UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF INFORMATION TECHNOLOGY
BACHELOR OF INFORMATION TECHNOLOGY (HONS) IN INTERNET OF THINGS
FINAL YEAR PROJECT 2
ROTTEN FRUIT DETETCTION USING IOT

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INTRODUCTION

Spoiled fruits often go unnoticed until it's too late, leading to unnecessary food waste. Rotten Fruit Detection System uses IoT technology and automation to monitor fruit freshness in real time. By combining the MQ4 gas sensor and DHT22 sensor, the system detects early signs of spoilage based on gas emissions, temperature, and humidity levels. The Wemos D1 ESP8266 microcontroller collects this data and sends it to the Node-RED platform via MQTT. A built-in prediction model analyzes the readings to determine the fruit's ripeness status. If spoilage is detected, the system instantly sends a Telegram alert to notify users. This smart system helps reduce food waste, improves fruit storage management, and supports sustainable household practices.

OBJECTIVES

- · To use MQ4 gas sensors to get gas reading for rotten fruits by setting baseline readings in a fresh, non-spoiling environment.
- · To develop an IoT-based system using sensors to continuously monitor the condition of fruits and detect early signs of spoilage, such as changes in gas emissions or other environmental factors.
- · To create an alert system that notifies users when fruits are at risk of rotting, based on the data gathered from IoT sensors.
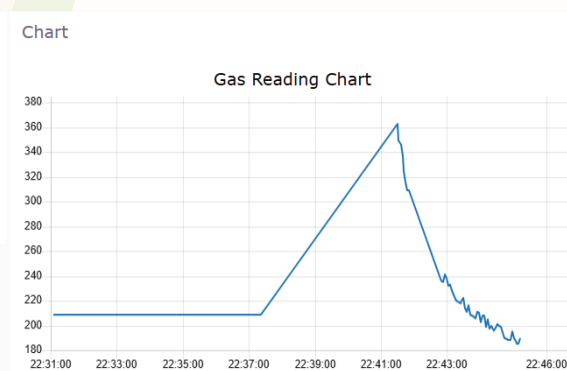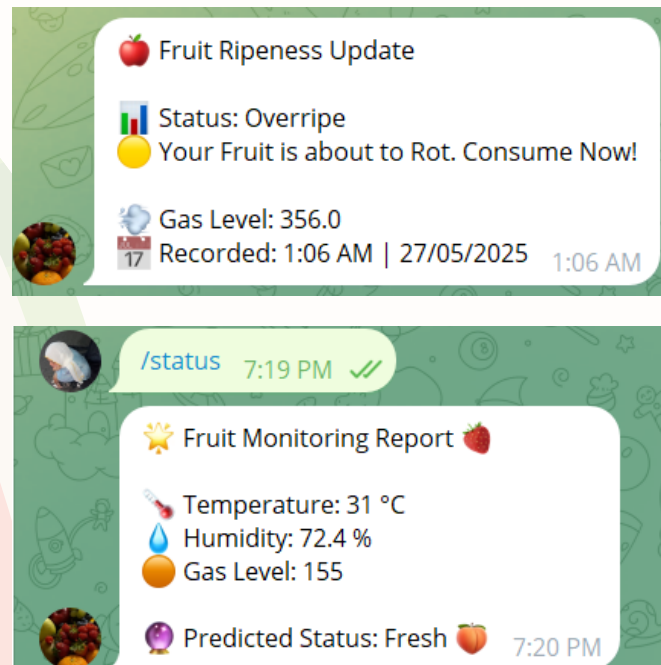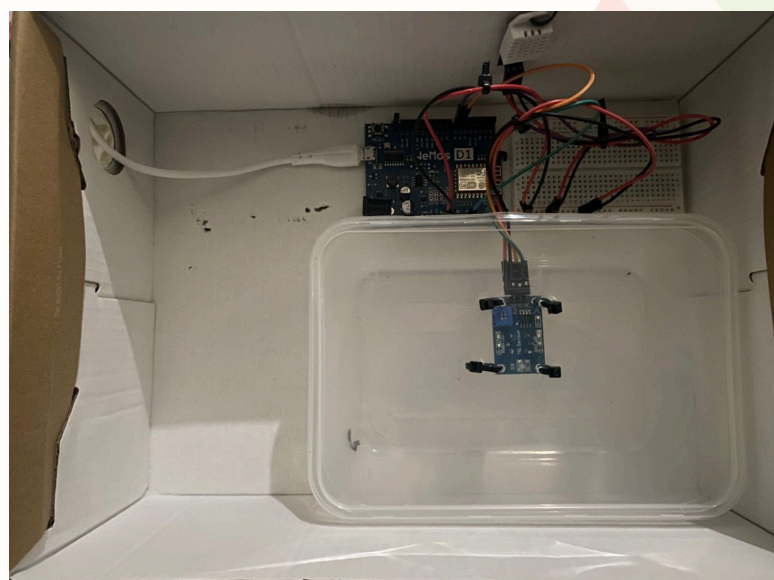
METHODOLOGY

