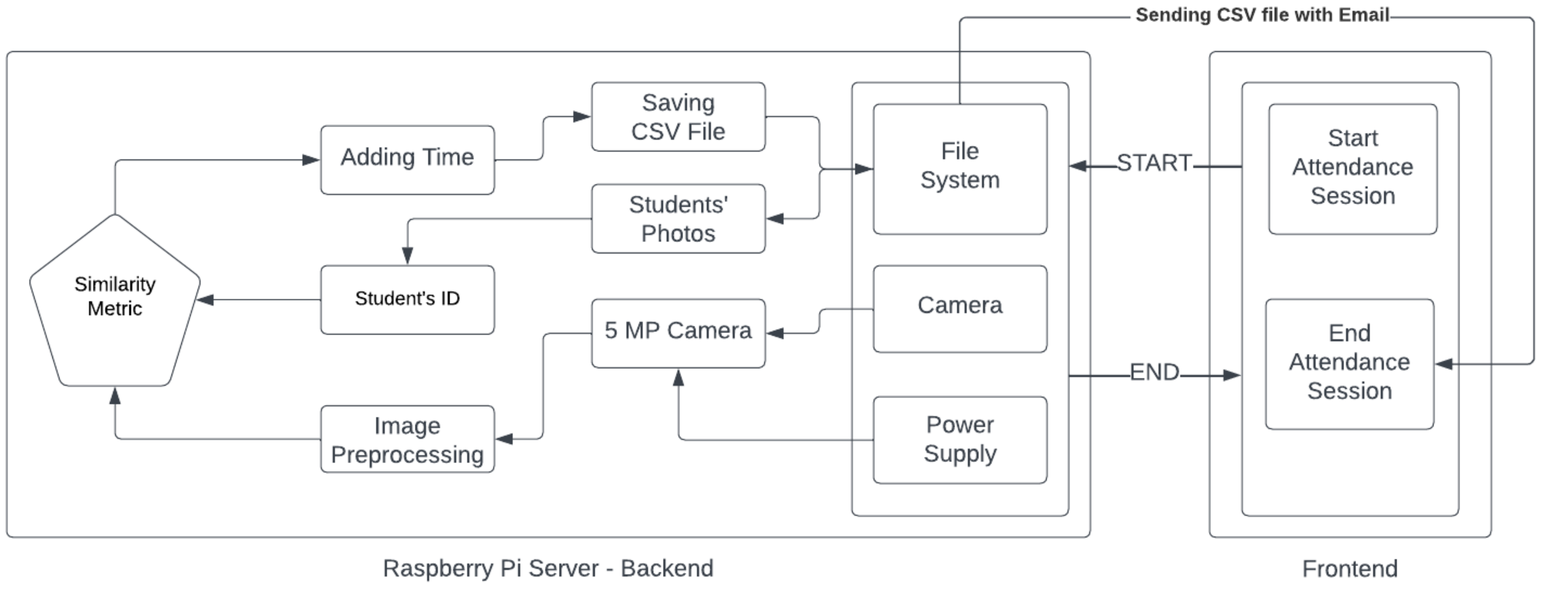
➔ LCD (Liquid Crystal Display): A visual interface that provides real-time information, enabling users to interact with the attendance system conveniently

➔ LEDs (Light-Emitting Diodes): Light indicators for signaling various system states, enhancing user awareness and communication.

➔ Buzzer: An audible feedback device that can be utilized to signal specific events or provide notifications, adding a sensory dimension to the user experience.

➔ Rechargeable Battery: To prevent data loss and system shut down in the middle of a session

