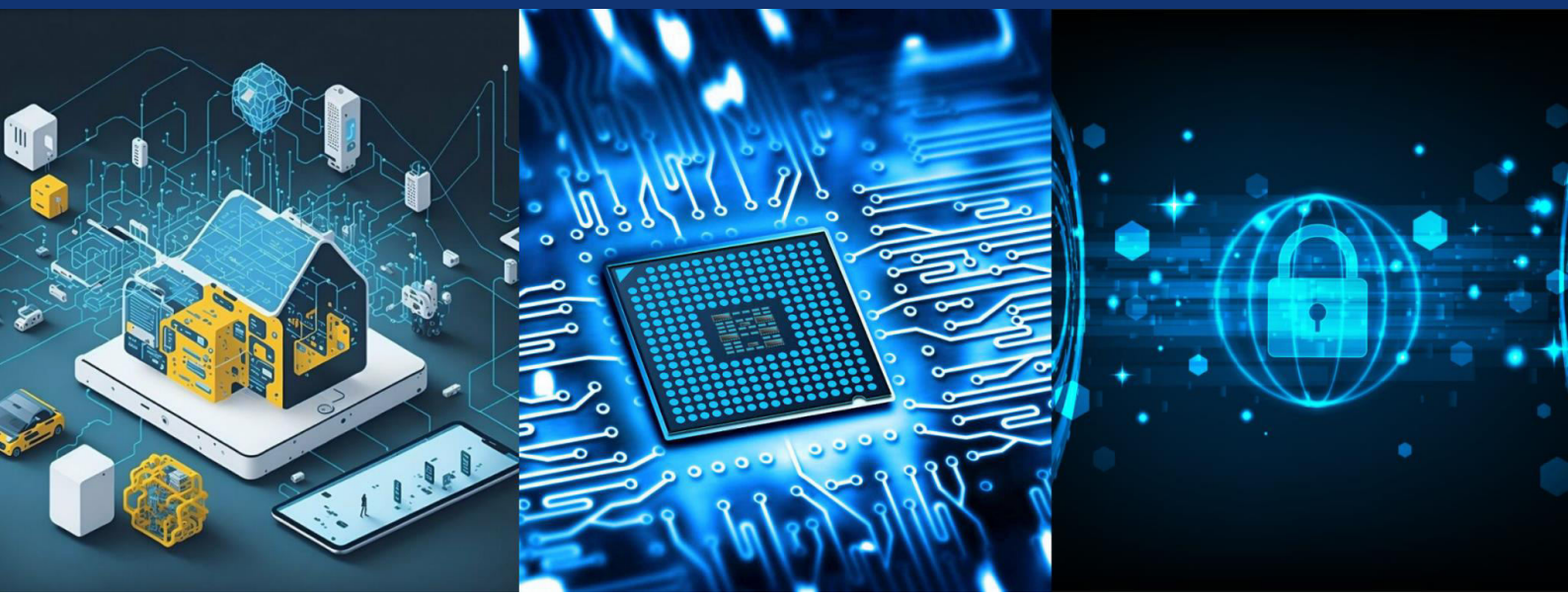
IJIRCCE

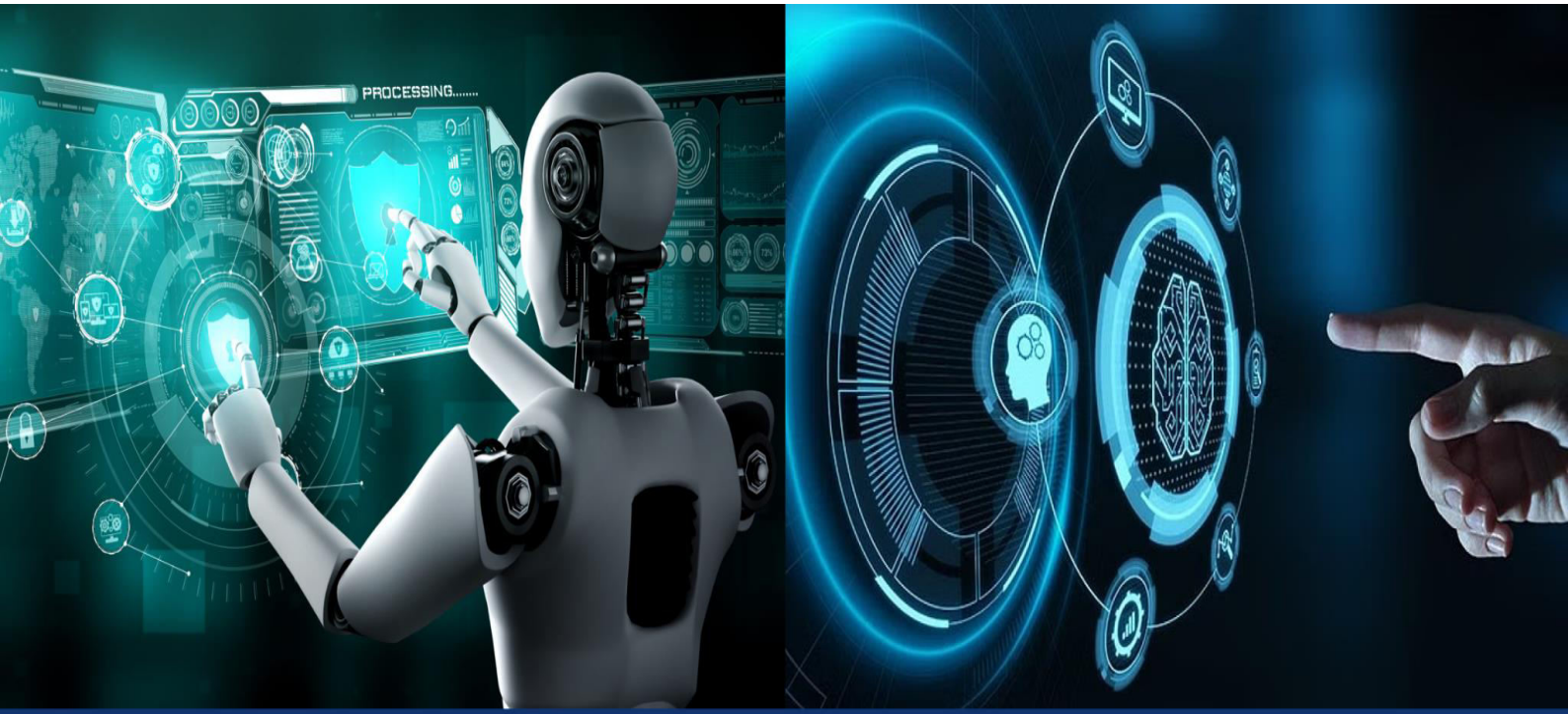
ISSN(O): 2320-9801

ISSN(P): 2320-9798



International Journal of Innovative Research in Computer and Communication Engineering

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 9.927

Volume 14, Issue 11, November 2026

© 2026 IJIRCCE | Volume 14, Issue 11, November 2026 DOI: 10.15680/IJIRCCE.2026.1411009

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 9.927| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Automatic Pet Feeder

Prof. Bhagya Shanthkumar, Sree Raksha G H, Tejaswini S C, Yash G Raikar, Veena C

Department of Electronics and Communication Engineering, Bapuji Institute of Engineering and Technology, Davangere, Karnataka, India

ABSTRACT: Pet owners often face challenges in maintaining consistent feeding schedules and ensuring timely food dispensing for their pets, particularly when they are away from home. This paper presents an IoT-based Automatic Pet Feeder that integrates scheduled feeding, manual operation, remote access, and voice-controlled functionality into a single embedded system. The proposed system is built around the ESP8266 Wi-Fi microcontroller, which controls servo motors to dispense food in predefined portions. An OLED display and buzzer provide real-time status updates and user feedback, while a push button enables manual feeding. The system supports scheduled feeding, remote control through a web dashboard, and voice commands implemented using the Web Speech API. Firebase Realtime Database is integrated to synchronize feeding schedules and activity, enabling real-time monitoring and customization. The developed prototype demonstrates the integration of IoT, embedded control, and web-based technologies to provide a cost-effective and user-friendly pet-feeding solution. The proposed system aims to improve feeding consistency, reduce the need for manual intervention, and enhance convenience for pet owners while supporting better pet nutrition management.

