



E-PROCEEDINGS

INTERNATIONAL TINKER INNOVATION & ENTREPRENEURSHIP CHALLENGE (i-TIEC 2025)

"Fostering a Culture of Innovation and Entrepreneurial Excellence"



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23 January 2025
PTDI, UiTM Cawangan Johor
Kampus Pasir Gudang

ORGANIZED BY:

Electrical Engineering Studies, College of Engineering
Universiti Teknologi MARA (UiTM) Cawangan Johor
Kampus Pasir Gudang
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PREFACE

It is with great pleasure that we present the e-proceedings of International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), which compiles the extended abstracts submitted to the International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), held on 23 January 2025 at **PTDI, Universiti Teknologi MARA (UiTM) Cawangan Johor, Kampus Pasir Gudang**. This publication serves as a valuable resource, showcasing the intellectual contributions on the invention and innovation among students, academics, researchers, and professionals.

The International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), organized under the theme "Fostering a Culture of Innovation and Entrepreneurial Excellence," is designed to inspire participants at various academic levels, from secondary students to higher education students and professionals. The competition emphasizes both innovation and entrepreneurship, encouraging the development of product prototypes that address real-world problems and have clear commercialization potential. By focusing on technological and social innovations, i-TIEC 2025 highlights the importance of turning creative ideas into viable, market-ready solutions that can benefit users and society. The extended abstracts in this e-proceedings book showcase the diverse perspectives and depth of research presented during the event, reflecting the strong entrepreneurial element at its core.

We extend our sincere gratitude to the contributors for their dedication in sharing their innovation and the organizing committee for their hard work in ensuring the success of the event and this publication. We also appreciate the support of our collaborators; Mass Rapid Transit Corporation Sdn. Bhd. (MRT Corp), Universitas Labuhanbatu, Indonesia (ULB), Universitas Riau Kepulauan, Indonesia (UNRIKA) and IEEE Young Professionals Malaysia, whose contributions have been instrumental in making this event and publication possible.

We hope that this e-proceedings book will serve as a valuable reference for researchers, educators, and practitioners, inspiring further studies and collaborations in both innovation and entrepreneurship. May the knowledge shared here continue to spark new ideas and market-ready solutions, advancing our collective expertise and fostering the growth of entrepreneurial ventures.

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B-ST112: SMART AUTOMATIC RAIN COVER CONTROL SYSTEM FOR ENHANCED FISH DRYING

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ABSTRACT

Smart Automatic Rain Cover Control System for Fish Drying is a system designed to improve the efficiency of fish drying, which is typically done by sun-drying fish. Sun drying is vulnerable to weather disruptions, particularly rain, which can damage the fish being dried. Therefore, a system is needed to detect rain and automatically close the fish drying cover to protect the fish from excessive moisture. This system uses rain sensors to detect rainfall and a servo motor to operate the drying cover. Additionally, the system is equipped with a microcontroller-based control that can monitor weather conditions and execute the closing command automatically. Thus, this system can enhance the efficiency of fish drying by reducing damage caused by rain and ensuring the drying process runs optimally without weather interruptions. The use of this system is expected to reduce production losses and improve the quality of dried fish.

Keywords: smart automatic rain cover, fish drying efficiency, rain sensor, microcontroller, production loss reduction

1. Product Description

The Riau Archipelago, a province in Indonesia with over 200 islands, is renowned for its natural beauty and rich marine resources, supporting approximately 143,354 fishermen. Fish drying, a traditional practice vital to the local economy, relies heavily on sunlight. However, unpredictable weather, particularly sudden rain, poses significant challenges. When rain occurs, fish laid out to dry often become wet again, reversing the drying process and compromising quality. Manual efforts to cover the fish with tarps are labor-intensive, time-consuming, and often insufficient to prevent losses. To address these challenges, an innovative, automated fish drying system has been proposed. Utilizing rain sensors, microcontrollers, and servo motors, this system detects rain and automatically covers the drying fish, protecting them from moisture. When the weather clears, the cover reopens, allowing the drying process to resume. This technology reduces production losses, enhances efficiency, and minimizes manual intervention. By modernizing traditional practices, this system not only improves the livelihoods of fishermen but also strengthens the Riau Archipelago's fishery sector. It represents a crucial step toward sustainable production, ensuring resilience against climate unpredictability and boosting the region's economic competitiveness.

