UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF INFORAMATION TECHNOLOGY
BACHELOR OF INFORMATION TECHNOLOGY (HONS) IN INTERNET OF THINGS
FINAL YEAR PROJECT 2

SMART PLANT MONITORING SYSTEM FOR CUCUMBER

Name: Afiq Hazim Bin Azaddin
ID: 52224122132
Supervisor : Ts. Faridah Binti Yahya

INTRODUCTION

The Smart Plant Monitoring System for Cucumber project aims to implement IoT and sensor-based automation to innovate traditional farming practices. Paired with an array of sensors this system not only captures real-time data but also interprets it into actionable insights. This system indirectly enhances plant health through continuous monitoring, data-driven decision-making, and efficient resource utilization.

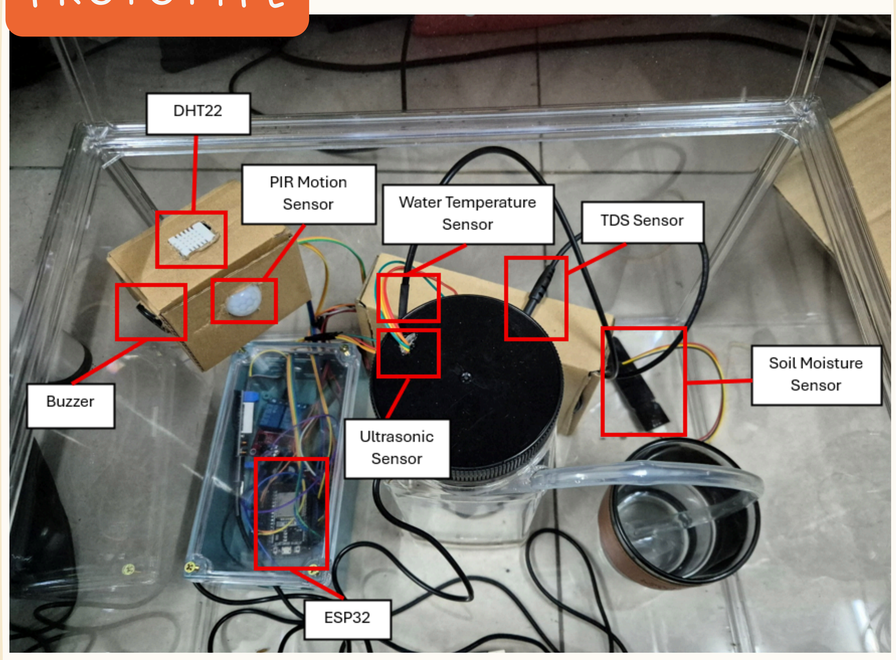
OBJECTIVES

- To implement PIR motion sensor configuration to turn on buzzer and send notification to the dashboard and app if it detects any movements or intruders.
- To develop irrigation control systems remotely, allowing for efficient management from anywhere which solves water scarcity.
- To gather data from the Environment Sensors. The data is continuously sent to an IoT platform where it can be monitored in real time through a mobile app or dashboard.

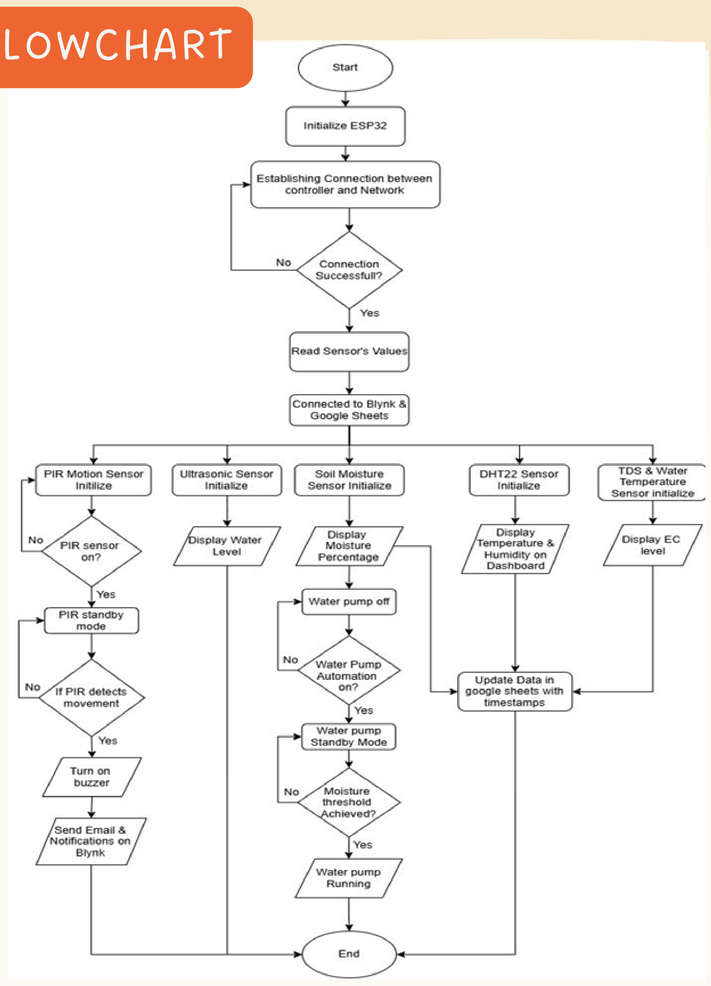
PROJECT LIMITATION

- The system relies on manual mixing of fertilizer into the water tank as it provides no automation to mix them automatically into the water. The quantity of us/cm is provided in the dashboard for reference.
- The system is powered with 2 micro USB which powers Step-up and ESP32 using a 5v output power source (e.g. Power bank). The system will not provide the battery percentage from the power bank, so user have to check it manually.
- PIR Motion sensor detection is limited

