FARM INTEGRATED MONITORING

Group 5 - RPL 02

OUR TEAM

Our team consists of individuals from Computer Engineering UI class of 2022, all with significant experience in software engineering and IoT. We are a group of creative minds, strategic thinkers, and industry experts dedicated to innovation and excellence, ready to bring fresh perspectives and expertise to this project.

Ivan Yuantama P
Team Lead & Backend

Rafli Adithia
Hardware & Integration

Faruq Sami R
Frontend & Testing

CONTENT

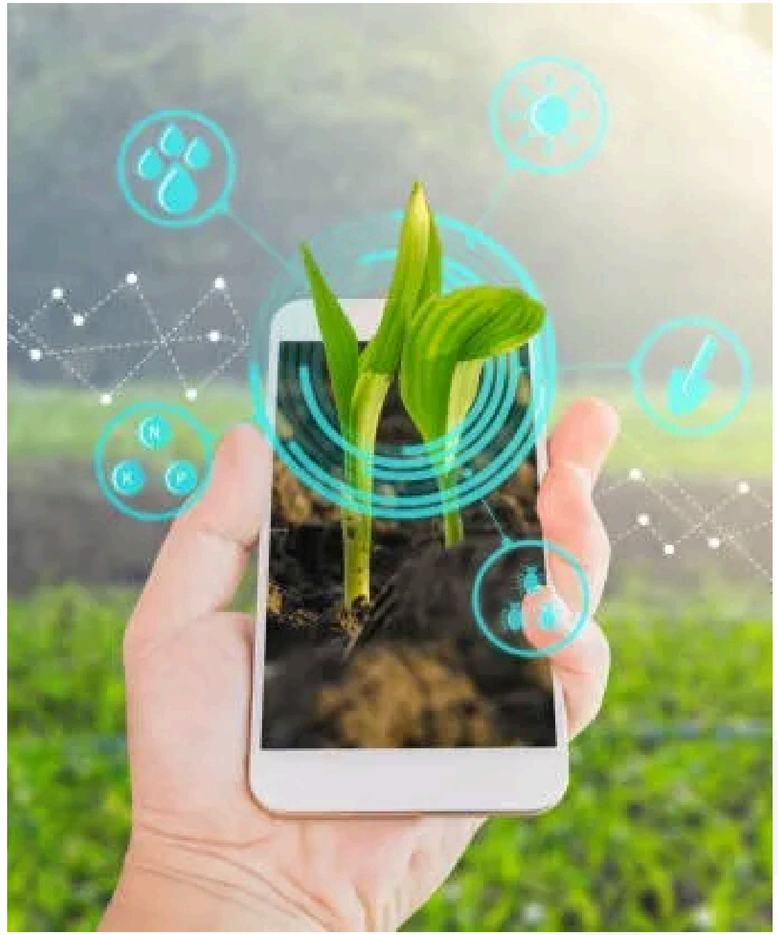
01 - INTRODUCTION

Gardening has become a popular side hustle due to seasonal harvests, but many gardeners face challenges in monitoring their crops while still going about their main job. Efficient use of water, fertilizers, and plant health monitoring are essential to maximize productivity and sustainability. Inefficient resource management not only reduces crop yields but also damages the environment, so modern solutions that support real-time data-driven decision-making are needed.

The Farm Integrated Monitoring (FIM) project is here to address this challenge by introducing an automated and online system for real-time crop monitoring. FIM enables precise fertilizer calculations, moisture content monitoring, and data-driven recommendations to help gardeners optimize their practices. With features such as real-time alerts and predictive analytics, FIM allows gardeners to respond to issues quickly, improving crop yields, resource efficiency, and ensuring a more sustainable farm.

02 - PROJECT AIM

The Farm Integrated Monitoring (FIM) project updates farm management by improving productivity and resource efficiency through real-time data and automation. By leveraging IoT, FIM helps farm owners remotely optimize their farms.



