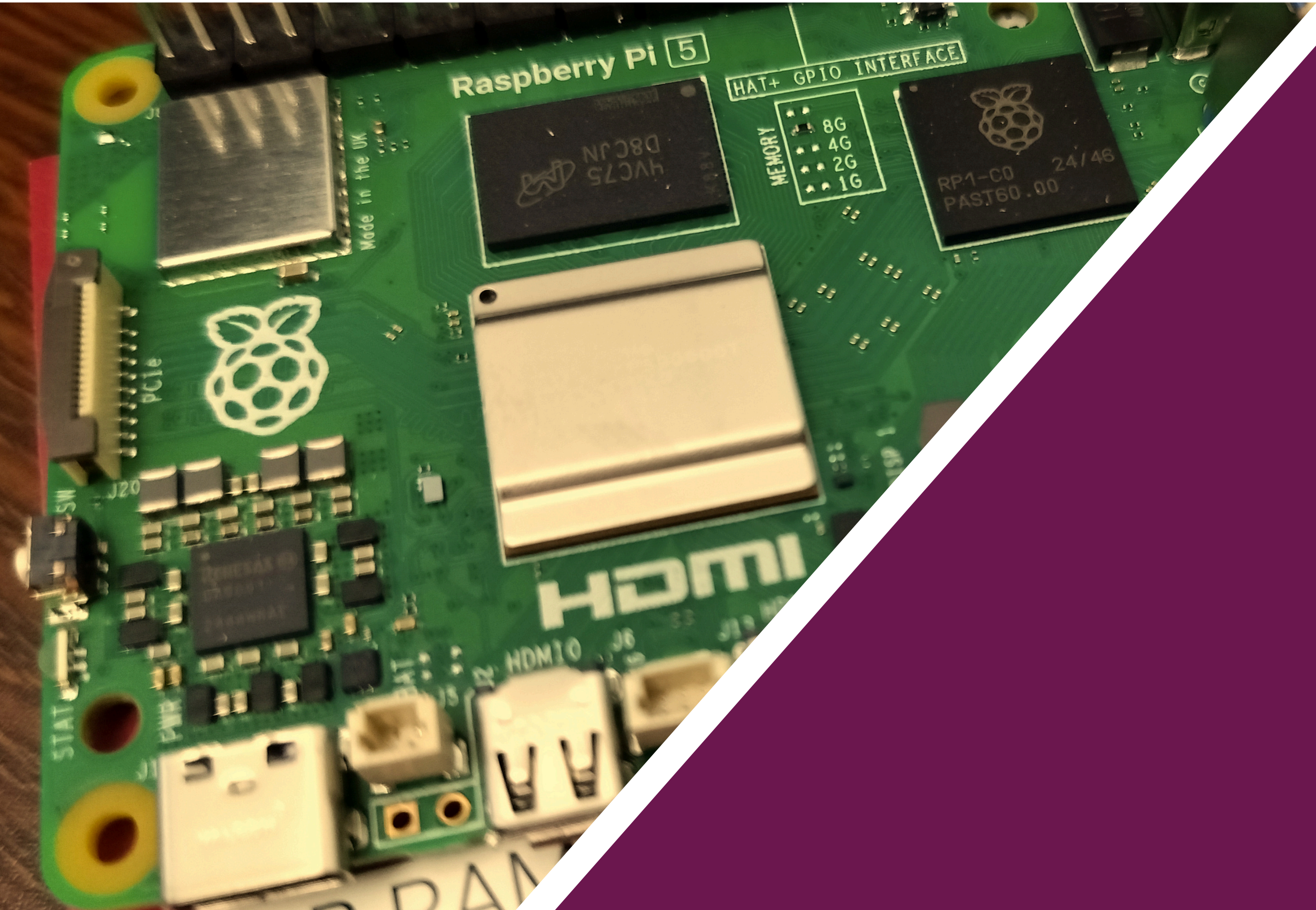




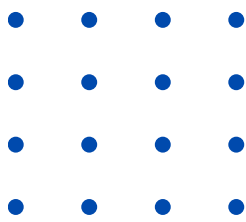
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EESEE 2025

10TH ELECTRICAL ELECTRONICS SYSTEMS
ENGINEERING EXHIBITION 2025
VOLUME 1



FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
JOHOR BRANCH
PASIR GUDANG CAMPUS



