

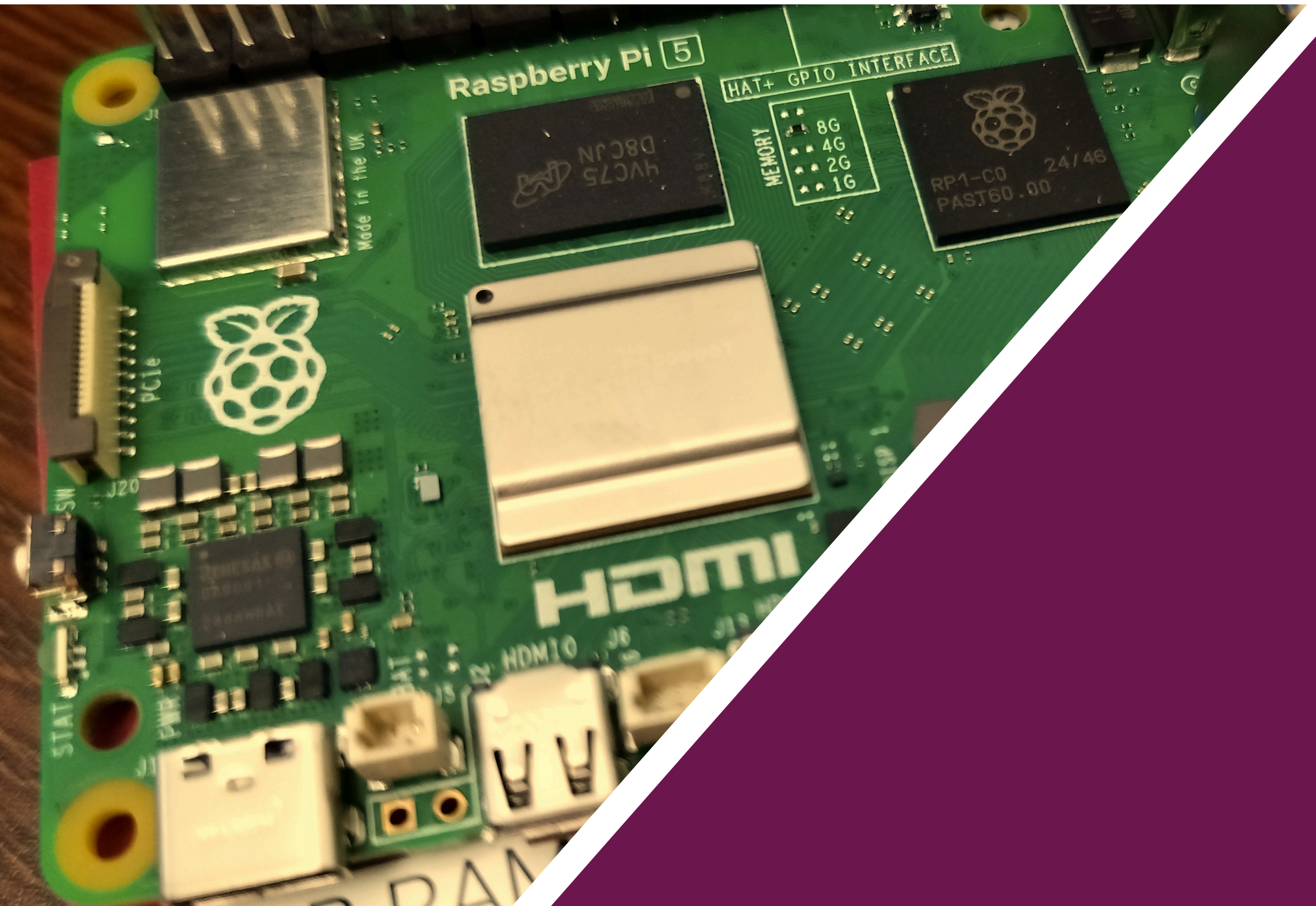


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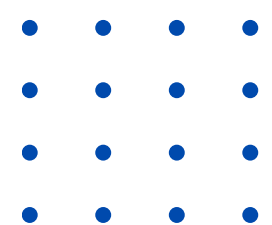
# EESEE 2025