PROTOTYPE



FLOWCHART



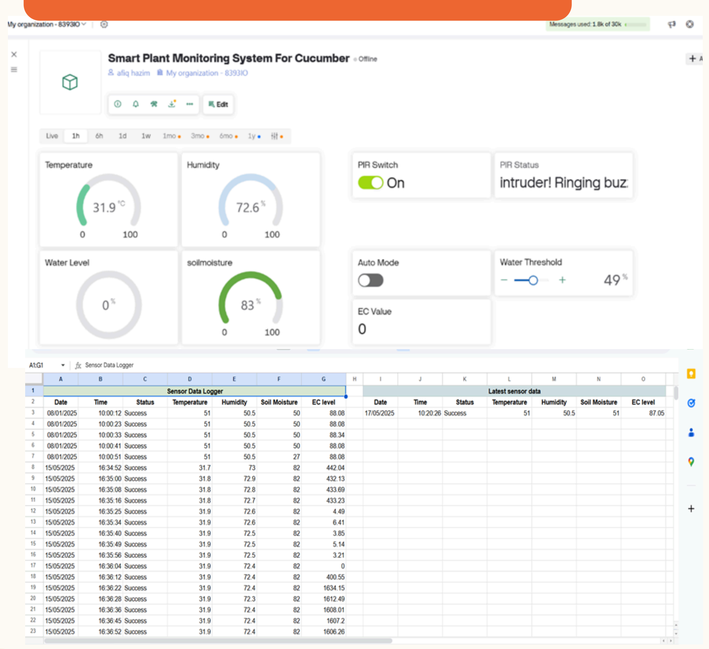
FUTURE IMPROVEMENTS

- Add 2 more water tank to have both fertilizer A & B automated mixing for the system.
- Integrating camera in the system provide enhanced security .
- Use solar panel as the Power Source to continuously have power.

LITERATURE REVIEW

Reference	Implementation Cost	Technology Used	Key Features	Weaknesses
Smart Plant Monitoring System using Aquaponics Production Technological with IDE and SMS Alert.(Shilpa Devram Pawar & Dr. Damala Dayakar Rao, 2022)	• High • Many actuators used.	Atmega328p, GSM module, Environment Sensors	• Wireless Automation • Notification system • Weatherproof • Suitable to cover large areas of crops.	• Higher cost • Complexity in setup • Many signal transmission in a process.
The Prototype of the Greenhouse Smart Control and Monitoring System in Hydroponic Plants.(Arif Supriyanto & Fathurrahmani, 2019)	• Medium	Arduino UNO, Environment Sensors, Relay, water pump	• Easy to setup. • Able to measure water quality. • Able to view real-time data from LCD screen.	• Uses separate microcontrollers which could cost space. • Data transmission delay.
Automatic Plants Watering System for Small Garden.(Astutiningtyas et al., 2021)	• Low	Arduino UNO, Wi-Fi Module, environment sensors, sprinkler.	• Own personalised app. • Capable to set watering time. • Uncomplicated system.	• No security sensors that could detect pests or intruders. • Unable to manually turn on the sprinkler
Smart Plant Monitoring System for Cucumber	• Low	ESP32, Environment Sensors, Water pump.	• Easy to set up • Automated Water pump • Able to detect motion.	• Manual Fertilizer mixture

RESULTS & DISCUSSION



- Enabled Data Logging System using google sheets for future analysis for user.
- Interactive Dashboard to view Real-Time Data from Blynk Website or Blynk Mobile.
- Allow user to control water pump and buzzer automation.
- Email and app alert are automated if PIR detects motion.
- EC value is displayed with data calculation from TDS Sensor & water temperature Sensor.

CONCLUSION

This project demonstrates the potential of IoT application to modernize traditional plant monitoring for cucumber practices by integrating real-time environmental Monitoring, automated irrigation, and remote access capabilities.

REFERENCES

- Mohabuth, A. Q., & Nem, D. (2023). An IoT-Based Model for Monitoring Plant Growth in Greenhouses. Journal of Information Systems and Informatics, 5(2). https://doi.org/10.51519/journalisi.v5i2.489
- Pereira, G. P., Chaari, M. Z., & Daroge, F. (2023). IoT-Enabled Smart Drip Irrigation System Using ESP32. Internet of Things, 4(3). https://doi.org/10.3390/iot4030012