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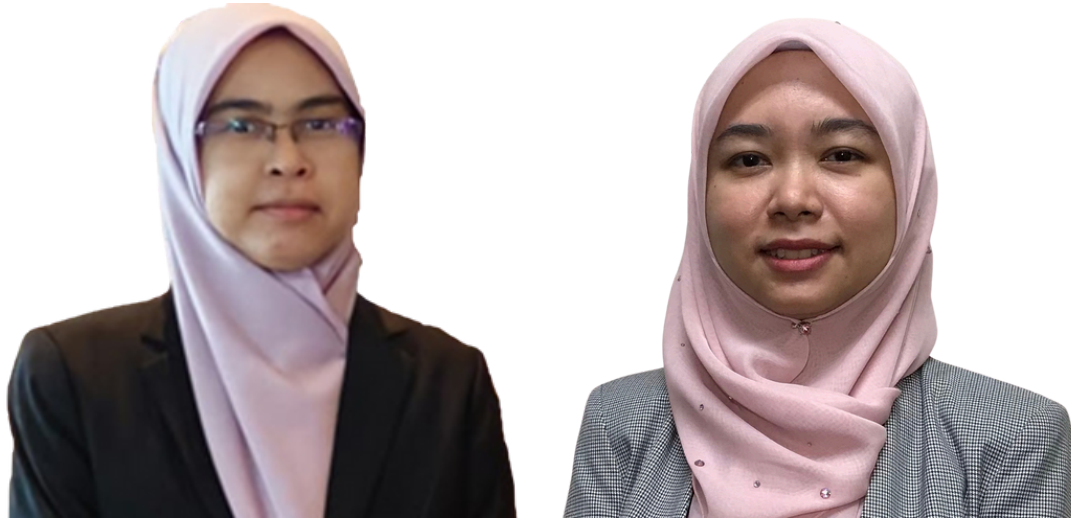
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FOREWORD BY THE PROGRAM CHAIR



Greetings from the Electrical, Electronics, and Systems Engineering Exhibition 2025 (EESEE 2025).

As the Program Chairs, it is our great pleasure to present this compilation of extended abstracts, showcasing the remarkable projects developed by our final-semester students from the Diploma in Electrical Engineering (Power) and Diploma in Electrical Engineering (Electronics) programs at Universiti Teknologi MARA, Cawangan Johor, Pasir Gudang Campus.

This exhibition marks a significant milestone in our students' academic journey, representing the culmination of years of dedication, perseverance, and learning. It also serves as an essential step toward the successful completion of their diploma studies. The projects featured this year are centered on the theme *Engineering Excellence: Bridging Technology and Life*, reflecting current trends and innovations in the engineering field.

This extended abstract book highlights not only the students' technical expertise but also their creativity, problem-solving skills, and ability to engage meaningfully with peers and industry professionals. Within these pages, you will find a diverse range of projects that embody a unique blend of knowledge, innovation, and practical application.

We warmly invite you to explore this collection, which celebrates the achievements of our aspiring engineers. Welcome once again to the Electrical, Electronics, and Systems Engineering Exhibition 2025. May the insights shared here inspire and pave the way for the next generation of innovative engineers.

Warm regards,

Dr. Fatimah Khairiah binti Abd Hamid

Dr. Atiqah Hamizah binti Mohd Nordin

Program Chairs

Electrical, Electronics, and Systems Engineering Exhibition 2025 (EESEE 2025)