## 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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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 Thermal Overload Alert System

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### ABSTRACT

The Thermal Overload Alert System is an innovative solution designed to mitigate the risks of overheating in electrical machinery such as motors, transformers, and generators. Overheating poses significant threats, including insulation damage, efficiency loss, operational downtime, and safety hazards. This system incorporates advanced sensors for temperature, vibration, and current monitoring, coupled with Arduino-based processing for real-time analysis and proactive responses. The system features multi-modal alert mechanisms, including LEDs for visual indicators, a buzzer for auditory alarms, and an LCD display for precise parameter readings. A GSM module extends functionality by enabling remote notifications, ensuring timely interventions and enhanced reliability. This user-friendly design facilitates effective hazard mitigation. Developed using simulation-driven methodologies, the system enhances machinery performance through continuous monitoring and predictive maintenance, reducing downtime and maintenance costs while extending equipment lifespan. An innovative zoning framework categorizes operating conditions into safe, caution, and danger zones, promoting operational safety and efficiency. The emphasis on sustainability is evident in the system's ability to minimize energy waste and prevent equipment failures. Its modular and scalable design supports cost-effective customization and seamless integration into a variety of applications, from small-scale operations to complex industrial setups. By addressing critical challenges in machinery management, the Thermal Overload Alert System sets a benchmark for safety, efficiency, and sustainability. It provides a robust, eco-friendly solution that safeguards machinery, protects human lives, and reduces environmental impact. This system holds significant promise for widespread adoption and future advancements in smart industrial technologies.

**KEYWORDS:** Temperature sensor,safety hazards,LEDs,Buzzer,LCD display,Vibration sensor

### PRODUCT DESCRIPTION

The Thermal Overload Alert System is one of the new solution designs in the protection of electrical machinery from overheating, which is usually a factor compromising efficiency, damaging insulation, and even involving some elements of safety. It also includes advanced sensors used in temperature, vibration, and current sensing, with a processing unit based on Arduino for real-time monitoring and proactive alerting of users in case of impending damage. Equipped with multi-modal alert mechanisms, this system issues warnings through LEDs for visual alerts, a buzzer for auditory alerts, and an LCD display for accurate temperature readings. In addition to this, the GSM module would send notifications even from remote locations for timely interventions. By developing this through simulation-driven design, it optimizes machinery performance, prolongs equipment life, cuts down maintenance costs, and advances safety and sustainability. The intelligent design and advanced functionality raise the bar in terms of effective management and protection against electrical machinery.

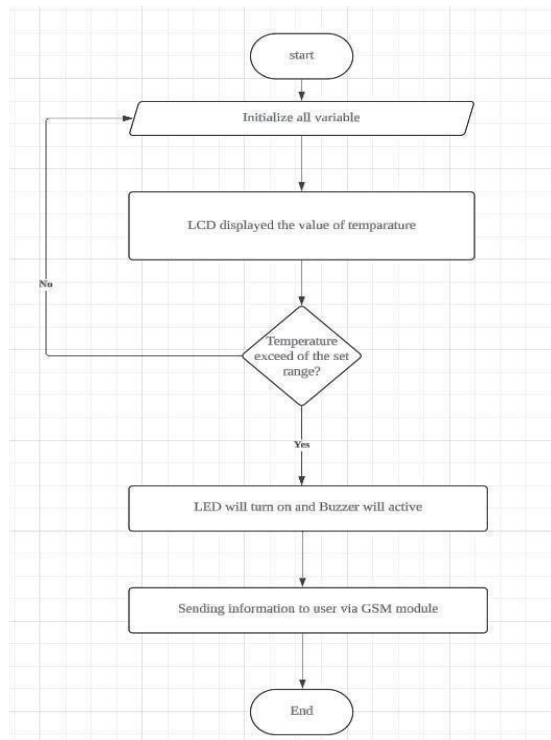
**PICTURES/ SCHEMATIC DIAGRAMS/ FLOW CHARTS/ SCREENSHOTS/ GRAPHS AND OTHER RELATED VISUALS**


