# 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
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# A-ST039: INTELLIGENT AUTOMATED CLOTH DRYING SYSTEM FOR HOME APPLICATION

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## ABSTRACT

The project is designed to address the inconvenience caused by Malaysia's unpredictable weather, which often disrupts the traditional process of drying clothes. This innovative system integrates IoT technology with a rain sensor, light sensor, and ultrasonic sensor, managed by an ESP32 microcontroller, to ensure efficient and automatic operation. The system activates a motorized mobile roof to protect clothes from rain and extends the hanger when sunlight is detected, providing an effective and user-friendly solution for busy individuals. This invention was driven by the need to provide a cost-effective, automated alternative to conventional cloth-drying methods, offering the dual benefits of convenience and resource optimization. The smart functionality of this project alerts users via the Blynk platform and allows remote control through a smartphone app. The integration of sensors and IoT ensures real-time adaptability to weather changes. The system's impact extends to improving household efficiency, reducing water wastage from re-washing wet clothes, and supporting sustainable living. With its scalable design, low-cost components, and broad appeal, this project holds strong commercialization prospects, particularly in urban and semi-urban markets. It shows a practical solution with significant socio-environmental and economic benefits.

**Keywords:** Automated cloth drying, home appliances, intelligent system, IoT

## 1. Project Description

The automated cloth drying system is an innovative solution designed to revolutionize laundry care by offering convenience, efficiency and adaptability in modern households. This smart system addresses common challenges in laundry management, such as sensor accuracy, user customization, space constraints, and environmental impact, making it an essential addition to home automation technologies. Equipped with water, light, and ultrasonic sensors, the system ensures precise detection of environmental conditions, such as rainfall, sunlight, and proximity, to optimize drying processes. An ESP32 Wi-Fi module forms the backbone of this smart hanger, enabling automated adjustments and remote monitoring through the Blynk platform. Key features include an LCD display for real-time updates, a DC motor for automated retraction and extension, and an LED alert system for user notifications. Compact and space-efficient, this automated hanger is ideal for urban homes, offering a sustainable solution through its use of recyclable materials and energy-efficient components. Users can enjoy a highly customizable experience as the system learns

and adapts to individual preferences, minimizing manual adjustments. By leveraging IoT technology, the system provides seamless control over critical parameters like water presence, temperature and drying distance, ensuring optimal fabric care while significantly enhancing the user experience.

## 2. Block Diagram and Flowchart of The Project

This block diagram illustrates in **Figure 1** is a microcontroller-based system, with the central component being an ESP32 module. Inputs are depicted on the left side, connecting to sensors or devices that supply data to the microcontroller. Outputs are shown on the right, representing actuators, displays, or other devices that receive signals from the ESP32. The bottom block likely represents power supply or communication interfaces, such as USB or external connections. The design highlights the ESP32's role in processing inputs and controlling outputs in an IoT or embedded application.

