

Initial Project Documentation

Plant Monitoring Device



Self-contained Plant Monitoring System With Companion App

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Project Narrative

Owning and caring for plants, whether it be a small houseplant or a garden of vegetables or fruit, has always been a hobby for many people. Although some are not at all hard to take care of, many are; especially if you intend on ensuring that your plants are in the best environment possible. This will not only allow your plants to live longer, but for food bearing plants it will allow them to grow healthier as well. There's nothing worse in plant ownership than putting your all into taking care of a plant only to have it die because one of its environmental factors was lacking, and this is the problem we aim to solve.

When it comes to taking care of plants, nothing is more important to their livelihood than the environment they are living in. This is the reason many fruits and vegetables have to be grown in certain states or countries, as their climates are best suited for those plants. We want to make monitoring the most important factors of the environment easy for anyone, and the best way to do that would be to allow an owner access to all the information they might need in one place: in their pocket.

Our project aims to allow for easy monitoring of one plant with the eventual possibility of multiple at a time. These monitors include sensors for moisture, humidity, light, temperature and pH. The physical sensors themselves will be all put together into one main monitor PCB that is as low cost and low power as possible while maintaining accuracy.

These monitors will be available on a mobile app that is accessible on Android that utilizes the internet. The companion app will also have access to a database of information regarding many different plants so that even the most uninformed plant owner can know the specifics of caring for whatever plant they may have. Although there is something that can be said about being self-informed and monitoring your plants yourself, our goal is simply to make this easier and more accessible for everyone.

Requirements Specifications

Physical system

- Moisture, humidity, light, temperature and pH sensors
- PCB and breadboard with possible display
- LED display on the physical monitor that will allow for quick glance updates without using the app
- These LEDs will flash specific colors for different states and allow the user to identify if there is an issue that needs to be tended to
- The LEDs will have a push button trigger to enable/disable their use for power saving reasons
- 3D printed shell for protection and looks
- Runs on battery at low power for longevity

Companion app

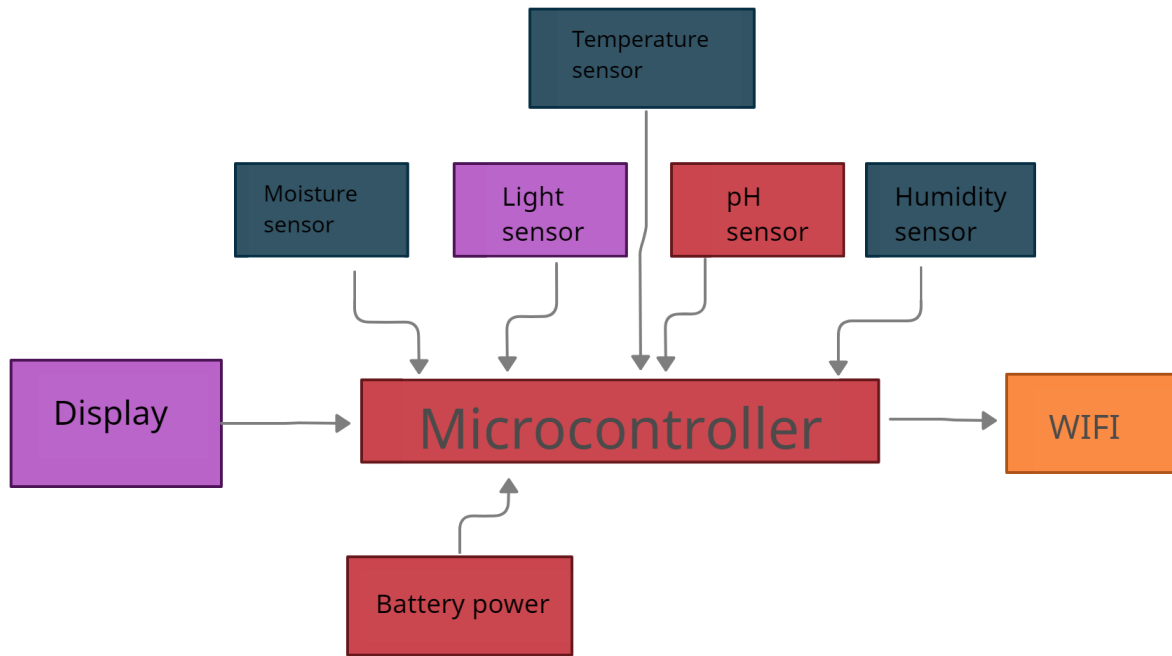
- Built for Android
- Connects to the internet
- Monitors your plant using the sensors
- Possible access to a database of common plants and their optimal environments
- Database will allow monitors to notify user if their plant's environment changes too much (e.g. one of the sensors measures a value outside of a range)
- These push notifications can be toggled on or off

Constraints

One of the biggest constraints here will be cost. Although we have a decent budget, we want to make this project cost as little as possible, especially when it comes to the individual monitors. Making this happen will allow us to expand our scalability and specifically allow multiple plants to be monitored at the same time on the app. We also don't have a lot of time either, we have roughly 20 or so weeks to get this done, meaning we will need to be on top of the progress and aim to be ahead of our milestones so that we make the absolute most out of the time we have to work on this project.