Key Benefits:

- Increased Yields & Profitability: Real-time monitoring boosts crop production while reducing costs.
- Improved Resource Efficiency: Optimizes water, fertilizer, and pesticide use, minimizing waste.
- Enhanced Sustainability: Promotes eco-friendly practices, conserving natural resources.
- Proactive Problem Solving: Early issue detection prevents losses.
- Remote Access: Manage gardens anytime, anywhere via mobile apps.

03 - TOOLS & TECHNOLOGY

IoT Sensors & Relay

We use sensors to measure temperature and soil moisture. The sensor used is the DHT11, which measures temperature and humidity in the soil. We also use relays to control electronic devices like water pumps.

Microcontrollers

The ESP32 or ESP8266 microcontrollers are used as the CPU or brain of the IoT system. They gather data from the sensors, send it to the server, and receive instructions to control automatic devices like water pumps.

Wi-Fi Modules

We use Wi-Fi modules for communication to connecting the IoT devices to the internet so they can be controlled remotely. The Wi-Fi is used to send the data from the microcontroller part such as sensor to the cloud (Blynk).

Cloud

We use Blynk as the cloud platform to store and process the data received from the IoT devices. Blynk is an IoT platform designed to connect hardware (such as sensors and automation controls) with mobile and web applications, allowing for online data management.

03 - TOOLS & TECHNOLOGY

Web Application Development

For web app development, we use frameworks/libraries like ReactJS and NodeJS. ReactJS is used for the frontend to develop the user interface, while NodeJS is used for the backend, linking the frontend to the database.

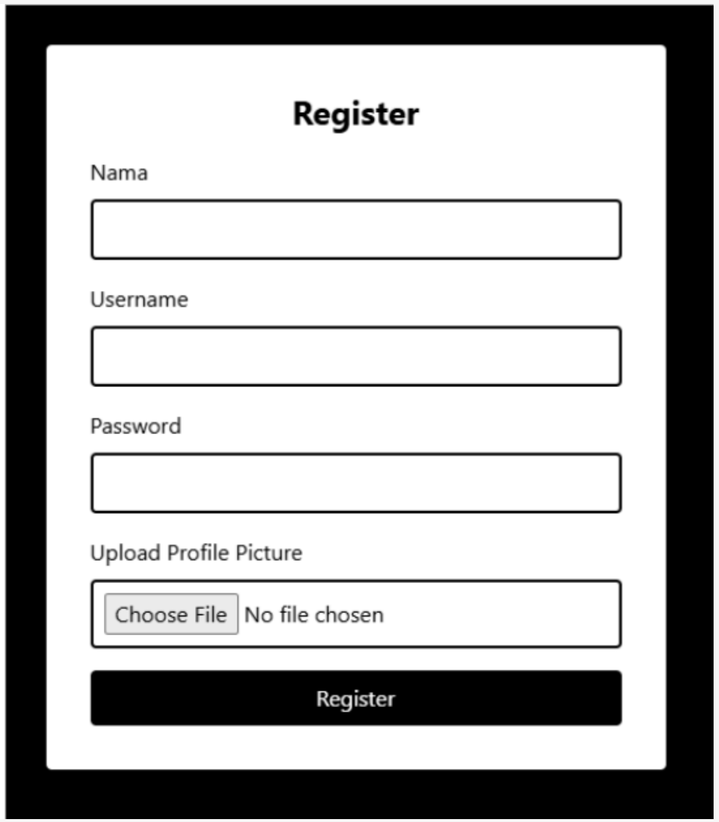
Database

We use NeonDB as the database to store various values from devices like sensors and relays, as well as for tracking monitoring and automation history. The database is also used for notifications when any issues occur with the devices.