Figure 1 flow chart of thermal overload alert

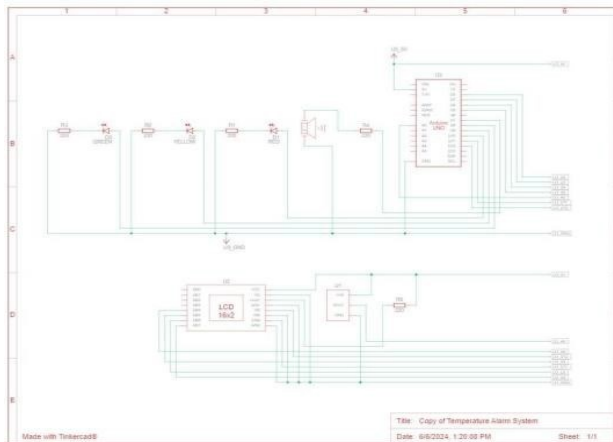


Figure 2 schematic diagram

**NOVELTY AND UNIQUENESS**

The Thermal Overload Alert System is new and special in tackling the critical problem of overheating in electrical machinery by integrating advanced technologies. It differs from all other conventional systems in applying a combination of temperature, vibration, and current sensors for comprehensive and precise real-time monitoring. It uses Arduino-based processing for seamless control and interpretation of data in order to proactively approach maintenance and safety. With its multi-modal alert mechanisms that include LEDs, a buzzer, an LCD display, and a GSM module, this system stands out for immediate and remote notifications. The intelligent zoning system that categorizes operating conditions into safe, caution, and danger zones makes the system user-friendly and efficient. Moreover, development and validation were performed through Tinkercad simulation, making it reliable and practical. It combines sustainability, efficiency, and safety, raising the bar with regard to protection for electrical machinery and pointing toward innovative solutions with the potential for

generalization in industry.

### BENEFIT TO MANKIND

The Thermal Overload Alert System offers many advantages to humanity in improving safety, efficiency, and sustainability in industries and day-to-day applications. By preventing overheating in electrical machinery, it reduces risks of fire, electrical hazards, and equipment failure, thus making for safer workplaces and protection of human life. Proactive monitoring by the system reduces costly downtimes and maintenance, hence improving operational efficiency and contributing to economic savings. Its intelligent design promotes eco-friendliness by considering the optimization of energy consumption, a longer life span of machinery, and waste reduction due to damaged equipment. By providing a more modern integration, the system introduces innovation towards smarter and more reliable industries. Finally, the Thermal Overload Alert System protects human lives, improves the quality of life, brings economic stability, and cares about the environment.

### COMMERCIALIZATION POTENTIAL

The Thermal Overload Alert System has tremendous potential for commercialization in manufacturing, power generation, and transportation industries that rely on electrical machinery. It offers solutions to the increasing demand for smart and sustainable industrial solutions, such as real-time monitoring, proactive alerts, and intelligent control. Accommodating a modular design that's cost-effective to build in blocks, such as using Arduino, sensors, and GSM modules, allows this system to be applied to various sized operations, from the most minute to the most industrially complex. Emphasizing safety, efficiency, and sustainability, the system addresses firms that want to meet some very stringent regulatory standards using the least operational costs as much as possible. It solves some very critical problems, like downtime, energy wastage, and safety hazards; hence, manufacturers, facility managers, and utility providers will make up the customer base for the system, which will become indispensable in modern industrial operations.

### CONCLUSION

The Thermal Overload Alert System is one milestone in electrical machinery protection and management. Advanced sensors, Arduino-based processing, and multi-modal alert mechanisms together help in real-time monitoring with proactive interventions that respond to overheating, operational inefficiencies, and safety hazards. Its intelligent design allows for optimization of the performance of machinery, reducing the maintenance cost and prolonging equipment life span with minimal energy waste in ways that are sustainable. Due to user-friendly features, the system has met stringent safety standards via simulation-driven development and raises the new standard in industrial and commercial use. Further refinement of this technology in the future and wider application could make a sea change in the use of electrical machinery by industries in general with safety, efficiency, and environmental concern.

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