E-PROCEEDINGS

INTERNATIONAL TINKER INNOVATION & ENTREPRENEURSHIP CHALLENGE (i-TIEC 2025)

"Fostering a Culture of Innovation and Entrepreneurial Excellence"

23 January 2025
PTDI, UiTM Cawangan Johor
Kampus Pasir Gudang

ORGANIZED BY:

Electrical Engineering Studies, College of Engineering
Universiti Teknologi MARA (UiTM) Cawangan Johor
Kampus Pasir Gudang
https://tiec-uitmpg.wixsite.com/tiec

e ISBN 978-967-0033-34-1

9 789670 033341

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e ISBN: 978-967-0033-34-1

Published in Malaysia by
Universiti Teknologi MARA (UiTM) Cawangan Johor
Kampus Pasir Gudang, 81750 Masai

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A-ST097: IOT-BASED STUDENT E-ATTENDANCE MANAGEMENT SYSTEM

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ABSTRACT

An IoT-based Attendance System report using an Esp-32 microcontroller reveals an ultrasonic sensor, RFID reader, and fingerprint sensor integration. The ultrasonic sensor on the other hand picks out a person's presence to start the system so that energy conservation is honored by activating only one component at a time when the load demands it. The user verifies / authenticates the ID cards using the RFID reader, and the fingerprint sensor provides biometric verification. An LED screen displays user IDs, authentication status, and other relevant information in real-time. A Wi-Fi module is used to transfer live data to a central server for remote monitoring and control, and the attendance register is saved in an external module storage. The Proteus simulation platform, through which the system is developed, flexibly collects and processes sensor data as a means to control attendance. Beside ultrasonic activation as well, card authentication and biometric verification, are all combined to provide more advanced level security measures, reliability, and give the infrastructure efficient power consumption in the attendance management area.

Keywords: RFID Reader, Fingerprint Sensor, Microcontroller

1. Product Description

This Iot-Based Student E-Attendance Management System is an IoT based biometric attendance tool, which takes attendance management to the next level. Using RFID, fingerprint scanning, and ultrasonic sensors, this system records the presence of students without having to do manual roll call saving time and reducing clerical work. With excel, you receive immediate attendance updates, full reports, and mobile application support for remote access and monitoring. Excel helps educational institutions streamline and transform their attendance tracking processes, thereby improving accuracy, driving efficiency, and supporting accountability.

2. Pictures and Flow Charts

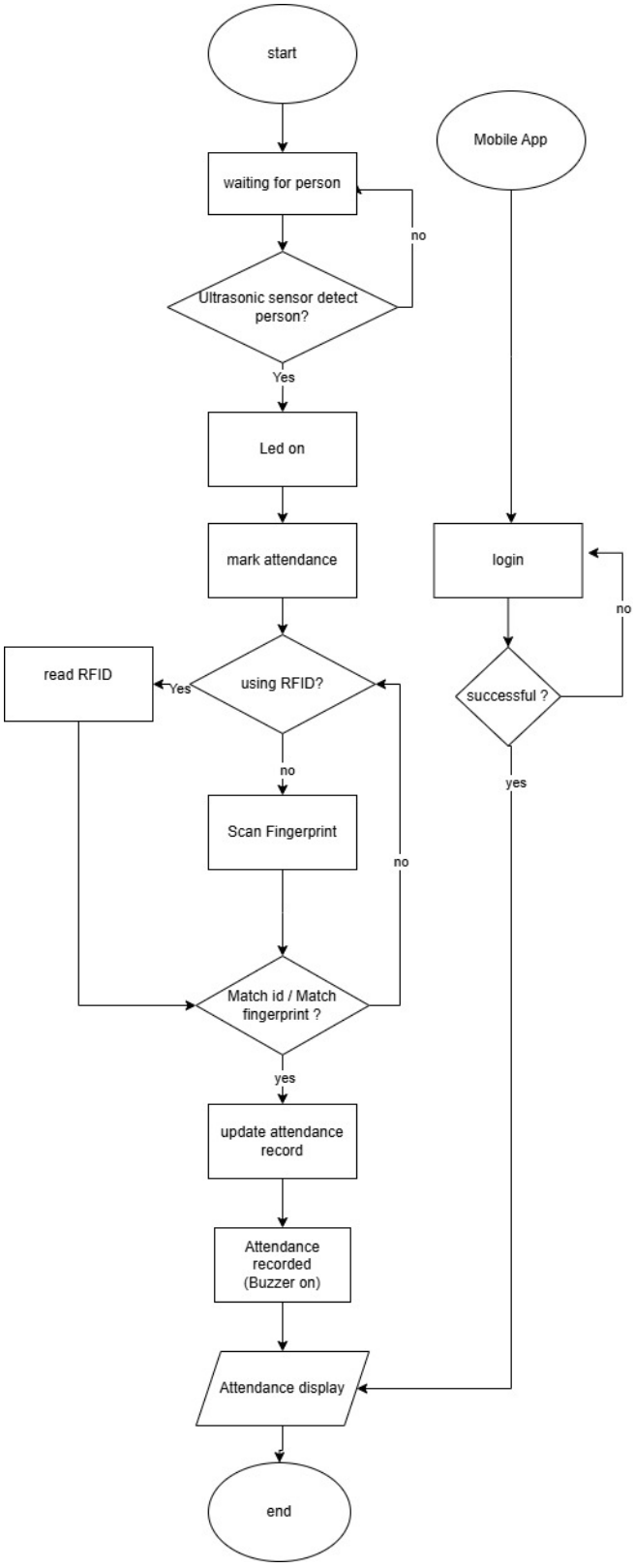
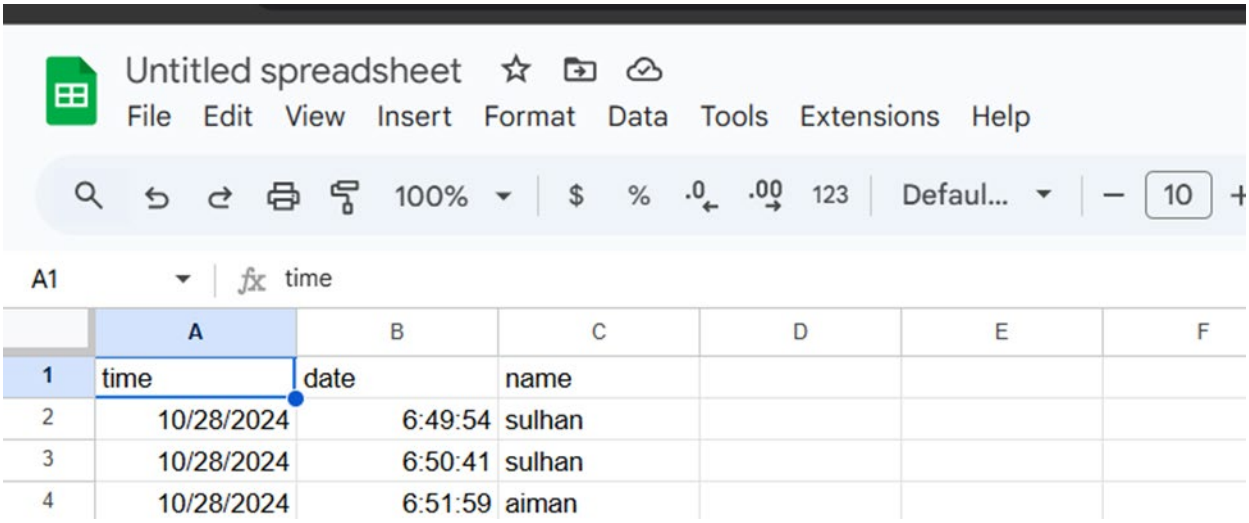


