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# PROCEEDINGS OF JOHOR INTERNATIONAL INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2024 (JIICaS 2024)



*“Flourish and Nurturing Sustainable  
Innovation for a Prosperous Nation”*

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## **Preface**

**In the name of Allah, the Almighty who gives us the enlightenment, the truth, the knowledge and with regards to Prophet Muhammad (peace be upon him) for guiding us to the straight path. We thank to Allah for giving us guidance and strength to write this e-book.**

**This e-book compiles the extended abstracts that submitted to Johor International Innovation Invention Competition and Symposium 2024 (JIIICaS2024), where JIIICaS2024 is a virtual platform for all creative minds to share and present their invention and innovation. Each abstract gives a brief background on the innovation or project.**

**We hope that this e-book will help the readers to get to know the innovation done by the students and get some ideas to develop future innovation products.**



## Foreword Rector



Assalamualaikum warahmatullahi Wabarakatuh,  
Salam Sejahtera, Salam Malaysia MADANI and  
Salam UiTM Dihatiku.

In the name of Allah, the Most Gracious, the Most  
Merciful.

It is a great honor to welcome you to the Johor  
International Innovation, Invention, Competition, and  
Symposium 2024 (JIIICaS 2024). This event

connects various disciplines, focusing on education and engaging educators,  
students, researchers, and innovators from all walks of life.

Innovation is not just about ideas; it demands perseverance, creativity, and  
determination to turn those ideas into reality. The remarkable projects  
showcased today highlight the dedication and spirit of all participants.  
Initiatives like this not only explore new technologies but also cultivate skills  
and leadership among our youth. At Universiti Teknologi MARA (UiTM) Johor  
Branch, we are fully committed to fostering a dynamic culture of innovation,  
promoting the commercialization of new products, and encouraging  
meaningful collaborations with industry and society.

As we celebrate this event, I would like to extend my heartfelt gratitude to all  
sponsors, judges, the College of Computing, Informatics and Mathematics,  
UiTM Pasir Gudang Campus as the event organizer, as well as to the  
researchers and participants for their hard work in making this event a  
success. Let us continue striving for innovation and excellence. May the  
ideas presented today inspire us and lay the groundwork for future  
achievements.

Thank you.

**Associate Professor Dr. Saunah Zainon**  
**Rector**  
**Universiti Teknologi MARA (UiTM)**  
**Johor Branch**

## **(A-ST088) PAWNURTURE LITE**

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### **ABSTRACT**

PawNurture Lite is an innovative solution designed to enhance pet care, particularly in food consumption, by combining advanced technology with a user-friendly mobile application. Traditional feeding methods often fall short, especially for those with demanding schedules or unpredictable routines. This solution was developed to address common challenges such as the availability of pet owners, the tendency to overfeed pets, and the high cost of pet hotel services. PawNurture Lite aims to study and improve existing products in the market, design a mobile application with IoT integration, and develop an IoT device aligned with the latest trends. It offers remote feeding capabilities, portion control, pet recognition, and additional features for monitoring food storage and pet conditions. This comprehensive functionality provides pet owners with an efficient way to manage their pets. Additionally, the integration of mobile applications has allowed pet owners to monitor their pet's eating habits and allow early detection of health issues. With its intuitive user interface, PawNurture Lite delivers convenience, peace of mind, and a higher standard of pet care.

Keywords: Pet Feeder, Smart Pet Feeding

### **1. INTRODUCTION**

PawNurture Lite represent a significant innovation in pet care, allowing owners to feed their animals remotely through a mobile app connected to the internet. These smart feeders automatically dispense a specified amount of food at pre-set times, ensuring pets receive consistent and appropriate nutrition. For pet lovers, maintaining a feeding schedule is crucial, and these devices help achieve that regardless of the owner's availability. This innovation addresses common challenges in pet feeding, such as ensuring food consistency and preventing early or late access to meals. This IoT-based solution promotes a healthier lifestyle for both pets and owners by automating feeding routines, providing portion control, and monitoring pet conditions remotely. It aims to simplify pet care, offering a more reliable alternative to traditional manual feeding methods.

### **2. OBJECTIVE**

The primary objectives of this project are to study and enhance existing pet feeder products available in the market, design a mobile application integrated with IoT technology, and develop an IoT device that aligns with current technological trends. The project aims to refine the functionality and performance of current pet feeders by

addressing identified limitations and incorporating advanced features. The development of a mobile application will facilitate seamless interaction between users and the IoT device, allowing for remote monitoring and control of pet feeding routines. By leveraging contemporary IoT advancements, the project seeks to create a state-of-the-art pet feeder that enhances user convenience, accuracy, and overall pet care experience.

### 3. METHODOLOGY

This project follows the Rapid Application Development (RAD) methodology as a guideline to develop fully functional product. RAD is ideal for projects that require fast development [1], frequent changing requirements [2] and prioritize cost savings [3]. The methodology is divided into six (6) phases: analysis and quick design, build, demonstrate, refine, testing, and implementation. Each phase is essential for maintaining project progress and ensuring milestones are achieved within the set timeline.

### 4. IMPLEMENTATION

#### Hardware Development

For the hardware development as shown in Figure 1, several hardware components are used to develop a complete prototype such as ESP32(1), Ultrasonic Sensor HC-SR04(2), Servo SG90(3), RFID MFRC522(4), Piezo Buzzer (5) and Load Cell Sensor(6).