Rent And Safety Enforcement Helmet

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ABSTRACT

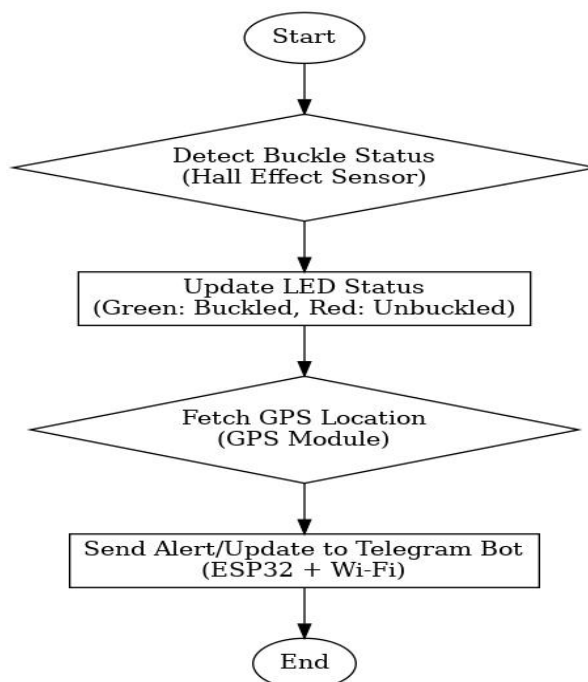
This project aims to develop a comprehensive smart helmet safety system combining advanced technologies to ensure secure usage and real-time monitoring. The system integrates a Hall effect sensor, magnetic coins, LEDs, Arduino Uno, GPS, ESP32, and a Telegram bot to detect whether the helmet is securely buckled and provide location tracking. The Hall effect sensor identifies the magnetic field from the buckle, triggering LEDs to indicate the status—green for securely fastened and red for unfastened. Additionally, the ESP32 interfaces with a GPS module to track the user's real-time location, sending updates and safety alerts via a Telegram bot. If the helmet is not properly buckled or an emergency occurs, the system notifies the user or concerned personnel. This cost-effective and user-friendly solution demonstrates the potential of IoT and embedded systems to enhance safety for applications in transportation, construction, and sports.

KEYWORDS: Helmet Safety, Hall Effect Sensor, GPS, ESP32, Arduino Uno

PRODUCT DESCRIPTION

Helmets are essential for ensuring safety in activities like motorcycling, construction, and sports. Despite their critical role, improper use of helmets, such as failing to buckle them securely, often compromises their effectiveness. This project introduces a smart helmet safety system that combines a Hall effect sensor, magnetic coins, LEDs, Arduino Uno, GPS, ESP32, and a Telegram bot. The system not only detects whether the helmet is properly buckled but also provides location tracking and real-time alerts. By merging IoT and sensor-based technologies, this project addresses the need for innovative safety solutions in a user-friendly and cost-effective manner.

PICTURES/ SCHEMATIC DIAGRAMS/ FLOW CHARTS/SCREENSHOTS/ GRAPHS AND OTHER RELATED VISUALS



NOVELTY AND UNIQUENESS

This project uniquely combines two critical safety aspects—buckle detection and real-time location monitoring—into a single, efficient system. The integration of a Hall effect sensor for buckle detection and GPS with an ESP32 for communication via Telegram bot enhances both safety and convenience. Unlike conventional helmet systems that focus solely on impact detection, this system ensures proactive safety by verifying proper usage and providing location-based alerts, making it a novel approach in smart helmet technology.

BENEFIT TO MANKIND

The smart helmet system addresses the global concern of safety in activities such as motorcycling, construction, and sports. By ensuring helmets are properly buckled and providing real-time alerts and location tracking, it reduces the risk of injuries caused by improper helmet usage. In emergency situations, the system's location-sharing capability can expedite response times, potentially saving lives. This project empowers users with technology that promotes safety and accountability.

COMMERCIALIZATION POTENTIAL

The smart helmet safety system has strong commercialization potential due to its practical applications across multiple industries. It can be marketed to motorcyclists, construction companies, and sports organizations as an affordable and efficient safety solution. Its ability to integrate with existing helmet designs ensures ease of adoption. By targeting markets with high safety regulations and raising awareness about helmet compliance, the system can achieve significant market penetration and profitability.

CONCLUSION

The smart helmet safety system developed in this project successfully integrates advanced technologies to enhance safety and usability. By combining a Hall effect sensor for buckle detection, GPS for real-time location tracking, and a Telegram bot for instant alerts, the system addresses critical safety concerns in various applications, such as motorcycling, construction, and sports.

The project demonstrates how IoT and embedded systems can be harnessed to create a cost-effective, user-friendly solution that ensures helmets are securely fastened and provides timely notifications in case of emergencies or improper usage. The dual functionality of buckle detection and location tracking enhances its practicality and adaptability.

This system represents a significant step towards promoting safe helmet usage and reducing preventable injuries. Its scalability and potential for customization make it a promising candidate for commercialization, contributing to the broader goal of improving personal safety through technology.

REFERENCES (*OPTIONAL, MAXIMUM 6 RELEVANT REFERENCES)

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