IOT PLANT HEALTH MONITORING SYSTEM

Project Proposal

Higher Diploma in Science in Computer Science

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DETAILS

Title	IoT Plant Health Monitoring System
Type	Independent
Category	Hybrid IoT and web application

OUTLINE

The primary component of this project will be an IoT plant health monitoring system. This will utilize a Raspberry Pi with sensors for environmental conditions such as soil moisture, light intensity, temperature, and humidity, and a monitoring program written in Python. Depending on feasibility, it may also include a water pump for watering.

After successful implementation of the IoT component, the secondary component will be a web application that allows users to interact with the IoT system and view reports of sensor data. Ideally, a cross-platform framework such as Flutter will be used, to facilitate deployment to web and mobile platforms.

I will draw heavily on lessons learned during the implementation of my previous IoT project, *Watchful Pi* (Kelly, 2022). However, this project will be substantially different, as it has a different use case, utilizes different sensor components, and will have an overall larger scope.

For determining the hardware components required, I will look at some of the hobby electronics kits available for this type of project, such as the *Grove Smart Plant Care Kit* (Seeed Studio, 2022). It is important to note that my project will not be a simple implementation of one of these hobbyist kits but will use them as a point of reference.

The primary goal of the project will be to deepen my knowledge of the IoT field by producing a simple but complete system for plant health monitoring over the internet. The secondary goal will be to gain exposure to additional technologies, such as Flutter and Dart.

The technologies and tools described in this proposal are provisional and may change during implementation as the requirements of the project become clearer.

TECHNOLOGIES

HARDWARE

Provisionally, the project hardware technologies will include:

- Raspberry Pi 4 model B
- Environmental sensors, including:
    - Temperature and Humidity sensor
    - Moisture sensor
    - Light sensor
    - Water flow sensor
- Actuators, including:
    - 12v water pump

        o   Relay

SOFTWARE

Provisionally, the project software technologies will include:

- Python 3.x and libraries for GPIO devices, for implementation of the IoT component
- Dart, for implementation of the web application component
- MongoDB, for data storage
- Microsoft Azure, for any cloud hosting requirements

TOOLS

- Visual Studio Code, for developing in Python and Dart
- Flutter, for user interface design of the web application component
- Proxmox Virtual Environment, for hosting test and development servers

PROCESS

I will start by implementing the IoT component of the project. At a minimum, this should read data from the sensors and log that data to a database.

Once data from the sensors is being logged to a database, work can begin on a web application to allow the user to view this data. Completion of this would be considered version 1.0.0.

Once the version 1.0.0 milestone is reached, additional features could be added, such as automated watering of plants, based on environmental conditions or user input from the web application. Additionally, we could consider making the web application available on mobile, if feasible.

STAKEHOLDERS

The project will be developed independently by me. The target audience is keepers of indoor plants who would like to automate some of the plant care process.

REFERENCES

Kelly, H. [htkelly] (2022) *Watchful Pi* [GitHub]. Available at: https://htkelly.github.io/watchfulpi (Accessed: 6 November 2022).
Seeed Studio (2022) *Grove Smart Plant Care Kit*. Available at: https://wiki.seeedstudio.com/Grove_Smart_Plant_Care_Kit (Accessed: 6 November 2022).