2. Method Flow Chart and Product Model

The development of the Automatic Fish Drying System Prototype aims to address the challenges faced by fishermen during the traditional fish drying process. The system utilizes key components such as a rain sensor, a microcontroller Arduino, limit, cover a and a motor to automate the covering and uncovering of drying fish. In this project, the team make a prototype and can implement it in fact. Component prototype as **Figure 1.**

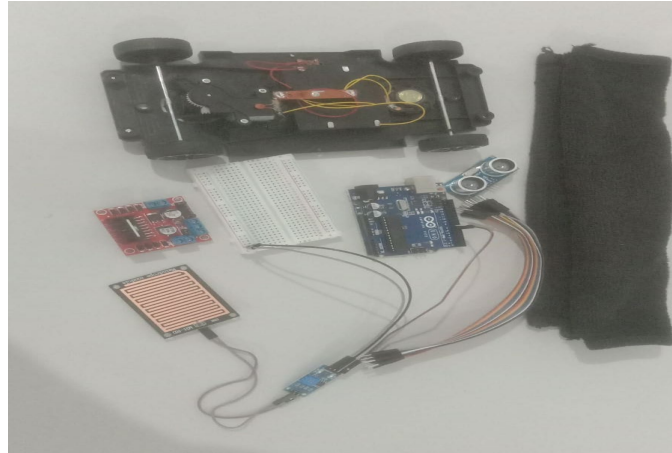


Figure 1. Component System

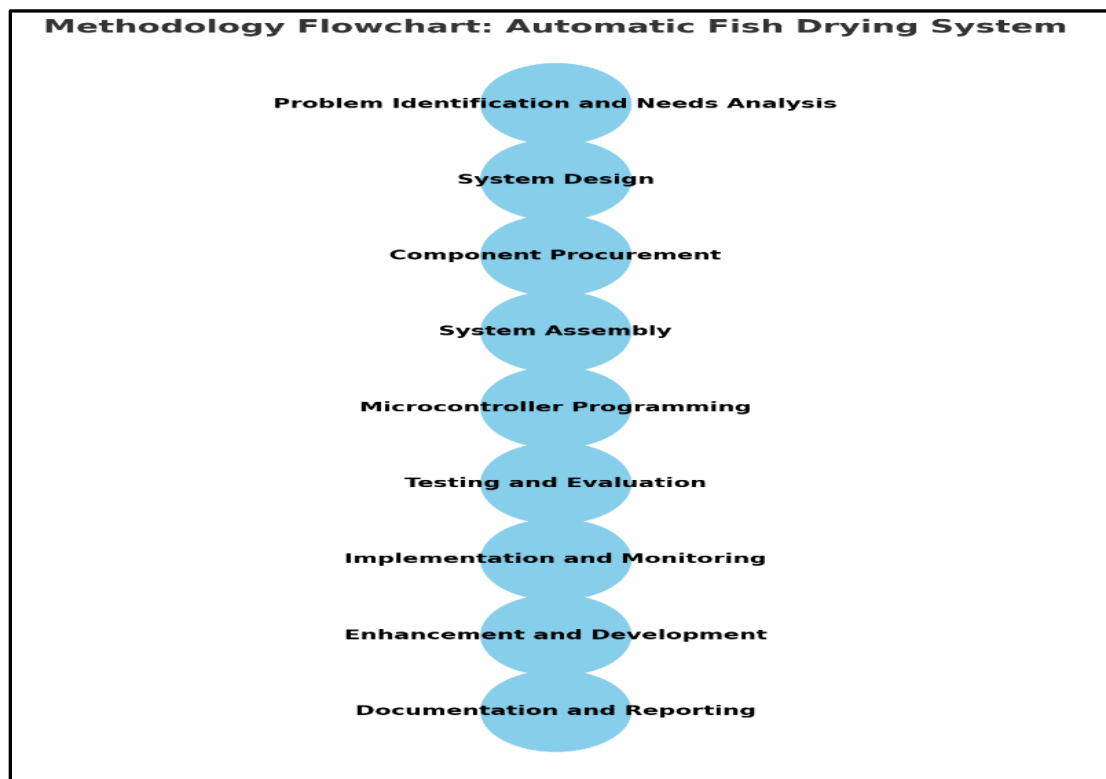


Figure 2. Model Flowchart

The methodology for developing the Automatic Fish Drying System consists of several structured steps to ensure the system is efficient and functional as **Figure 2**.

