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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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.

A-ST146: PURFEEDER: AUTOMATIC CAT FEEDER

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ABSTRACT

The Purfeeder: Automatic Cat Feeder represents an innovative advancement in pet care technology, designed to address the challenges of modern pet ownership. Leveraging Internet of Things (IoT) technology, the feeder automates the feeding process, ensuring precise portions are dispensed at scheduled times, even when the owner is away. Key features include a buzzer to alert pets during feeding time and a load cell sensor that detects the cat's presence, dispensing food only when needed to maintain freshness. The integration of ultrasonic sensors and servo motors ensures accurate food monitoring and dispensing, preventing overfeeding or underfeeding. Additionally, the feeder's connection to Adafruit IO enables remote monitoring and control, allowing owners to adjust feeding schedules and track food levels in real-time from any location. The Purfeeder combines advanced automation, precision, and user-friendly features to deliver a reliable, convenient solution for modern pet care.

Keywords: Internet of Things (IoT), Adafruit IO, Automatic Cat Feeder, Smart Pet Care, Remote Monitoring and Control

1. Product Description

The Purfeeder: Automatic Cat Feeder is a cutting-edge device designed to simplify and enhance pet care for busy owners. Utilizing IoT technology, it automates meal scheduling and portion control, ensuring pets are fed on time with the correct amount, even in the owner's absence. A built-in buzzer alerts pets during feeding time, creating a routine they can rely on. Equipped with load cell and motion sensors, the feeder detects the pet's presence and dispenses food only when needed, keeping it fresh and preventing waste. The Purfeeder uses ultrasonic sensors and servo motors for precise food dispensing, offering accurate portion sizes tailored to the pet's needs. Real-time monitoring of food levels ensures there is always enough for the furry companion while preventing overfeeding or underfeeding, promoting healthier eating habits. Whether the owner is at work, traveling, or simply seeking peace of mind, the Purfeeder delivers a convenient, reliable, and efficient solution for pet feeding. Its innovative design and smart technology make it an essential tool for modern pet owners, providing both care and convenience while ensuring cats stay healthy and happy.