04 SYSTEM ARCHITECTURE

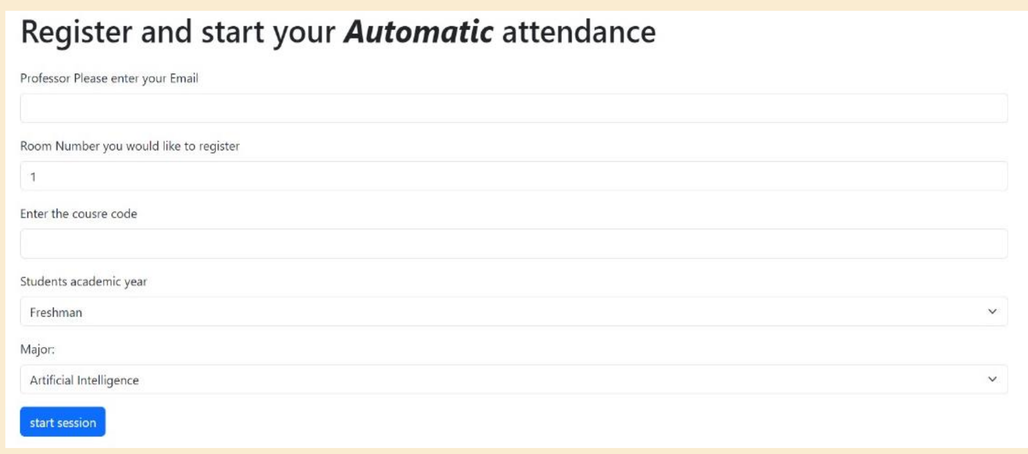


06 CONCLUSION

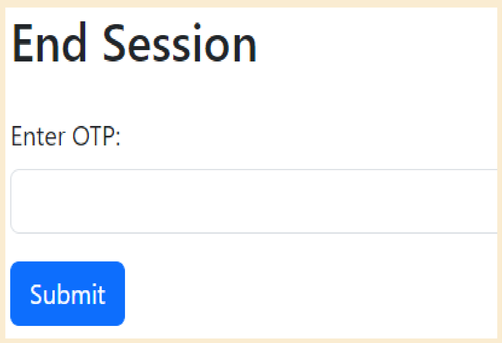
. In conclusion, our innovative student attendance tracking system, rooted in a Raspberry Pi-based IoT solution, represents a transformative leap in efficiency and accuracy over traditional methods. With a keen focus on privacy, error handling, and redundancy, it ensures a robust and reliable solution tailored for universities in Egypt. The incorporation of real-time facial recognition, intelligent error detection, and backup systems sets a new standard for attendance management, revolutionizing the landscape.

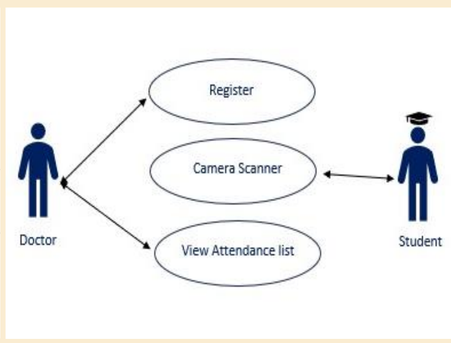
This Raspberry Pi-based IoT solution seamlessly captures faces in real-time, surpassing the limitations of conventional methods and prioritizing efficiency, privacy, error handling, and redundancy. The system ensures a reliable and user-friendly experience by eliminating manual data storage, employing OTP-protected communication, and incorporating backup measures. Our forward-thinking approach not only enhances accuracy and fairness but also establishes a benchmark for the future of attendance systems, showcasing the potential of technology in education. As we redefine the attendance tracking experience, we envision a future where advanced technology seamlessly blends with user-friendly interfaces, creating a more streamlined and innovative experience for both students and instructors in Egyptian universities.

05 SYSTEM FEATURES



Multiple faces recognition in single frame





	A	B
1	student ID	Date
2	202000440	Sunday, December 31, 2023 11:53 AM
3	202000597	Sunday, December 31, 2023 11:53 AM
4	202000674	Sunday, December 31, 2023 11:54 AM
5	202001762	Sunday, December 31, 2023 11:54 AM
6	202000799	Sunday, December 31, 2023 11:54 AM
7	Attendance rate	5/6

Mohamed Essawey Esraa Negm Rawan El-framawy Samaa Maged Asmaa El-Maghraby Amira El Sharaby

Face Recognition based Smart Attendance system. (2020, June 1). IEEE Conference Publication | IEEE Xplore.

IoT based Automatic Attendance Management System. (2017). IEEE Conference Publication | IEEE Xplore.

Ali, W. A., N, M. K., & Darem, A. (2023). IoT-BASED AUTOMATED ATTENDANCE SYSTEM USING RASPBERRY PI3.