BLOCK DIAGRAM
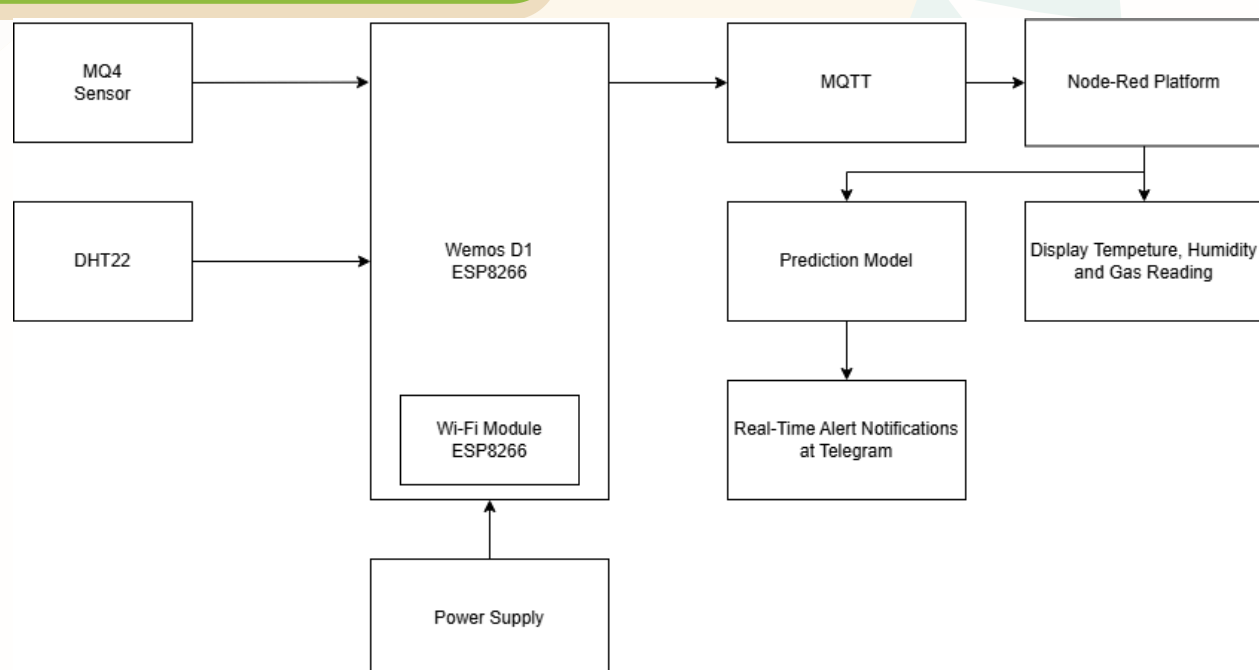
PROBLEM STATEMENT

Many households face the common problem of forgetting fruits stored in the fridge, often leading to spoilage and unnecessary food waste. Without a reliable system to monitor their freshness, users are unaware of early signs of spoilage, resulting in fruits being discarded once they are completely rotten. This project addresses this issue by providing an IoT-based system that detects early indicators of fruit spoilage, such as gas emissions based on predictions model and promptly notifies users. By enabling timely action, this system helps reduce food waste, ensures better produce management, and promotes sustainability in daily household practices.
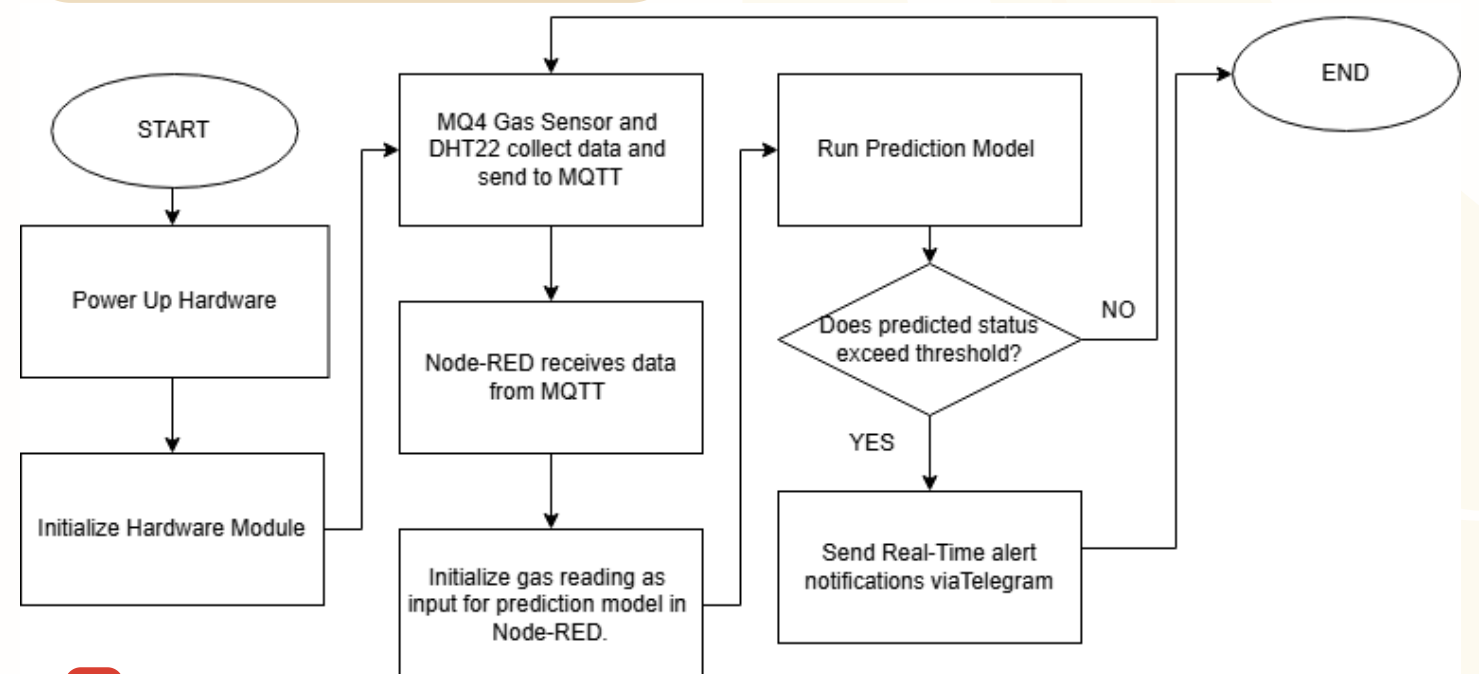
SCOPE AND LIMITATION