Figure 1. Flowchart Model



Untitled spreadsheet

File Edit View Insert Format Data Tools Extensions Help

100% $ % .0 .00 123 Defaul... 10

A1 time

	A	B	C	D	E	F
1	time	date	name			
2	10/28/2024	6:49:54	sulhan			
3	10/28/2024	6:50:41	sulhan			
4	10/28/2024	6:51:59	aiman			

Figure 2. App System

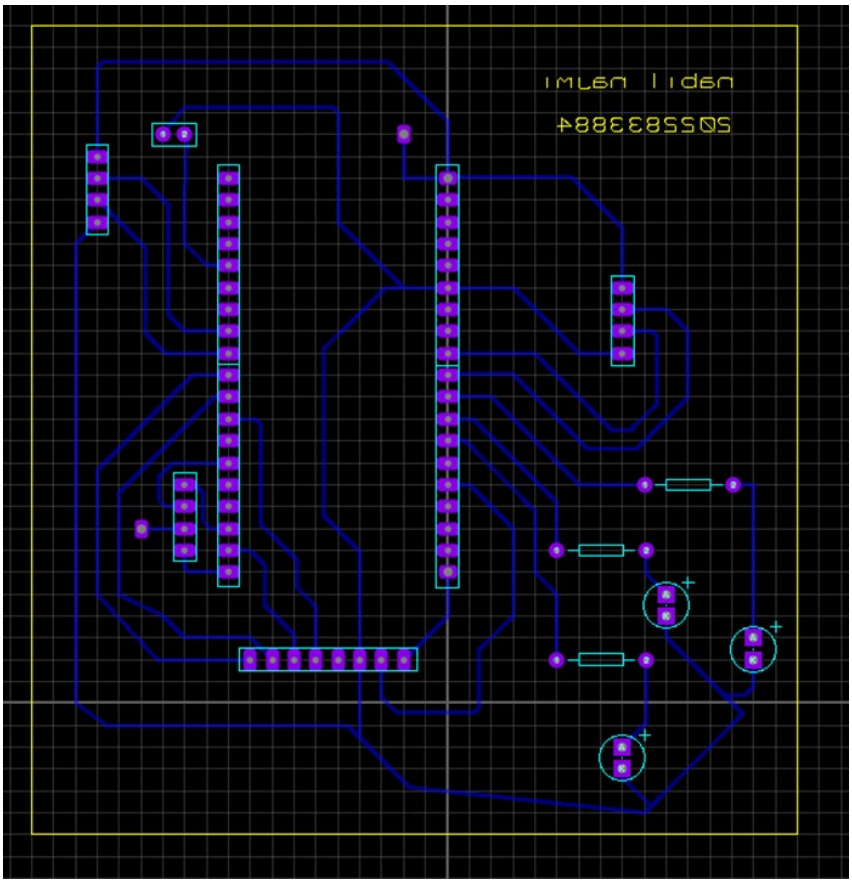


Figure 3. PCB Layout

3. Novelty and uniqueness

An innovative aspect of this project is the multi-sensory approach to student attendance. Traditional systems are either manual or depend on a single source or sensor of