2. Block diagrams, food level interface and system flow chart.

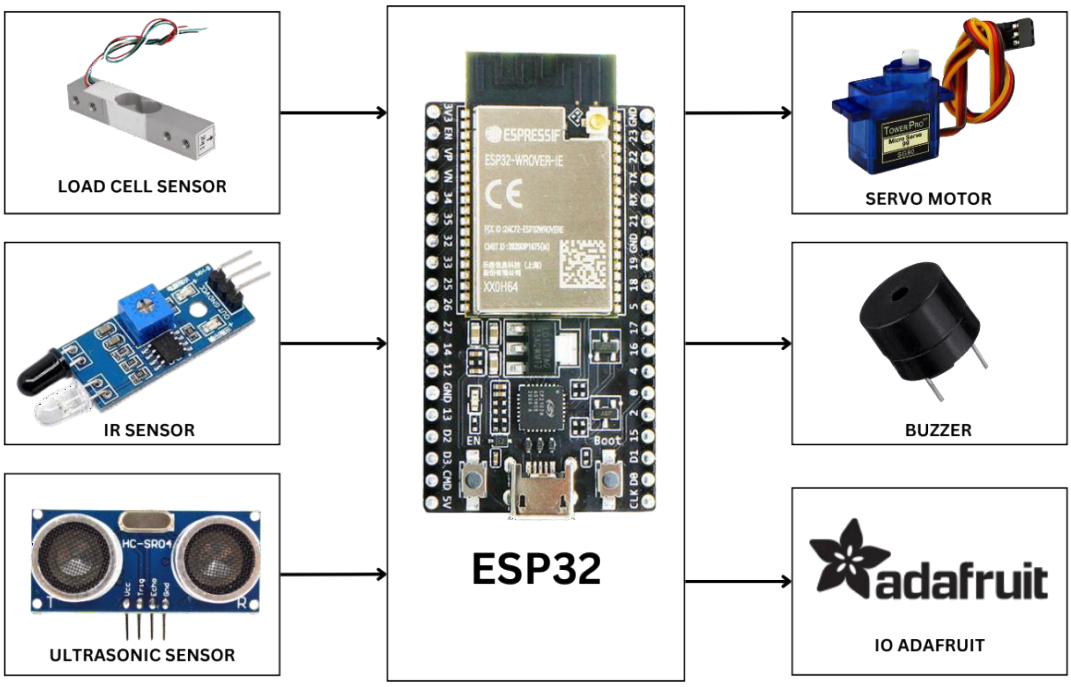

Figure 1. Block Diagram.

Figure 2. Food level interface.

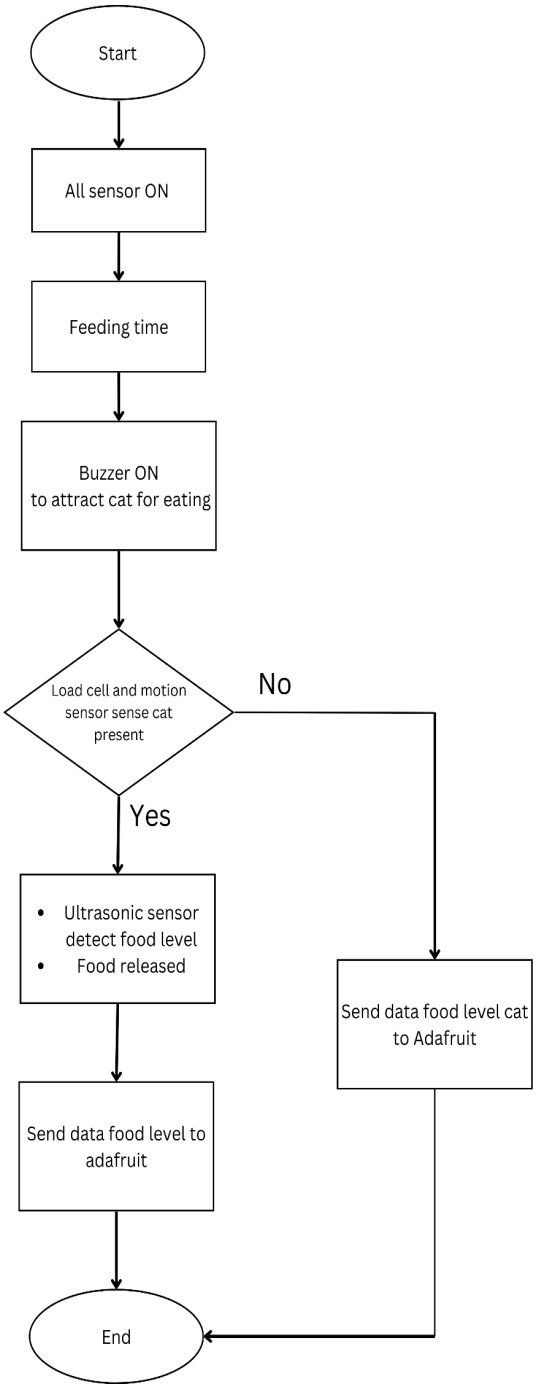

Figure 3. System flowchart.

Figure 1 shows the block diagram of the Purfeeder. It highlights the ESP32 microcontroller, load cell, ultrasonic sensors, servo motor, and buzzer, which work together to automate and streamline the feeding process. Food Level Monitoring Display in **Figure 2** showcases the real-time food level interface, allowing owners to monitor and adjust feeding schedules conveniently. The Flowchart of the Purfeeder System as shown in **Figure 3** illustrates its

operational process, from sensor activation to food level updates, which are sent to Adafruit IO for remote tracking and control. With advanced automation, real-time data access, and a user-friendly design, the Purfeeder sets a new standard in pet care technology, offering convenience and reliability while fostering innovation in the pet care industry.