KEYWORDS: Internet of things, esp8266 microcontroller, servo motor control, firebase integration

I. INTRODUCTION

Feeding pets at regular intervals is essential for maintaining their health and routine. However, busy schedules and unpredictable events often lead to missed or delayed meals, which can cause stress, digestive issues, and nutritional imbalance. Maintaining consistent feeding times and appropriate food portions is important for ensuring proper pet care. The Automatic Pet Feeder developed in this work integrates embedded hardware and IoT technology to address this challenge. The system uses an ESP8266 microcontroller for control and connectivity, a servo motor for precise dispensing, and an OLED display with buzzer for user feedback. A push button allows manual feeding, while additional features provide flexibility in managing feeding schedules. It supports manual, scheduled, remote, and voice-activated feeding modes, with Firebase Realtime Database integration for synchronization and monitoring. The proposed design provides a reliable and user-friendly solution for pet owners, demonstrating a practical application of IoT in everyday life.

II. RELATED WORK

Previous research on IoT-based automatic pet feeders has explored ESP8266 and NodeMCU controllers with web interfaces and mobile applications for remote food dispensing [1], [2]. Sensor-based approaches using ultrasonic sensors, load cells, and float sensors provide food-level monitoring and portion control, while solar-powered systems focus on sustainable operation and battery backup [3], [4], [5]. ESP32-based feeders using MQTT protocols support controlled dispensing of both wet and dry food through mobile applications [6]. Although these systems improve feeding automation and remote accessibility, some face limitations in internet dependency, local feedback, user interaction, and adaptability.

The proposed project addresses these limitations by integrating an ESP8266 microcontroller with Firebase Realtime Database for feeding schedule synchronization and activity monitoring. It combines servo-based food dispensing, OLED and buzzer feedback, and multiple feeding modes, including scheduled operation, manual control, web dashboard access, and voice commands. This integration aims to provide a convenient, cost-effective, and user-friendly solution for reliable pet-feeding management.

© 2026 IJIRCCE | Volume 14, Issue 11, November 2026 DOI: 10.15680/IJIRCCE.2026.1411009

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 9.927| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

III. PROBLEM IDENTIFICATION AND OBJECTIVES

The project identifies four major challenges: irregular feeding schedules due to busy routines and travel; delayed or missed meals that may affect pet health; lack of proper portion control, leading to overfeeding or underfeeding; and the absence of remote monitoring to verify feeding activity.

The objectives are to develop an IoT-based automatic pet feeder, ensure timely and controlled food dispensing, provide manual and scheduled feeding options, enable remote and voice-controlled operation, and integrate Firebase for feeding schedule synchronization and real-time activity monitoring.

IV. PROPOSED METHODOLOGY

A. Automated Food Dispensing: The ESP8266 NodeMCU acts as the central controller and operates a servo motor to dispense food. Based on the feeding command, the servo rotates to a predefined angle, allowing a controlled quantity of food to be released, and then returns to its initial position. This reduces manual effort and helps maintain a consistent feeding routine.

B. Multiple Feeding Modes: To provide flexibility, the system supports four feeding modes. Manual feeding is initiated using a push button, while scheduled feeding is performed automatically at predefined times. Users can also trigger instant feeding through a web dashboard or use voice commands implemented with the Web Speech API. These options allow feeding operations to be managed according to the user's convenience.

C. Remote Monitoring and Synchronization: Firebase Realtime Database is integrated to store and synchronize feeding schedules, user commands, and feeding activity logs. Through the web dashboard, users can view feeding history, update schedules, and initiate feeding remotely. The ESP8266 communicates with Firebase over Wi-Fi, while Network Time Protocol (NTP) synchronization helps maintain accurate timing for scheduled operations.

D. User Feedback and Status Indication: An OLED display is used to indicate system status, feeding operations, and relevant messages. A buzzer provides audible alerts to notify users about feeding completion and system errors. These feedback mechanisms help users understand the current system status and confirm the execution of feeding commands.

The proposed methodology combines automated food dispensing, multiple control options, cloud-based synchronization, and user feedback to provide a convenient and accessible solution for managing pet-feeding activities.

V. HARDWARE AND SOFTWARE DESCRIPTION

The key hardware elements are the ESP8266 NodeMCU for embedded control and Wi-Fi communication, a servo motor for food dispensing, an OLED display for status updates, a buzzer for audio alerts, a push-button for manual feeding, and a 12V DC power supply with a buck converter for regulated voltage distribution.

