Project Abstract: Rubus Labs

Project Title: FloraGuard: Intelligent Environmental & Soil Health Monitor

Team Name: Rubus Labs

Chosen Theme: PI the IoT (IoT is Bold)

Problem Statement

In today’s busy lifestyle, it is becoming increasingly difficult to monitor the progress of our plants and their physical states due to constant changes in their environments. Indoor gardeners and enthusiasts often struggle with the "invisible" health metrics of their plants. While a plant might look healthy externally, subtle fluctuations in ambient temperature and humidity, combined with inconsistent soil moisture levels, can cause irreversible strain on plant health before physical symptoms appear, leading to plant failure due to delayed responses to environmental changes. Neglecting to respond to these environmental changes in real-time can be detrimental to sensitive flora

Proposed Solution

We propose FloraGuard, an integrated embedded system built on the Raspberry Pi and Sense HAT. Our solution will leverage the Sense HAT’s onboard temperature and humidity sensors to monitor the plant's immediate atmosphere.

Using Python, we will develop a monitoring script that:

Analyses Data: Interprets real-time environmental data against pre-defined optimal thresholds for specific plant species.

Visual Feedback: Utilizes the 8x8 LED Matrix to provide instant status updates (e.g., a Green icon for optimal conditions and Red for temperature spikes).

Data Logging: Stores hourly readings in a CSV format on the Raspberry Pi to allow for long-term health trend analysis. This allows our team to generate statistical summaries and graphs to identify long-term growth patterns.

Security & Surveillance: We will integrate the Camera Module v3 to capture photos when significant environmental changes are detected, creating a visual log of the plant's reaction to stress

Team Members & Initial Role Assignments

Izabela Heczkova (Project Manager & Problem Analyst): Responsible for project timelines, requirements gathering, and final document synthesis.

Hurrain Ghaffar (Lead Code Developer): Responsible for Python script development, sensor integration, and GitHub repository management.

Irene Kellegher (Hardware & Systems Specialist): Responsible for hardware configuration, system testing, and technical troubleshooting.