3. Novelty and uniqueness

The Purfeeder: Automatic Cat Feeder stands out as a novel solution in modern pet care, integrating cutting-edge IoT technology to revolutionize the way pets are fed. Unlike traditional feeders, the Purfeeder automates the feeding process with features designed to ensure efficiency, convenience, and precision. Its buzzer system is unique in alerting pets during feeding times, enhancing consistency and interaction. Additionally, the load sensor, which detects the presence of the pet, ensures food is dispensed only when the cat is nearby, maintaining freshness and minimizing waste which is an innovation not found in standard feeding systems. What further sets the Purfeeder apart is its connectivity with Adafruit IO, enabling owners to remotely monitor food levels, adjust feeding schedules, and control the feeder from anywhere in the world. The integration of ultrasonic sensors and servo motors provides real-time monitoring and precise control, eliminating concerns about overfeeding or underfeeding. This combination of smart features and automation makes the Purfeeder a groundbreaking product, offering a personalized and efficient feeding experience tailored to the pet's needs, and addressing the challenges faced by busy or frequently away pet owners.

4. Benefit to mankind

The Purfeeder: Automatic Cat Feeder simplifies pet care by ensuring pets are fed on time and with precise portions, even when owners are busy or away. This reduces stress for pet owners and provides peace of mind, knowing their pets' nutritional needs are met. The device promotes healthier eating habits for pets by preventing overfeeding or underfeeding, contributing to their overall well-being. By leveraging smart technology, the Purfeeder enhances daily life and fosters a stronger bond between humans and their pets, making modern pet care more convenient and efficient.

5. Innovation and Entrepreneurial Impact

The Purfeeder: Automatic Cat Feeder promotes innovation by leveraging IoT technology to address modern pet care challenges. Its advanced features, including a load cell sensor for detecting the cat's presence, ultrasonic sensors for food monitoring, and servo motors for precise dispensing, ensure accurate and efficient feeding. The buzzer alerts pets during mealtimes, while Adafruit IO connectivity allows owners to remotely monitor and control feeding schedules, enhancing convenience. By integrating automation and real-time data access, the Purfeeder fosters a culture of entrepreneurship by showcasing how smart technology can solve real-world problems. It inspires the development of tech-driven solutions in the pet care industry, creating opportunities for innovative business ventures. The Purfeeder exemplifies how combining advanced automation with user-friendly design can meet evolving market needs and add value to modern lifestyles.

6. Potential commercialization

The Purfeeder: Automatic Cat Feeder has strong commercialization potential in the growing pet care market, appealing to tech-savvy pet owners who seek convenience and efficiency. By addressing common challenges like overfeeding, food freshness, and feeding during owners' busy or absent times, the Purfeeder stands out with its unique IoT features, including remote monitoring and precise portion control. Its ease of use and innovative design makes it attractive to a wide range of customers, from busy professionals to frequent travelers.

7. Acknowledgment

The authors would like to express their heartfelt gratitude to the Electrical Engineering Studies, College of Engineering, Universiti Teknologi MARA, Johor Branch, Pasir Gudang Campus, Masai, Malaysia, for their invaluable support and guidance throughout this project. Their assistance and resources have greatly contributed to the successful completion of this work.

8. Authors' Biography

Muhammad Mursyid Akma Muhd Farid is currently pursuing a Diploma in Electrical Engineering (Electronic) at Universiti Teknologi MARA, Johor Branch, Pasir Gudang Campus. With a strong passion for IoT and coding, he enjoys exploring how smart technologies can be applied to solve real-world problems. Aspiring to become a skilled and forward-thinking electrical engineer, he aims to contribute to advancements in the fields of electronics and automation, making a positive impact on industry and society.

Mastura Omar is a senior lecturer at the Electrical Engineering Studies, College of Engineering, Universiti Teknologi MARA, Johor Branch, Pasir Gudang Campus, Masai, Malaysia. With extensive experience in teaching and research, she specializes in electrical and electronic engineering, focusing on innovative solutions and practical applications in the field. Dedicated to nurturing future engineers, Mastura is passionate about guiding students in their academic and professional growth.

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