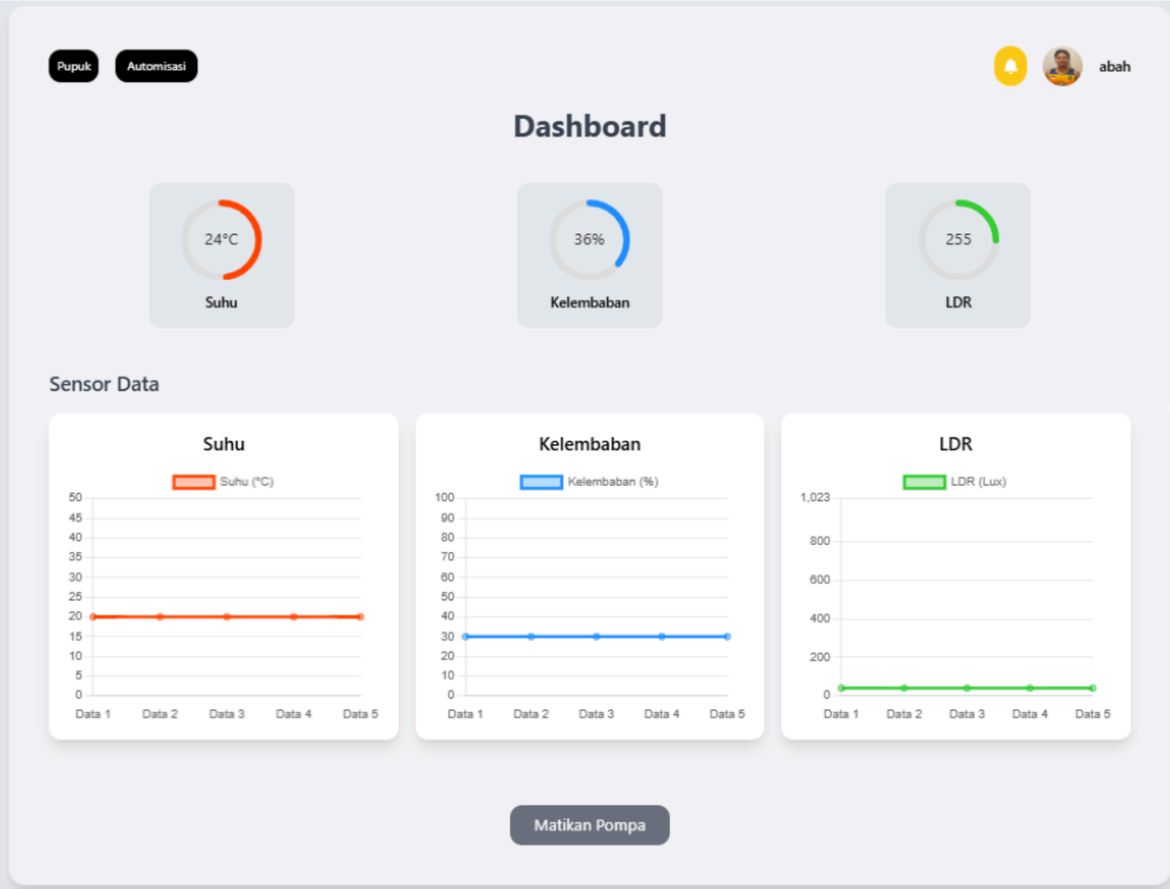
04 - FUNCTION / MODELS

Login & Register

oversees user authentication, making sure that only users who have registered can use the FIM app's functionality. Before allowing a user to use the app, the secure login system checks their identity and controls their access permissions according to roles like admin or regular users.



04 - FUNCTION / MODELS



Crop Monitoring Module

Gathers information in real time from several sensors (such as light, humidity, and temperature) and presents it on the user dashboard. In order to maximize farm management, this data is processed and examined.

