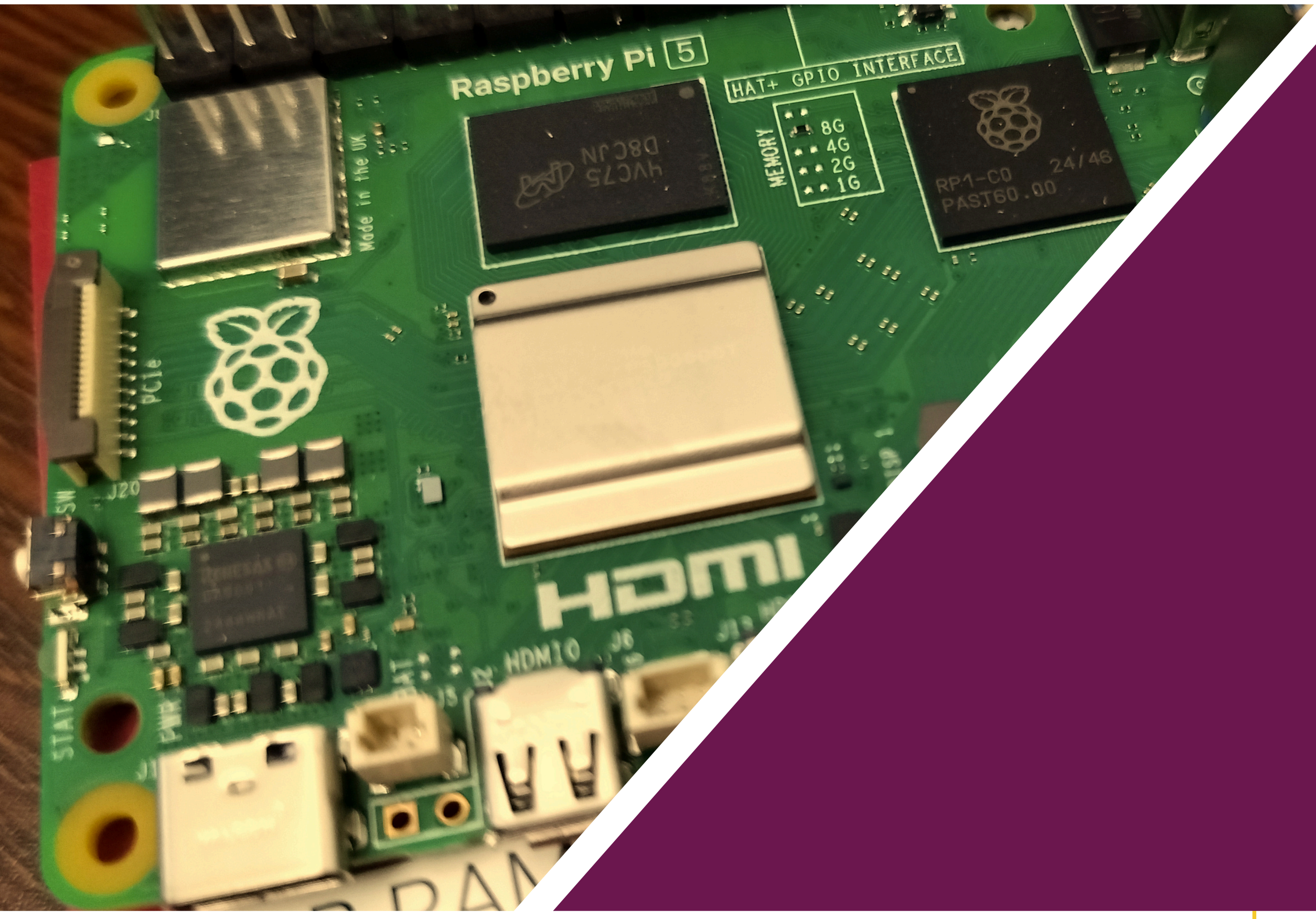
UNIVERSITI TEKNOLOGI MARA

EESEE 2025

10TH ELECTRICAL ELECTRONICS SYSTEMS ENGINEERING EXHIBITION 2025

VOLUME 1



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UNIVERSITI TEKNOLOGI MARA
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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)