technology inputting data, but the proposed system combines various technologies like Ultrasonic Distance Sensors, RFID readers, and Fingerprint Scanner to provide a better analysis of student attendance. In addition, integrating the system with a mobile application that enables real-time data access and remote monitoring sets it apart from traditional attendance systems. Having access to this data in real-time allows educators and administrators to understand when students are attending and how consistently they do it to encourage better student engagement proactively. This novel blend of cutting-edge sensors, live data processing, and mobile accessibility is a substantial leap forward in student attendance tracking, delivering a far more effective, precise, and convenient alternative for educational establishments.

4. Benefit to mankind

This system provides accurate and timely attendance tracking, this system greatly improves educational outcomes. This accelerates student ownership and enables a deeper focus on student learning and support by educators. Real-time data on students' attendance patterns allows educators and administrators to spot potential issues, such as absenteeism or disengagement, early. Such data can then be utilized to execute interventions that are targeted at student academic success, for example, academic counseling or additional support programs. Additionally, by offering accurate attendance records that can be used to track student progress, monitor school performance, and ensure equitable access to education for all students, the system facilitates transparency and accountability in the educational sector.

5. Innovation and Entrepreneurial Impact

Packed with features and an innovative multi-sensorial approach involving Ultrasonic Distance Sensors, RFID readers, and Fingerprint Scanners, this system stands tall against conventional attendance systems that follow one-sensor technology. Multimodal biometric approaches are more robust, accurate, reliable, and secure than single-modal solutions since they overcome the limitations of single-sensor solutions. Furthermore, a mobile application will offer secure access to real-time data, enabling remote monitoring wherever you are, which is a major technological advancement, allowing teachers and administrators to have more convenience and flexibility in managing your attendance data. This will act as a stepping stone for some revolutionary start-ups in the Edu-Tech area. It is not just a system that can be further developed and commercialized but also caters to the needs of schools and educational institutions worldwide. This promotes entrepreneurship and fuels innovation in the education sector.

6. Potential commercialization

The system can provide a cloud-based SaaS solution and help educational institutions to have a flexible and cost-effective way to access the platform. Thanks to this feature, the system can adjust with demands and needs of different educational institutions like schools, colleges, and universities. The app can be scaled up to new classes for items such as auto report generation, integration with school management systems, advanced

analytics for data insights. If built to the education sector's evolving needs, this system could emerge as an effective and commercially successful product.

7. Acknowledgement

First and foremost, I would like to express my deepest gratitude to my supervisor, Madam Norbaiti Sidik and the whole team for their invaluable guidance, unwavering support, and continuous encouragement throughout the course of my final year project. Their insightful suggestions, constructive feedback, and patience have been instrumental in shaping this project into its final form. I would also like to extend my sincere thanks to the Electrical Engineering Studies, College of Engineering, Universiti Teknologi MARA, Johor Branch, Pasir Gudang Campus for providing the necessary resources, facilities, and an academic environment that greatly facilitated my research and learning.

8. Authors' Biography

Nabil Najmi Bin Mohammed Idrun currently is studying in Electrical Engineering for obtaining diploma from UiTM with a strong interest in the intersection of electrical engineering and computer science. He is particularly fascinated by the application of coding and machine learning algorithms to solve real-world electrical engineering challenges, such as optimizing power grid operations and developing smart energy solutions. Nabil actively seeks opportunities to enhance his skills in areas like proteus, data analysis, and electrical circuit design, demonstrating a strong foundation and a keen interest in advancing his knowledge in these fields.

Mrs. Norbaiti Sidik is a Senior Lecturer at Universiti Teknologi MARA, Johor Branch, Pasir Gudang Campus with over 15 years of teaching experience. She earned a Bachelor of Engineering in Electrical, Electronics & Systems, and a Master of Engineering in Communication and Computer from Universiti Kebangsaan Malaysia. Her educational journey began at SK Batu Lima, Sik Kedah, followed by Maktab Mahmud Alor Setar, and Science Matriculation Centre in Ipoh. Known for her dedication, she specializes in Electrical Engineering Studies.

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Dr. Nor Affida M. Zin is a Senior Lecturer at UiTM Pasir Gudang Campus. She holds a Ph.D in Advanced Optical Networking, focusing on deterministic and time-sensitive services in Passive Optical Network (PON). She has authored numerous high-impact journal articles and conference papers on PON technology. She is actively collaborating with academia and industry to enhance PON frameworks and developments in Malaysia.