The report identifies C/C++ as the programming language, with Arduino IDE used for ESP8266 programming and hardware interfacing. Firebase is used for cloud-based data storage and synchronization; HTML, CSS, and JavaScript are used to develop the web dashboard; the Firebase API enables real-time communication, while the Web Speech API supports voice-controlled feeding. The system integrates scheduled, manual, instant, and voice-based feeding modes for automated pet feeding and remote monitoring.

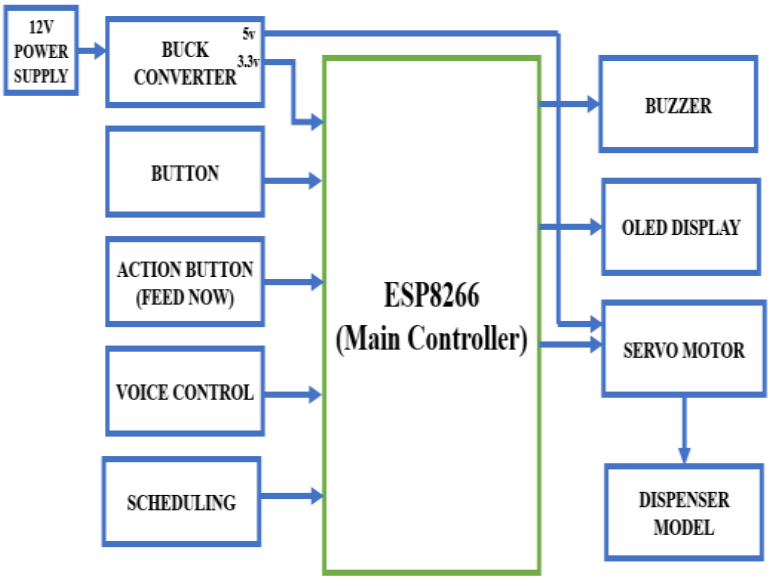
© 2026 IJIRCCE | Volume 14, Issue 11, November 2026 DOI: 10.15680/IJIRCCE.2026.1411009

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 9.927| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

VI. BLOCK DIAGRAM



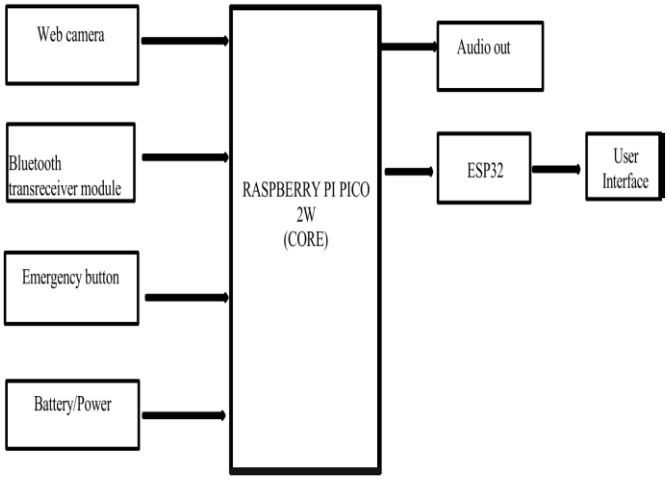


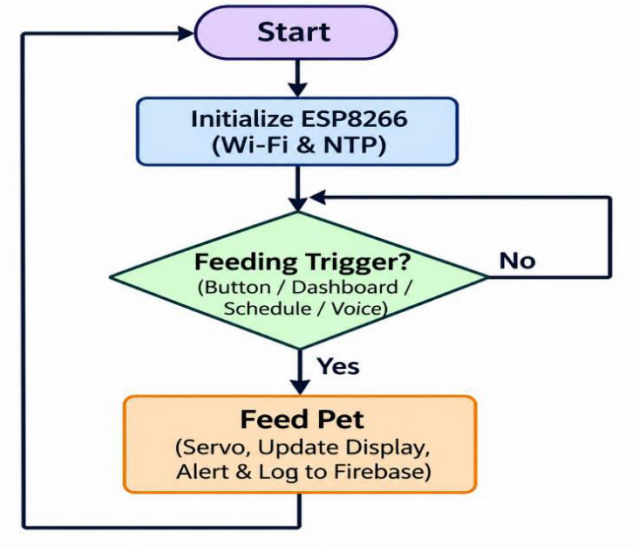
Fig 1. Block diagram

© 2026 IJIRCCE | Volume 14, Issue 11, November 2026 DOI: 10.15680/IJIRCCE.2026.1411009