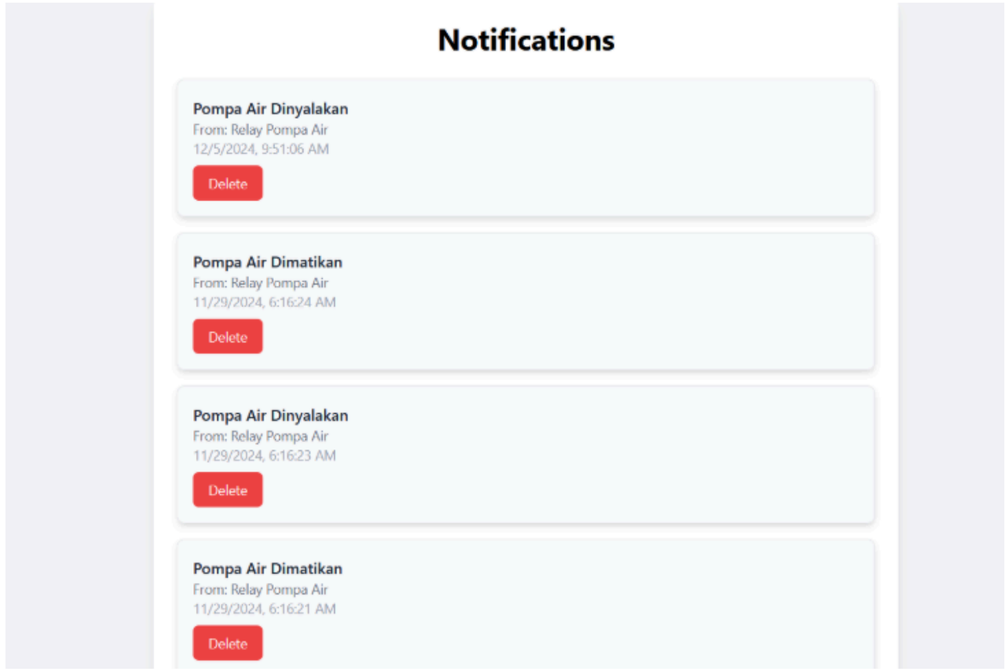
Database Connectivity Function

This feature establishes a connection between the FIM app and the database that houses the monitoring data from IoT devices. Plant data can be stored and retrieved in real time and is shown on the user dashboard. The cloud platform being used, Blynk, facilitates effective data management using simple-to-integrate APIs.