Block Diagrams

Hardware –



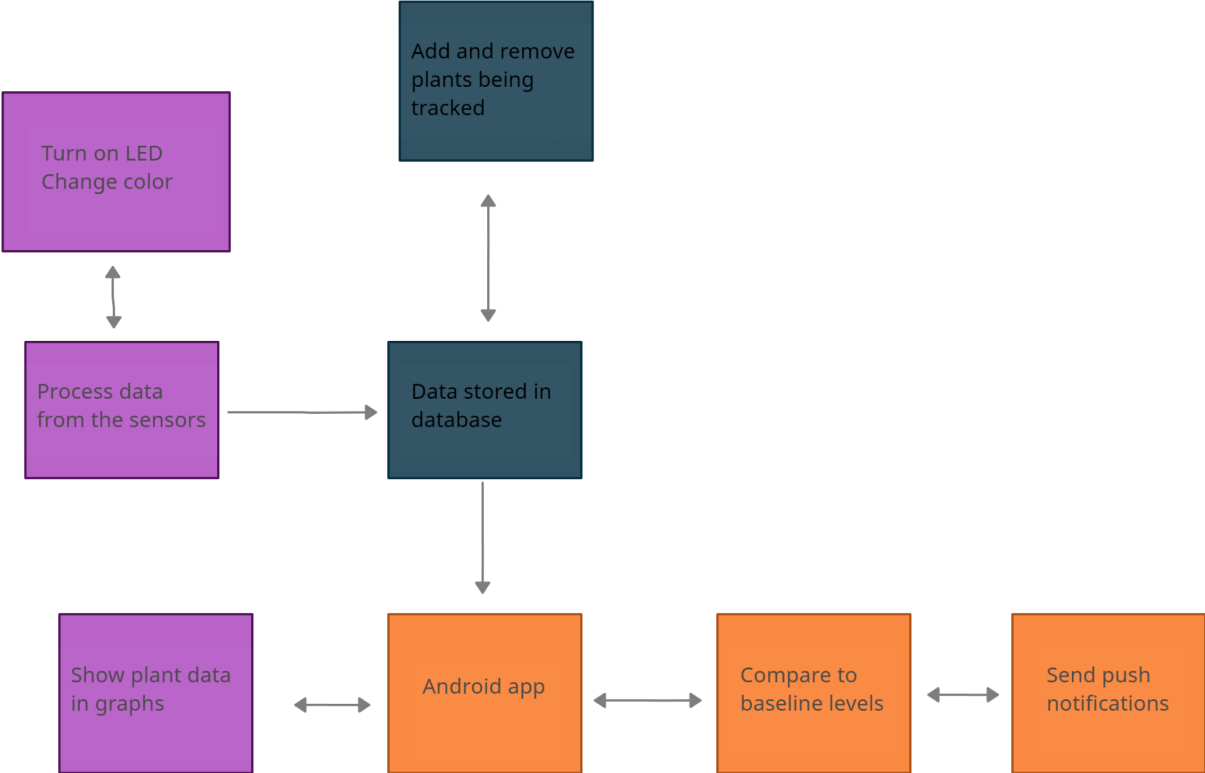
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Software –



Project Budget

Below you will find the Estimated Project Budgeting Chart for this project. The reason for “TBD” in the Quantity column is due to the possibility of multiple systems versus one. We are not sure if we will be creating one major system or multiple smaller systems for each plant. This is dependent upon our time frame given. This project will be self-funded.

Item	Quantity	Price Estimate
Moisture Sensor	TBD	~ \$10
Humidity Sensor	TBD	~ \$15
Other Various Sensors (light, temp., etc.)	TBD	>= \$10
Batteries	TBD	~ \$15
Custom PCB	TBD	>= \$30
Miscellaneous Plants	TBD	N/A
Possible Enclosure (plant &/or device)	TBD	TBD
Possible LCD Display	TBD	~ \$15
Breadboard	TBD	~ \$10
Extra Components (LED lights, etc.)	TBD	<= \$50
Total Estimated Cost		~ \$150

Project Milestones

Milestone	Duration	Approximate Completion Date
Divide and Conquer		February 4
First Meeting With Dr. Wei		February 7
Initial Research	~ 8 weeks	February 7 - March 25
First Rough Draft Document		March 25
First Rough Draft Meeting		Week of March 28
Second Rough Draft Document		April 8
Second Rough Draft Meeting		TBD
Final Draft Document		April 26
Build Prototype	~ 1 month	May - June (first week)
Testing	~ 1 week	June (second week)
Possible Redesign	~ 1 week	June (third week)
Final Prototype	~ 1 week	July (first week)
Presentation	TBD	July (first week) - TBD
Final Report	TBD	July (first week) - TBD

Throughout research conduction, we will be able to note our prototype goals and then be able to add prototyping milestones to the “Build Prototype” portion.