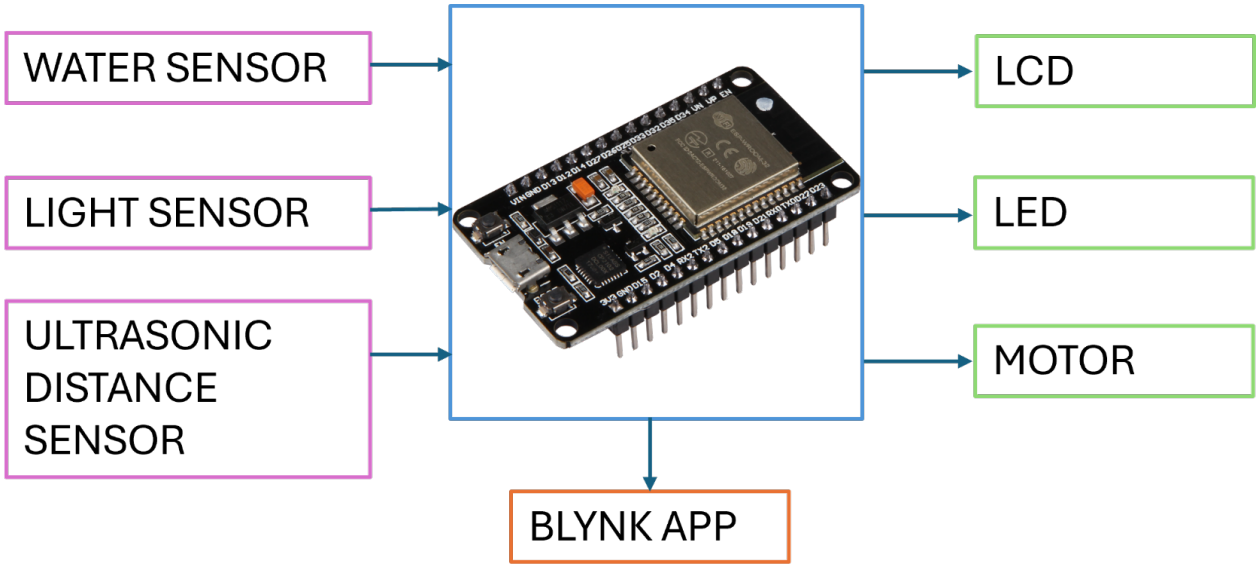


**Figure 1.** Block diagram of the automated cloth drying system

**Figure 2** shows the flowchart of the project. It outlines the operational sequence of a smart hanger system. The process begins with initialization, followed by inputs from three sensors: a water sensor, a light sensor, and an ultrasonic sensor. Based on sensor readings, the system either retracts the hanger with a red LED indicator if water is detected or pushes out the hanger with a blue LED if sufficient light is detected. The ultrasonic sensor checks the hanger's position and displays its current condition on an LCD. The status is also sent to a Blynk app for remote monitoring, completing the cycle. **Figure 3** demonstrates the simulation output of the project. The simulation demonstrates a smart hanger system using an Arduino Uno. The circuit includes an LCD display showing "HANGER OUT," indicating the hanger's active position, along with connections to a water sensor, light sensor, ultrasonic sensor, and motor driver. The sensors and motor work together to control the hanger's movement based on environmental inputs, and the LCD provides real-time status feedback.