1. **Problem Identification and Needs Analysis:**
The process begins by identifying the primary issue—rain disrupting the fish drying process. The needs of fishermen are analyzed to ensure the solution is tailored to their requirements.
2. **System Design:**
A comprehensive design of the system is created, including components such as rain sensors, microcontrollers, servo motors, and a solar-powered energy source. A schematic of how these components interact is also prepared.
3. **Component Procurement:**
All necessary materials are sourced, including rain sensors, Arduino for processing, motors for automation, solar panels for energy, and structural materials for the drying rack.
4. **System Assembly:**
The components are assembled. The sensor is mounted to detect rain, the motor is attached to the cover mechanism, and all parts are connected to the microcontroller and power source.
5. **Microcontroller Programming:**
The system is programmed using Arduino to ensure it responds to rain automatically by closing the cover and reopens it when the weather is clear.
6. **Testing and Evaluation:**
The system is tested by simulating rain conditions to ensure it functions as expected. Adjustments are made if any issues arise during testing.
7. **Implementation and Monitoring:**
The system is installed in a real-world setting, and its performance is monitored over several days. Feedback is collected from users to evaluate its reliability and practicality.
8. **Enhancement and Development:**
Based on feedback, improvements are made.
9. **Documentation and Reporting:**
Finally, the entire process is documented, and a report is created to guide future replication or further development of the system.

3. Novelty and Uniqueness

The novelty of this paper lies in its innovative application of automated technology to address the challenges in traditional fish drying processes caused by unpredictable weather. The system integrates rain sensors, microcontrollers Arduino and servo motors to create an automatic covering mechanism for fish during rainfall. This technology ensures the drying process is protected without requiring constant manual intervention, offering a significant improvement over traditional methods where fishermen must physically cover the fish using tarps, often resulting in delays and loss of quality due to exposure to rain. The uniqueness of this system can improve electrical from solar energy or conventional electrical sources. Additionally, the system's compact design and reliance on readily available components make it highly practical and accessible for fishermen in rural or semi-urban areas. By removing the dependency on solar power, this solution provides flexibility for

implementation in various geographical locations, including areas with established electrical grids or where alternative energy sources are more cost-effective. This innovative combination of automation and accessibility makes the system a practical, scalable, and cost-effective solution for modernizing fish drying practices. It not only enhances productivity but also maintains affordability and ease of use, making it suitable for widespread adoption by fishing communities.

4. Benefit To Mankind

This system optimizes the drying process by monitoring weather conditions in real-time, improving the efficiency of the drying process, and saving time that would normally be spent manually monitoring the weather. With this system, time and labor savings are significant, and it reduces economic losses if the drying process fails and the quality of the fish decreases, which would lead to a drop in fish prices. With this system, product quality can be improved, and the selling price can be guaranteed. This system also enhances health and safety by protecting workers from exposure to rain or extreme weather, which could impact health, especially for those working outdoors for extended periods.

5. Innovation and Entrepreneurial Impact

The innovation presented in this research lies in its ability to seamlessly integrate modern automation technology into the traditional fish drying process. By developing a system that uses rain sensors, microcontrollers Arduino and servo motors to automatically protect fish from rain, this solution addresses a long-standing problem for fishing communities. Unlike conventional methods, which rely heavily on manual intervention to cover fish during sudden rainfall, this system offers an automated, efficient, and reliable alternative that saves both time and labor while reducing the risk of spoilage. The entrepreneurial impact of this innovation is significant, as it opens up new opportunities for the development and commercialization of automated systems tailored for rural and semi-urban fishing communities. The system's reliance on conventional power sources rather than solar energy makes it cost-effective and accessible, allowing for easier adoption in diverse locations. This lowers the entry barrier for fishermen who might otherwise find solar-powered systems too expensive or impractical.

6. Potential commercialization

From a business perspective, this system can serve as the foundation for creating a scalable product line that targets not only fish drying but also other weather-sensitive drying processes, such as drying agricultural products like grains, fruits, or spices. Entrepreneurs can capitalize on this innovation by manufacturing and distributing these systems, offering them at competitive prices to fishing and farming communities across regions. The automatic rain cover control system for fish drying has significant commercial potential in various aspects, including the fisheries, agriculture, renewable energy, and agricultural technology industries, both in local and global fisheries markets. With diverse business models (B2B, B2C), opportunities for integration with renewable energy, and partnerships with governments and nonprofit organizations, this technology has great prospects for improving production efficiency, reducing losses, and enhancing product quality.

Furthermore, its sustainability and global market potential make it an attractive opportunity for application in various international markets.

7. Acknowledgment

The authors would like to express their gratitude to the Program Studi Teknik Mesin, Universitas Riau Kepulauan for the support and resources provided, which have motivated us to work on this project.

8. Authors' Biography



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