Smart Garden

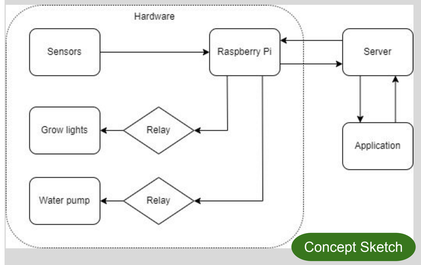
sdmay22-25

Members: Bryanna Adamson, Julia Condon, Devon Sindt, Jacob Thomae, Jasen Helsel, Nick Vaughan, Sarah Schoenke

Advisor: Diane Rover

Client: NA

Project Basics



Concept Sketch

Problem Statement

Growing plants can be not only a time consuming task, but a very sensitive one as well. With our smart garden monitoring system, we hope to automate as much of the plant growing process as feasibly possible in order to make it more consistent and manageable for the user. Doing so will save time and money, and will in turn make growing plants a more accessible task for a wide range of potential users.

Solution

Our solution for this problem was to create our own garden, capable of monitoring and controlling itself with predetermined values for water, heat, light, and humidity. Our final concept included control of all of these aspects of plant growing in a greenhouse plus an easy to control web application to manage the greenhouse however the client likes.

Design

Design Requirements

Functional:

- *Monitor temperature and humidity of the environment in order assure plant health*
- *Time the growth of the plant*
- *Water the plant using a timed water pump*
- *Give the plant light using an led plant light*

Resource:

- *Funds to purchase Seeds, & Soil*
- *A location to host our project - AWS*
- *The prototype size is limited by the amount of allocated space for the project*
- *Sensors and circuitry to observe the plant and communicate findings to the user*

Economic/Market:

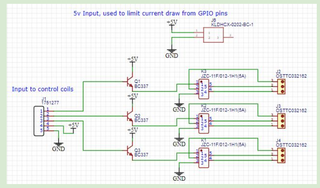
- *This project must cost under $1000 to create and operate*

Environmental:

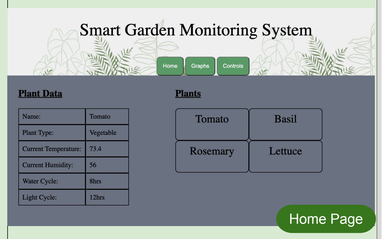
- *The greenhouse was constructed to avoid temperature variations while testing the IoT components*

Design Approach

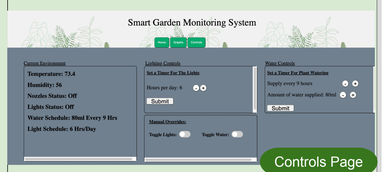
Hardware



Software

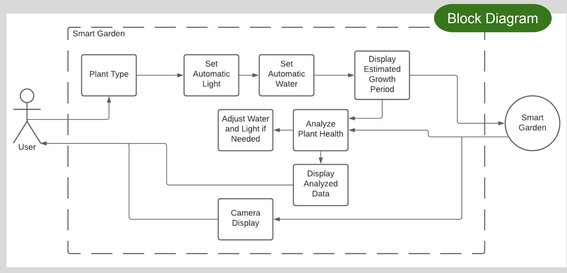


Home Page

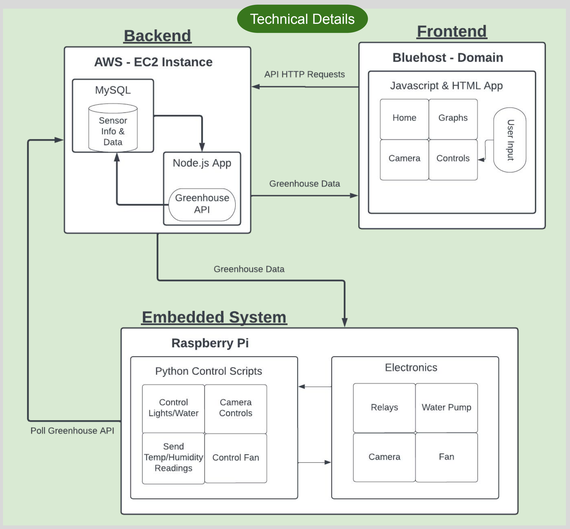


Controls Page

Block Diagram



Technical Details



Intended Users

- Low income household
- Food insecure communities
- Individuals looking to live a healthier lifestyle
- Hobby gardeners
- Teachers for educational purposes

Testing

Strategy

- Integration Testing - Testing as new developments were made
- Agile Testing - on a monthly cycle tested the software system

Results

Testing of every subsystem during and after development yielded successful results. Each part of the smart garden functions as expected, as well as the communication between them.

Future Development

While each subsystem was tested and verified to work properly, large scale testing of the system as a whole remains to be done. The next phase of development for the greenhouse would be to begin long term plant growth testing and tuning of the subsystems according to what results in the best plant growth.