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 9.927| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



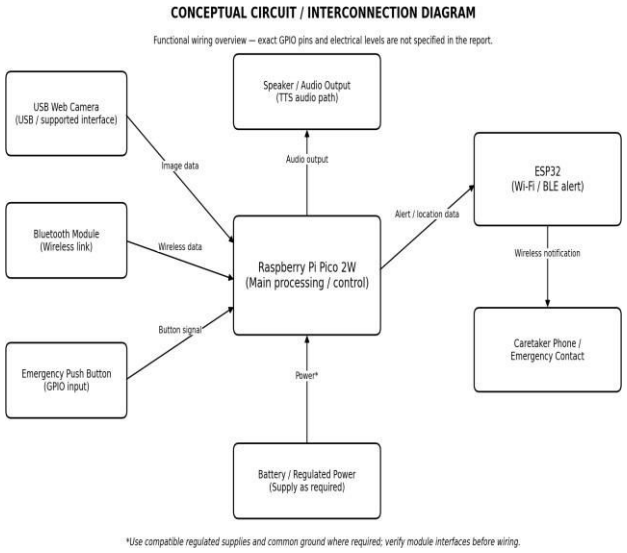


Fig. 2. Flowchart.

VIII. RESULTS AND DISCUSSION

The Automatic Pet Feeder system was successfully implemented using the ESP8266 NodeMCU as the central controller and demonstrated four feeding modes: manual, scheduled, instant, and voice-controlled feeding. The servo motor dispensed food at predefined angles, while the OLED display provided real-time system status and feeding updates. The buzzer generated audible alerts to confirm feeding operations, demonstrating effective coordination between the hardware components.

The web dashboard provides live device status, manual feeding control, voice assistance, feeding schedule management, and feeding history. Firebase synchronization enabled the storage and retrieval of feeding schedules and logs, while the Web Speech API supported voice-based commands. The Feed History section recorded feeding events with timestamps and categorized them as Scheduled, Voice, or Manual, providing transparency in system operation.

The overall results demonstrate that the system achieved its intended objectives by providing automated feeding, remote monitoring, and multiple user interaction methods. The integration of hardware components with cloud services

© 2026 IJIRCCE | Volume 14, Issue 11, November 2026 DOI: 10.15680/IJIRCCE.2026.1411009

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 9.927| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

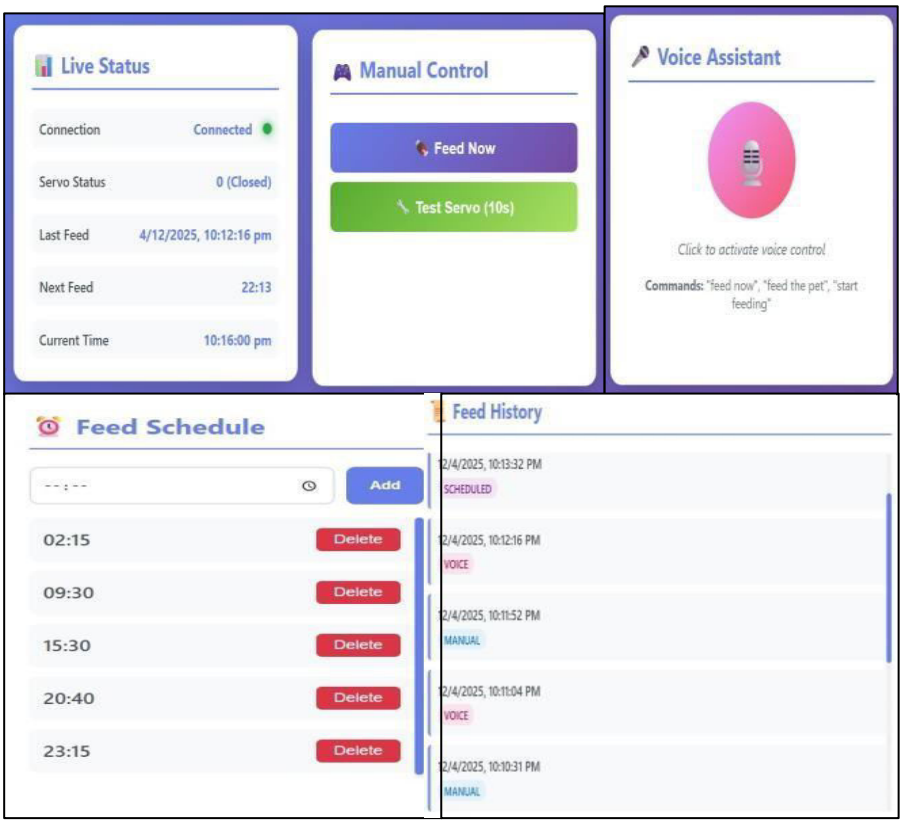
(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

