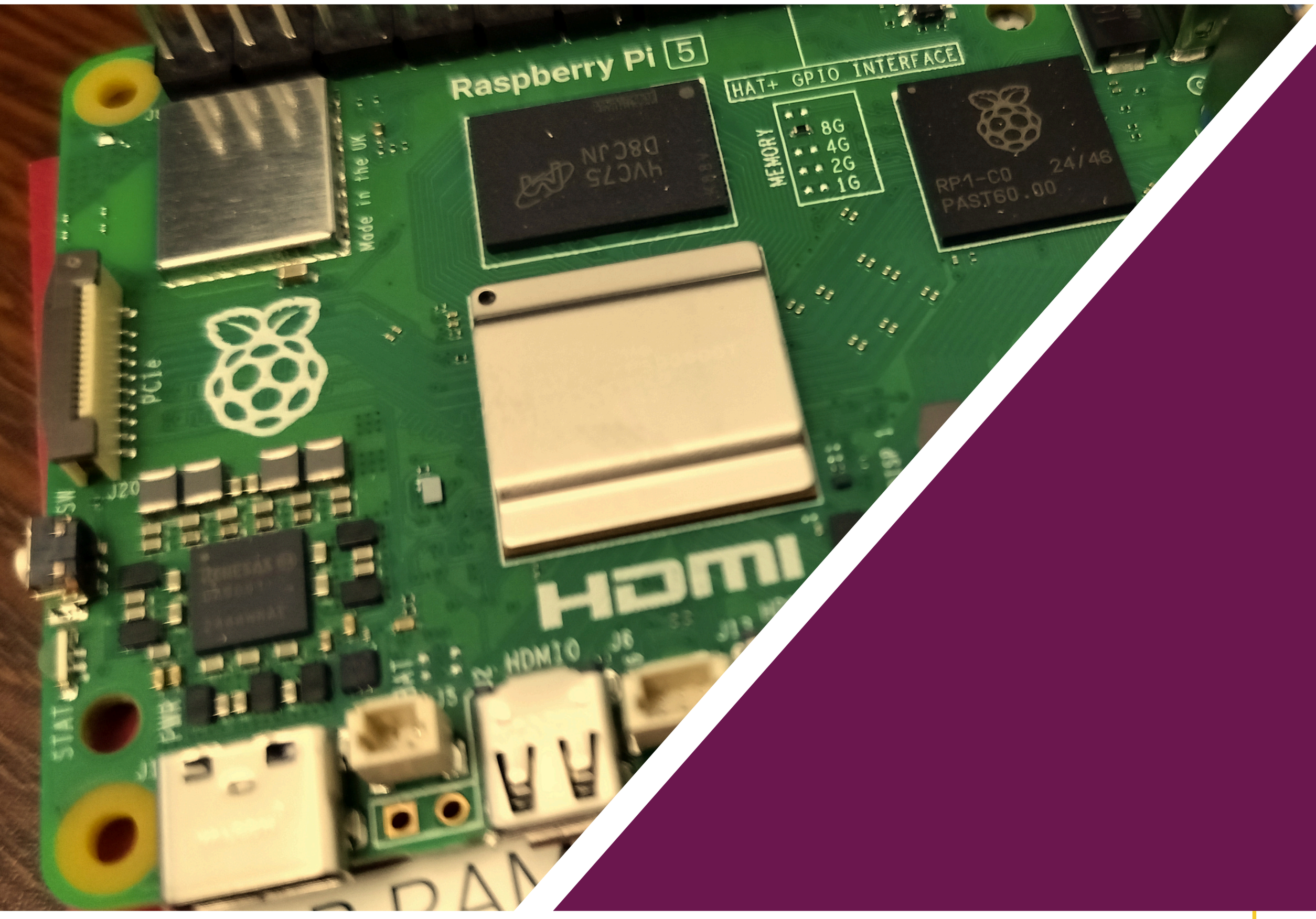
UNIVERSITI TEKNOLOGI MARA

EESEE 2025

10TH ELECTRICAL ELECTRONICS SYSTEMS ENGINEERING EXHIBITION 2025

VOLUME 1



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UNIVERSITI TEKNOLOGI MARA
JOHOR BRANCH
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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)

Solar Power Station for Portable Device Charging

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ABSTRACT

The Solar Power Station for Portable Device Charging is designed to provide an efficient and sustainable energy solution for charging electronic devices in various environments. This project harnesses solar energy through solar panels, converting sunlight into electricity that is stored in batteries for later use. The innovative addition of a cooling system ensures that the charging station operates within optimal temperature ranges, enhancing the performance and longevity of both the charging mechanism and the devices being charged.