The Distribution Box Overheat Monitoring System

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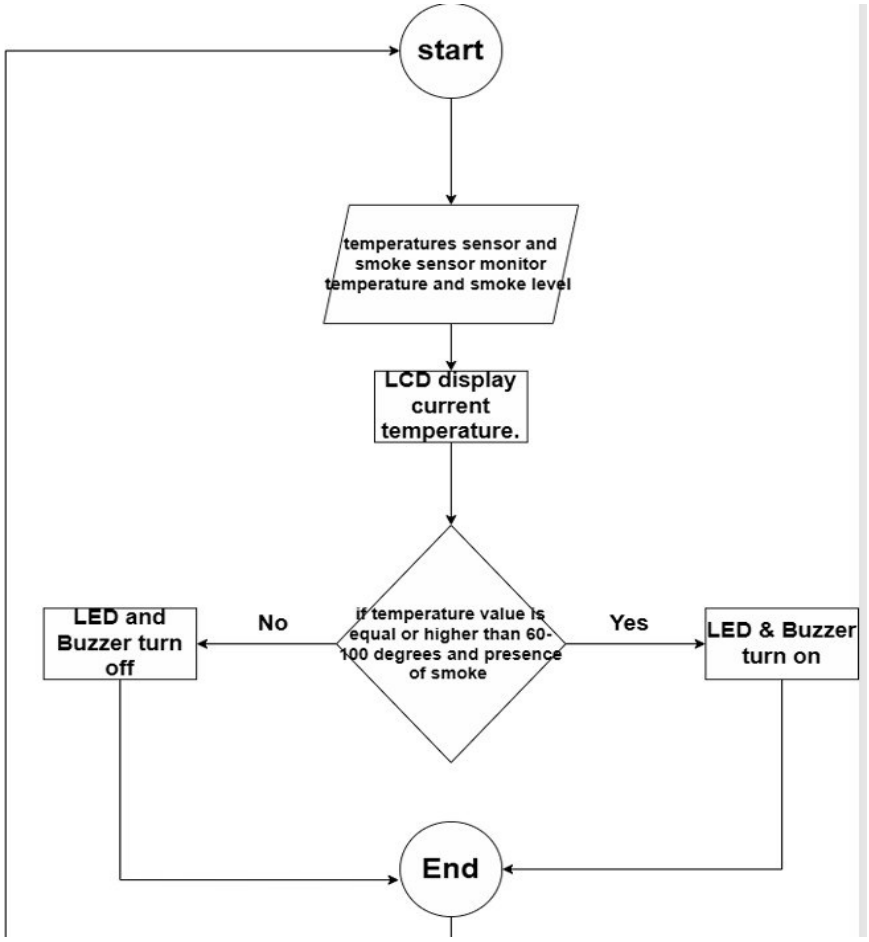
ABSTRACT

In industrial settings, electrical distribution boxes are necessary for power distribution and control. They are at risk for overheating, though, which brings a risk to safety as well as the potential for equipment failure and downtime. In order to solve this problem, this project develops the construction of an Arduino-based overheat monitoring system. Heat and smoke within distribution boxes will be continuously monitored by the system due to the combination of temperature sensors, smoke sensors, and an Arduino microcontroller. When temperature rises from a predetermined level, or smoke is detected the system will alert the operator by sounding the buzzer and blinking the light emitting diode (LED). In addition, Liquid Crystal Display (LCD), will provide continuous status updates, while the system can be manually controlled by switch. By minimizing overheating-related issues and guaranteeing continuous and safe operations, this comprehensive real-time monitoring and automated response system will improve the dependability and safety of electrical distribution systems.