ensured coordinated operation and convenient user interaction. However, the system relies on continuous internet connectivity for Firebase communication, time synchronization, and remote dashboard access. Network interruptions may affect scheduled feeding, cloud synchronization, and remote control.

IX. CONCLUSION AND FUTURE SCOPE

This paper presented an IoT-based Automatic Pet Feeder designed to automate pet feeding through manual, scheduled, instant, and voice-controlled operations. The system integrates the ESP8266 NodeMCU, servo motor, OLED display, buzzer, Firebase database, and web dashboard to provide convenient feeding management and remote monitoring. The successful operation of all four feeding modes, along with real-time status updates and feeding history synchronization, demonstrates the effectiveness of combining embedded systems with cloud-based services in providing a reliable and user-friendly pet feeding solution.

Integrating weight sensors for accurate portion measurement; adding food-level monitoring to detect low food availability; implementing offline scheduling during internet interruptions; incorporating a camera for live pet monitoring; developing a dedicated mobile application with push notifications; and introducing enhanced security and user authentication. These improvements can further enhance system reliability, feeding accuracy, and user convenience.



© 2026 IJIRCCE | Volume 14, Issue 11, November 2026 DOI: 10.15680/IJIRCCE.2026.1411009

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 9.927| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

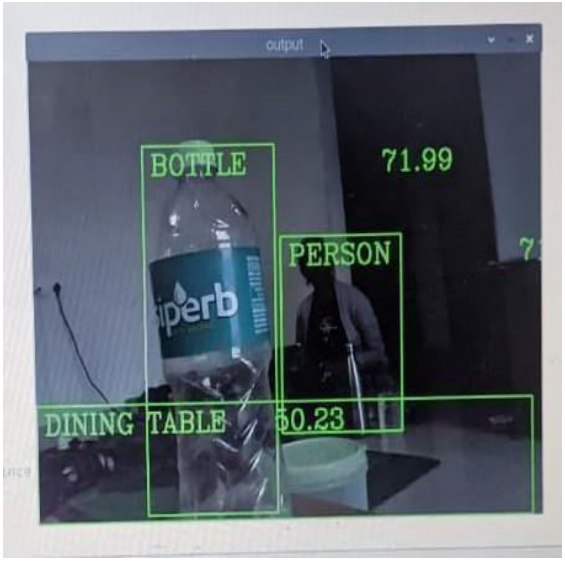




Fig 3. Web Dashboard



Fig 4. Model Image

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 9.927| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

REFERENCES

[1] M. S. Rajesh, "Automatic pet feeder using Internet of Things," International Journal of Emerging Technologies and Innovative Research (JETIR), 2019.
[2] H. Vargas, "Pet food dispenser design using ESP8266," International Journal of Emerging Technologies and Engineering Research (IJETER), 2020.
[3] A. V. Airikala, "Automatic pet feeder with solar PV system," IOP Conference Series: Earth and Environmental Science, 2021.
[4] P. G. K. Mahadiputra, "Automatic pet feeder rotational model using MQTT and mobile application," Jurnal Ilmiah Merpati, 2024.
[5] E. A. Vijayalakshmi and S. Sriman Narayana Iyengar, Getting Started with ESP8266 and Internet of Things. Chennai, India: Notion Press, 2020.
[6] Sarful Hassan, IoT Beginners Guide Level-1: ESP32, ESP8266 and Arduino Wi-Fi Basics Projects. New Delhi, India: Atlantic Publishers, 2024.
[7] Imran S. Malik, Shilpi Gupta, and Harsh K. Singh, Internet of Things with 8051 and ESP8266. Boca Raton, FL, USA: CRC Press (Routledge), 2023.
[8] Neil Cameron, Electronics Projects with the ESP8266 and ESP32: Building Web Pages, Applications, and Wi-Fi Enabled Devices. New York, NY, USA: Apress, 2021.



INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details