The cooling system is activated by temperature sensors that monitor the internal environment of the power station. When temperatures exceed a predetermined threshold, a fan is triggered to dissipate heat, preventing overheating and ensuring safe operation. The system's performance is displayed on an LCD interface, providing real-time feedback on temperature and operational status, which enhances user interaction and monitoring capabilities.

This project not only addresses the growing need for renewable energy solutions but also improves device safety through active thermal management. The combination of solar energy technology and a cooling system positions this solar power station as a versatile solution for outdoor activities, emergency situations, and remote locations where access to conventional power sources is limited.

KEYWORDS: Solar Power Station, Portable Charging, Cooling System, Renewable Energy, Temperature Monitoring.

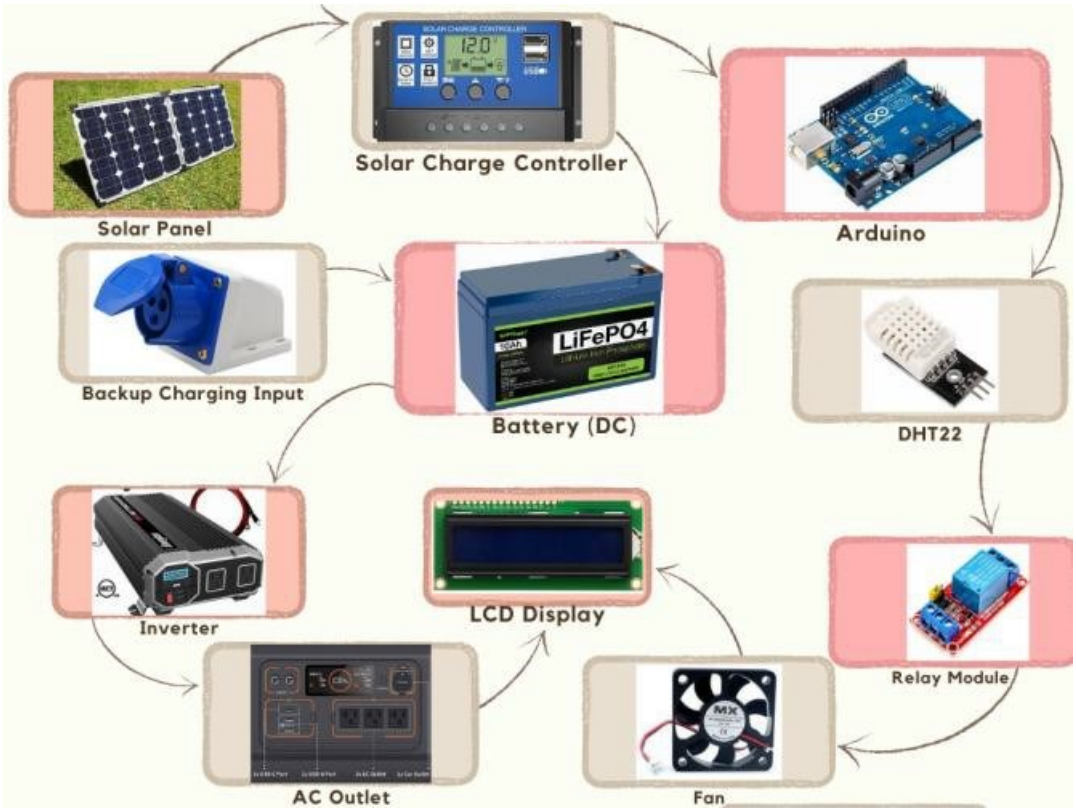
PRODUCT DESCRIPTION

The Solar Power Station is an innovative device designed for charging portable electronic devices using renewable solar energy. It features photovoltaic panels that capture sunlight and convert it into electrical energy, which is stored in batteries for later use. The addition of a cooling system ensures that the internal components remain within optimal operating temperatures, enhancing efficiency and preventing damage to sensitive electronics. The cooling mechanism consists of temperature sensors that continuously monitor the internal environment. When temperatures rise above a specified threshold, a fan activates to circulate air and dissipates heat. This proactive approach to thermal management not only prolongs the lifespan of the charging station but also protects connected devices from overheating.