KEYWORDS: overheat monitoring system, electrical distribution box, home safety.

PRODUCT DESCRIPTION

The Electrical Distribution Box Overheat Monitoring System is a progressive safety application made to guard against circuit breaker failures, smoke accumulation, and overheating in electrical distribution systems. A temperature sensor, smoke sensor, LCD display, LED indication, buzzer, manual reset switch, and parts are integrated with an Arduino microcontroller in this system to offer real-time alerts and continuous monitoring. The distribution box's temperature and smoke levels are measured by the system. The system automatically alerts users by activating the buzzer and LED if the temperature rises over a certain level, smoke is detected, indicating the circuit breaker malfunctions, enabling prompt action. The LCD shows real-time system status updates, making sure users are aware of all important circumstances. After resolving the issue, users can deactivate alerts and reset the system using the manual reset switch.A practical and efficient method to improve the security of residential electrical systems is with this monitoring system. It ensures the stable operation, safety, and durability of electrical systems by addressing the risks of smoke, overheating, and circuit breaker faults, hence reducing the potential of electrical fires and other hazards.



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

Methods used in preparing the samples are summarized as follow: Material Selection and Acquisition

The project's needed parts, including Arduino microcontrollers, circuit breakers, temperature sensors, smoke sensors, LEDs, buzzers, and LCD screens, were sourced and their compatibility and quality checked.

1. **Circuit Assembly**

The designed schematic was followed when integrating the hardware components. Using jumper wires, breadboards, and soldering procedures as needed, connections were made between the Arduino board, sensors, and output devices.

2. **Programming**

The Arduino IDE was used to program the Arduino microcontroller. The code contained algorithms for gathering sensor data, processing it, and sending out signals when certain thresholds were reached.

3. **Testing and Calibration**

Simulations were used to test the system. To ensure exact temperature and smoke level detection as well as output responses (buzzer, LED, and LCD).

4. **Error Identification and Debugging**

Any problems that developed during programming or assembly were fixed by over time debugging,

improving the code, and modifying the hardware configuration.

NOVELTY AND UNIQUENESS

With its new options, the Electrical Distribution Box Overheat Monitoring System was designed to improve electrical safety. It includes several sensors, such as a smoke and temperature sensor, and shows real-time data on an LCD. In addition to providing instant alerts through an LED and buzzer, the system also has a manual reset feature for ease of usage. It is unlike traditional methods due to a focus on identifying circuit breaker failures and its affordable scalability through the use of Arduino. This general method is a unique and significant addition to electrical safety systems since it guarantees accurate hazard detection and prevention.

BENEFIT TO MANKIND

By minimizing any electrical hazards the Electrical Distribution Box Overheat Monitoring System enhances safety in residential environments. It assists in identifying overheating, smoke, and circuit breaker malfunctions before they become major problems like fires by offering real-time temperature and smoke level monitoring. By reducing hazards to people and property, this approach makes the environment safer. Because of its flexibility and cost, it may be used widely, encouraging safer electrical installations all around the world. By warning users of problems early on and encouraging proactive management of electrical systems, it also helps to lower maintenance costs and downtime.

COMMERCIALIZATION POTENTIAL

The system's scalability enables adjustment for a range of settings, from massive industrial panels to tiny home distribution boxes. This product can be positioned as an essential safety device given the growing demand for smart monitoring systems, regulatory compliance requirements, and worldwide awareness of electrical safety. Working together with utility providers, building contractors, and electrical manufacturers could expand its market reach and make it a product that can be widely adopted.

CONCLUSION

The Electrical Distribution Box Overheat Monitoring System is an economical and practical way to improve electrical safety. It efficiently detects overheating, smoke, and circuit breaker failures by combining temperature and smoke sensors with real-time warnings and monitoring. Despite coding difficulties, the system shows great promise in reducing property and life hazards, making it a useful instrument for both home and commercial use.

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