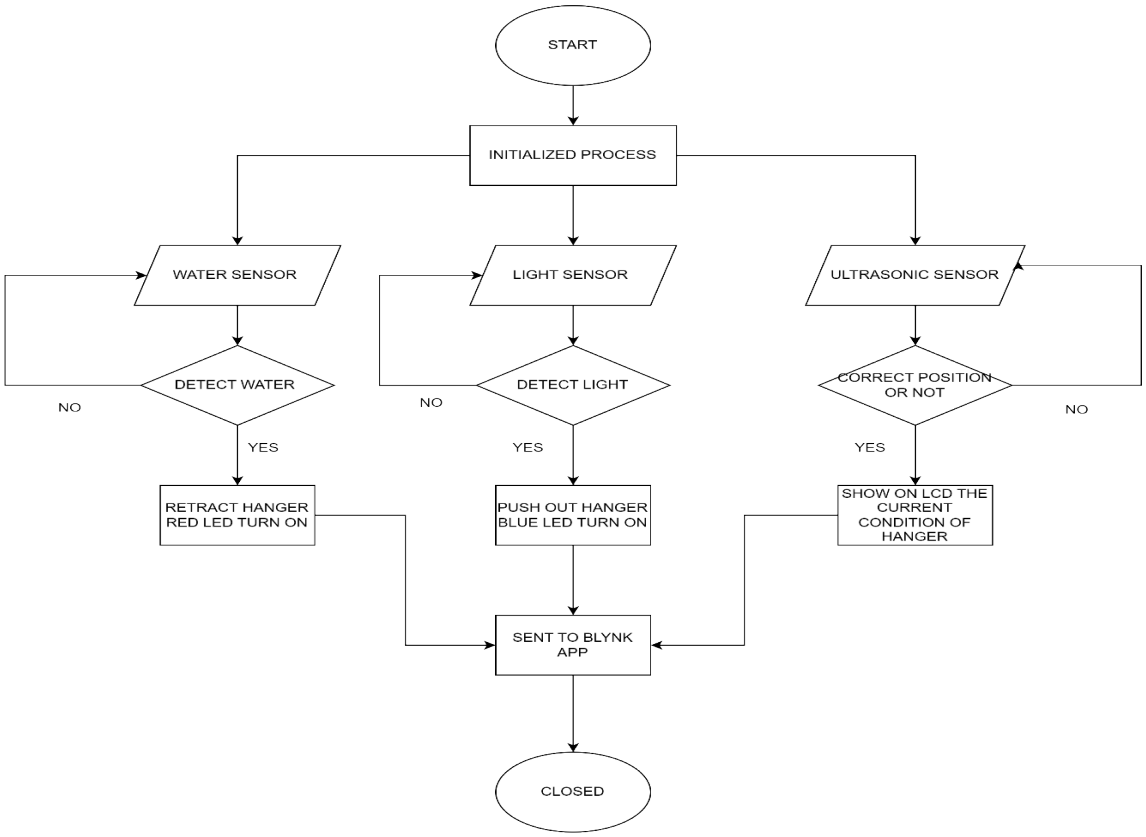


**Figure 2.** Flowchart of the automated cloth drying

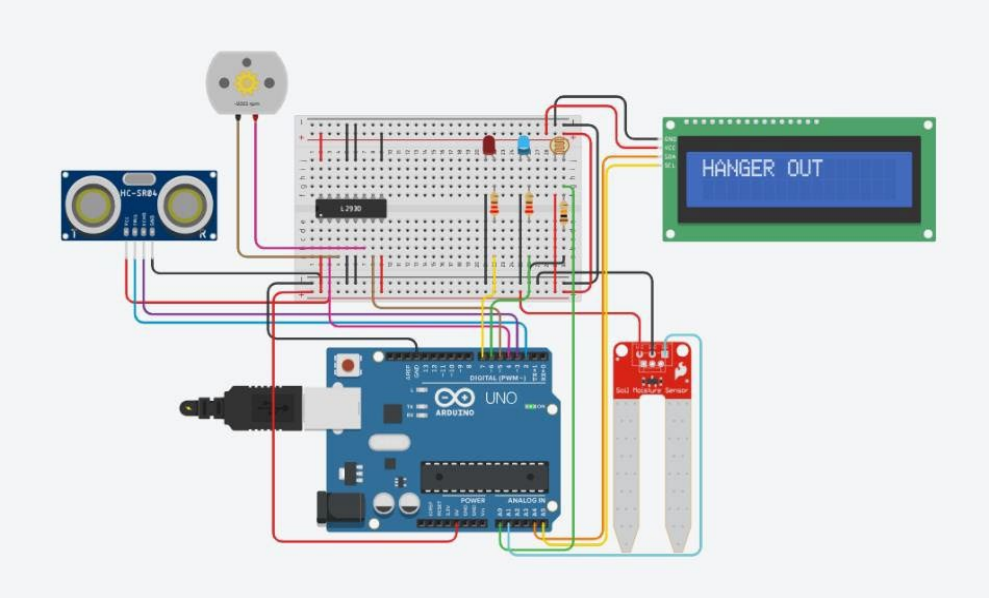


**Figure 3**. Simulation result for condition 2 of light presence

## 3. Novelty and uniqueness

The automated cloth drying system introduces a groundbreaking solution for tackling the unpredictable weather challenges in Malaysia. Unlike traditional drying methods, this system integrates IoT and automation technologies, employing sensors to detect rain, light, and distance to ensure optimal drying conditions. The use of a motorized mobile roof to protect clothes from rain and expose them to sunlight showcases an innovative approach to laundry care. Its cost-effectiveness and intuitive design set it apart as an accessible option for the average household.

## 4. Benefit to mankind

This system addresses the inconvenience of re-washing clothes due to sudden rain, conserving water and reducing energy usage. By ensuring consistent drying conditions, it saves time and effort for users, particularly those away from home. Its sustainable design, incorporating recyclable materials and energy-efficient components, contributes to eco-friendly living. The system also provides real-time feedback and visual alerts, enhancing the user's experience and offering peace of mind.

## 5. Innovation and Entrepreneurial Impact

Combining IoT-based sensors with automation, the system transforms traditional laundry drying into a smart, user-friendly process. Entrepreneurs can capitalize on its scalability and adaptability to create tailored solutions for urban households, commercial laundromats, and apartment complexes. The integration of remote monitoring and control via Wi-Fi adds value, enabling businesses to expand offerings and address diverse customer needs.

## 6. Potential commercialization

The automated cloth drying system holds strong market potential due to its affordability, ease of use, and compatibility with modern lifestyles. Its compact design appeals to urban households with limited space, while its eco-friendly features align with the growing demand for sustainable products. By leveraging e-commerce platforms and partnerships with smart home solution providers, the product can achieve wide-scale adoption, catering to both local and global markets.

## 7. Authors' Biography

Azmeer Asyraf is currently a final-year diploma student at Universiti Teknologi MARA (UiTM) Pasir Gudang, where he is pursuing a Diploma in Electrical Engineering. Throughout his academic journey, Azmeer has developed a solid foundation in electrical systems, circuits, and engineering principles. His studies equip him with both theoretical knowledge and practical skills essential for the dynamic field of electrical engineering.

Nur Asfahani Ismail has been serving as a lecturer at UiTM Pasir Gudang since 2014. Over the years, she has guided numerous students in their final year projects and earned recognition from the university for her contributions. Her research interests focus on IoT-based systems and machine learning.

Arif Nurhan is a final-year diploma student at Universiti Teknologi MARA (UiTM) Pasir Gudang, specializing in Electrical Engineering. His coursework has provided him with a strong understanding of electrical design, power systems, and control technologies. With hands-on experience in labs and practical projects, Arif has cultivated problem-solving skills and a keen interest in modern engineering applications.

Azfar Suhail, a diploma candidate at UiTM Pasir Gudang, is in the final stages of completing his studies in Electrical Engineering. Over the course of his education, he has gained comprehensive knowledge of electrical circuits, automation, and energy systems. His academic experience is complemented by practical training, enabling him to apply engineering concepts to real-world problems effectively.