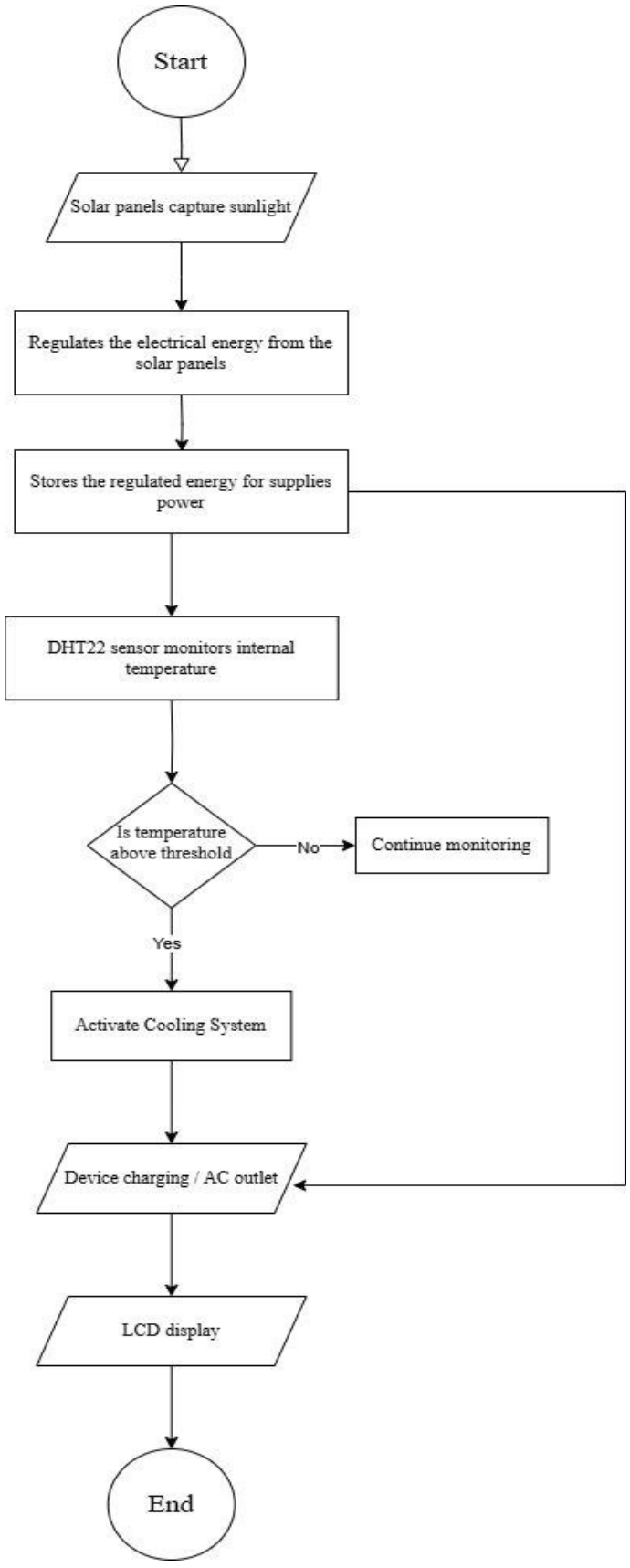
The user-friendly LCD interface displays real-time temperature readings and the operational status of the fan, providing users with immediate feedback on system performance. This integration of solar technology with active cooling represents a significant advancement in portable charging solutions.

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

Block Diagram



Flow Chart


Start
Solar panels capture sunlight
Regulates the electrical energy from the solar panels
Stores the regulated energy for supplies power
DHT22 sensor monitors internal temperature
Is temperature above threshold
No
Continue monitoring
Yes
Activate Cooling System
Device charging / AC outlet
LCD display
End

NOVELTY AND UNIQUENESS

The uniqueness of this project lies in its dual functionality: combining solar power generation with an active cooling system tailored for portable device charging. This innovative approach addresses common challenges associated with overheating in electronic devices while promoting sustainable energy practices. By integrating these technologies, this project offers a comprehensive solution that enhances user experience and device safety in various applications.

BENEFIT TO MANKIND

This solar power station significantly benefits society by providing a clean and renewable energy source for charging portable devices. It promotes environmental sustainability by reducing reliance on fossil fuels while offering a practical solution for outdoor enthusiasts, emergency responders, and individuals in remote areas. The integrated cooling system further enhances safety and reliability, making it an ideal choice for diverse applications.

COMMERCIALIZATION POTENTIAL

The commercialization potential of this solar power station is substantial due to its versatility across multiple markets. Key sectors include outdoor recreation (camping, hiking), emergency preparedness (disaster relief), and everyday consumer electronics. Its ability to operate independently of traditional power sources positions it favorably in an increasingly eco-conscious market focused on renewable energy solutions.

CONCLUSION

The Solar Power Station for Portable Device Charging represents a significant advancement in sustainable energy technology. By effectively managing heat while harnessing solar energy for device charging, this project addresses critical issues related to efficiency and safety. Future developments may focus on enhancing battery capacity, improving cooling efficiency, and expanding application scopes to further benefit users across various sectors. Continued research and development will be essential to refine this technology and maximize its impact on renewable energy solutions.

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