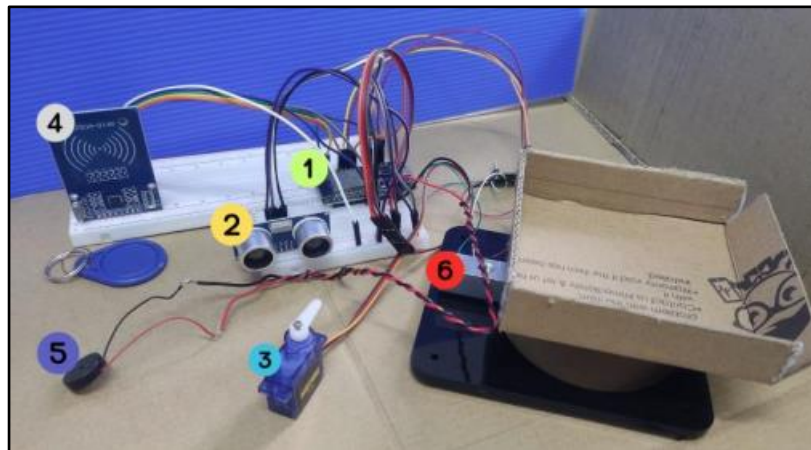


Figure 1: Product Prototype

#### Software Development

Software involvement is essential to enable remote management of the device through mobile phones. Various software integration across different environments work together to develop the mobile app functionality. As shown in Figure 2, Arduino IDE is used to program the microcontroller ESP32 which is connected to Blynk Apps. Additionally, Firebase real-time database is used to store RFID tag numbers.

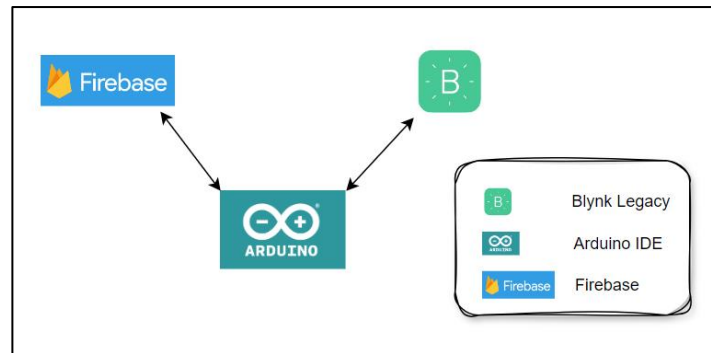


Figure 2: Software Requirements

## 5. RESULT

PawNuture Lite with its unique features such as waste control, RFID technology and data analytics in user-friendly system, provides pet owners with convenience and peace of mind in managing their pet. An overview of the project is as follows.

### Features

- a) Portion control  
The system is designed to accurately measure and dispense the pre-set portion amount, ensuring that pets receive the correct amount of food at every feeding.
- b) Waste control  
PawNuture Lite is designed to minimize waste by combining leftover food from the previous meal with the next feeding, resulting in a smaller portion being dispensed for the upcoming session.
- c) Notification alert  
The notification alert feature keeps pet owners informed about the status of PawNuture Lite device. The system sends notifications to the owner's mobile device regarding completed feeding sessions, low food levels, or any issues with the feeder. These alerts ensure that the pet owner is always aware of the device's condition, even when they are away from home.

### Functionality

- a) Automatic feeding  
The automatic feeding functionality is the core of the PawNuture Lite system. It allows for customizable feeding time, ensuring consistent and timely feeding. When the food storage level is low, automatic feeding will be disabled to prevent the pet from receiving insufficient amount of food, but manual feeding is available. Engaging the user to manually feed the pet through the mobile app also serves as a reminder of the low food storage.
- b) Manual feeding  
Pet owners can manually dispense food through the mobile application, providing flexibility for unscheduled feeding times or extra meals.

- c) Food storage monitoring  
The system regularly checks the food levels in the storage compartment and alerts the owner if the supply is running low.
- d) Eating habits monitoring  
This function helps pet owners track their pet's health and well-being. The system records data on the pet's eating patterns and the timing of meals. In addition, the data can be exported in CSV format.
- e) RFID registration  
The RFID tag is a key feature that enables the system to recognize registered pets. The RFID registration process is straightforward and can be completed through the mobile application.

### Usefulness

- a) Eliminate direct human-interaction  
PawNurture Lite is designed to work independently without the need for direct human interaction in the pet feeding process. Additionally, busy pet owners can enjoy peace of mind, knowing that PawNurture Lite will manage their pet's meal automatically.
- b) Customizable  
This system allows pet owners to tailor the feeding process to their specific needs and preferences. Different breed of pet requires different amount of food, making it suitable for various animal breeds.
- c) Precise and consistent  
With the load cell sensor and a pre-set feeding schedule, issues of underweight and overweight pets can be avoided, as the device ensures precise and timely feeding.

### Practicality

- a) User-friendly interface  
The PawNurture Lite system focuses on user experience. The mobile app is straightforward and easy to use, making it accessible to everyone regardless of their level of technical skills.
- b) Rapid deployment  
PawNurture Lite can be quickly deployed with minimal setup time and complexity.
- c) Sound  
A better sound device model is recommended to produce louder sound comparing to current piezo buzzer used.
- d) RFID scanner  
A better RFID scanner model is recommended, as the current RFID model can only read up to a maximum of 50mm, while in this project, only up to 25mm is

effective. The recommended reading range is approximately 1.5 meter to allow for easier reading at a further distance, making it much more convenient for use with pet.

## 6. CONCLUSION

In conclusion, PawNurture Lite has made significant advancements in the field of pet care, combining cutting-edge technology to overcome common challenges faced by pet owners. By automating the feeding process, enabling real-time monitoring, and providing data analysis, this innovation ensures that pets receive consistent and appropriate feeding even in their owners' absence. PawNurture Lite not only simplifies pet ownership but also contributes to the overall well-being of pets, making it a valuable asset for pet lovers. This innovation enhances traditional feeding methods.

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