04 - FUNCTION / MODELS

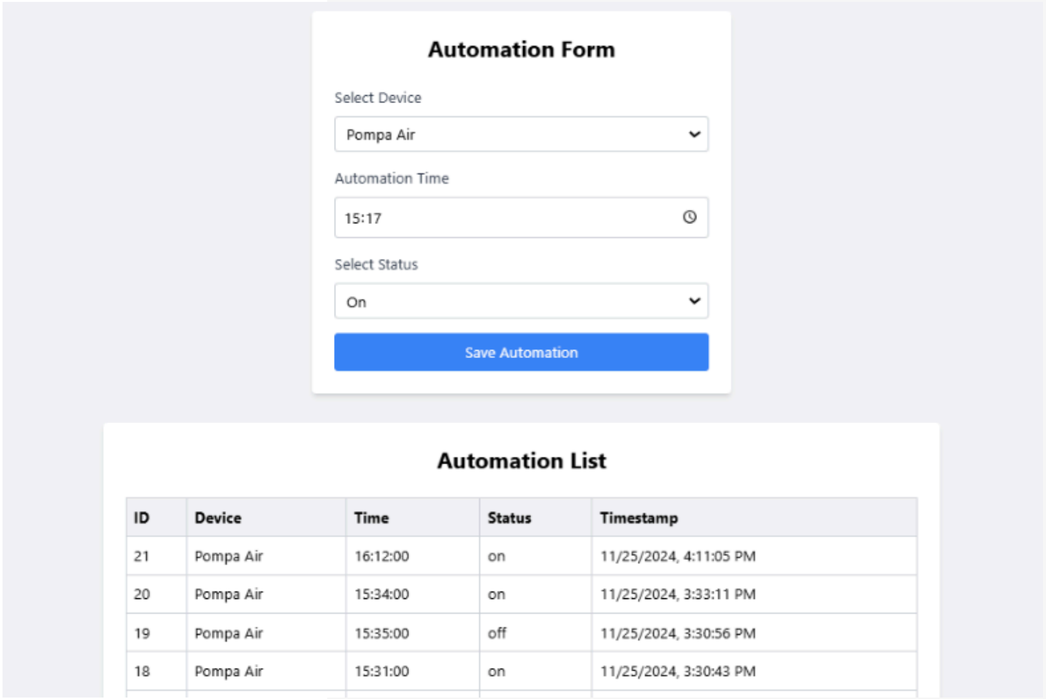
Notification Module

When plant conditions—such as a shortage of water, fertilizer, or pest attacks—are not ideal, the module automatically sends out notifications. Users are able to take the required actions fast.



Automated System Control Module

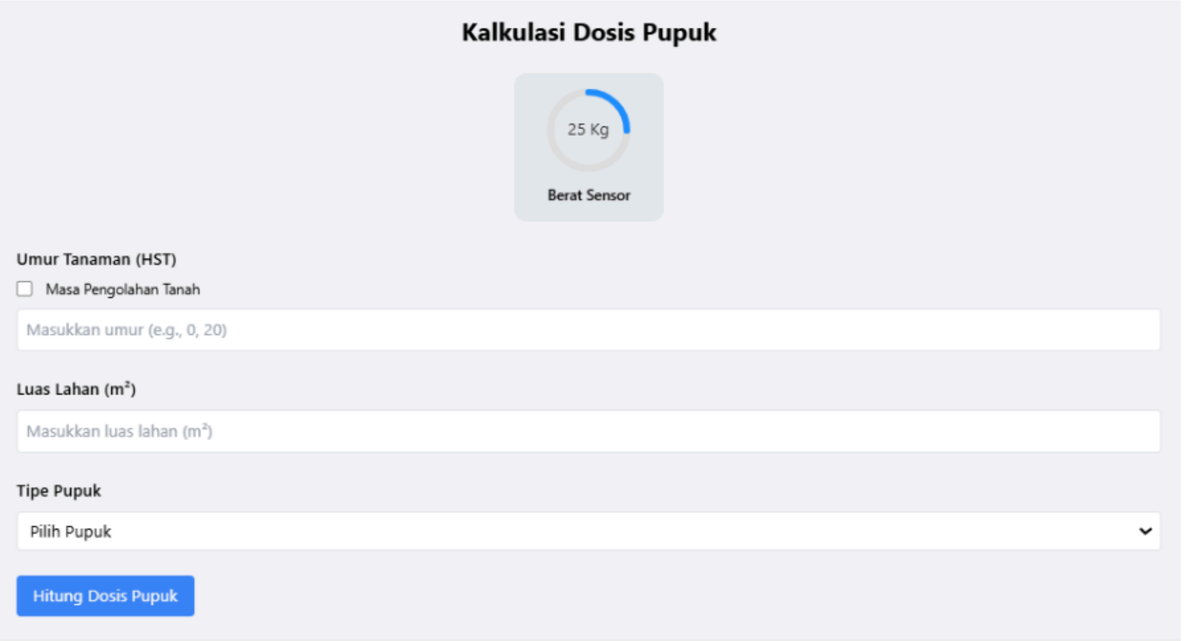
Controls automatic systems like water pumps and pesticide sprayers based on sensor data, allowing plant care without operator intervention.



04 - FUNCTION / MODELS

Fertilizer Calculation Module

Determines fertilizer requirements by considering plant conditions. The algorithm calculates the required amount of nutrients and suggests the right amount of fertilizer. In this fertilizer calculation, we can calculate the right weight of fertilizer for the melon plantation according to the age of the plant and the size of the land.



Farm Integrated Monitoring

THANK YOU

FOR YOUR ATTENTION

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