The scope of this project is to develop an IoT-based fruit spoilage detection system specifically designed for household users, including those who may not have the time or ability to regularly check their stored produce. The system will monitor environmental factors such as gas emissions, temperature, and humidity using sensors and provide real-time alerts through a user-friendly interface. By automating the detection process, the system ensures that users can easily manage their fruit storage without needing technical knowledge or constant attention, making it accessible for all, including busy individuals or those with physical or cognitive limitations. This solution aims to reduce food waste, improve convenience, and promote sustainable practices in everyday household routines.

LITERATURE REVIEW

Title	Author(s) and Year	Technology Used	Methodology	Sensor, Microcontroller and Cloud
IOT Based Food Freshness Detection Using Deep Learning Techniques	Karthickeyan P, 2022	IoT, Deep Learning Algorithms Rotational Mechanism	Agile	-Raspberry Pi 4 Model B - ESP8266 - Web Camera - MQ2 Sensor - MQ135 Sensor
IoT based Fruit Quality Inspection and Lifespan Detection System	Ashim Saha, 2024	IoT, Machine Learning, Data Visulization	Waterfall	- Raspberry Pi Pico - NodeMCU ESP8266 - MQ4 Sensor - DHT11 -ThingSpeak Cloud
IoT-Based Food Spoilage Detection System with UV Sterilization	P. Manjulamna, 2024	IoT, UV Sterilization, Mobile Application	Agile	- NodeMCU ESP8266 - Gas Sensor - DHT11 - IR Sensor
Fruit Freshness Detection and Monitoring using IOT	Prof. Dipti A. 2024	IoT, Data Communication	Waterfall	- ESP8266 - Arduino UNO - MQ3 Sensor - Blynk
Developing an IoT and ML-driven Platform for Fruit Ripeness Evaluation and Spoilage Detection: A Case Study on Bananas	Rajini M, V Persis 2024	IoT, Machine Learning, Cloud Storage, Data Transmission	Waterfall	- ESP32 - SGP30 - SHT40 - ThingSpeak Cloud

FLOWCHART

RESULT AND DISCUSSION

🍎 Fruit Ripeness Update
📊 Status: Overripe
🟡 Your Fruit is about to Rot. Consume Now!
📟 Gas Level: 356.0
📅 Recorded: 1:06 AM | 27/05/2025   1:06 AM

/status 7:19 PM ✓✓
🌟 Fruit Monitoring Report 🍅
🌡 Temperature: 31 °C
💧 Humidity: 72.4 %
📟 Gas Level: 155
✅ Predicted Status: Fresh 🍅   7:20 PM

Rotten Fruit Detection

Gas Reading: 219
Temperature: 31.2
Humidity: 66.8

Gas Reading Chart

CONCLUSION

The Rotten Fruit Detection System offers a smart solution for monitoring fruit condition using real-time sensor data and automated alerts. By providing early warnings of spoilage, the system supports better food management and encourages more sustainable habits at home.

REFERENCES

- [KarthickeyanP, B., Devi, K., & Professor, A. (2022). IOT Based Food Freshness Detection Using Deep Learning Techniques.
- Zakaria, A., Rahman, A., & Rahim, A. (2014). AN OVERVIEW OF FRUIT SUPPLY CHAIN IN MALAYSIA (Vol. 37).