ENGINEERING
TEXAS A&M UNIVERSITY

TEXAS INSTRUMENTS

EPS Booth: 353

Smart Indoor Watering System

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TEXAS A&M UNIVERSITY
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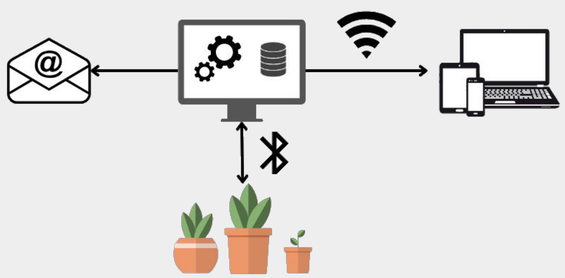
Introduction

- **Plant Care Anxiety:** A striking 67% of millennials struggle with indoor plant maintenance, indicating a significant anxiety and knowledge gap as highlighted by The Independent.
- **Our team has** designed a functional indoor plant watering management system to decrease the workload of maintaining an indoor home garden.

Objectives

- **Simplify Maintenance:** Create a user-friendly system that allows users to monitor the health of all of their plants.
- **Automate Plant Watering:** Make autonomous the important but mundane tasks of plant maintenance, feeding back soil moisture measurements into watering quantities to match user-specified moisture levels.
- **Real Time Notifications:** Notify plant owners of hazards to plant health.
- **Enhance User Confidence:** Provide a solution that assists beginner hobbyists in overcoming the struggles associated with plant maintenance, encouraging them to confidently own and care for houseplants.

Framework

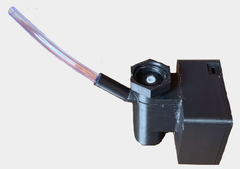


Our Product

Hardware:

- Centrally, a Main Unit (MU), powered by TI's AM625 SoC, hosts a web-application, database, and controls the operation of individual Field Sensor Units (FSUs).
- In each pot, a TI CC2650 MCU monitors potted plant soil moisture and sends the TI DRV8212 driver a PWM signal for watering.
- Devices are connected via BLE: the MU commands each FSU to perform required tasks, and the FSU replies with the results of each task.

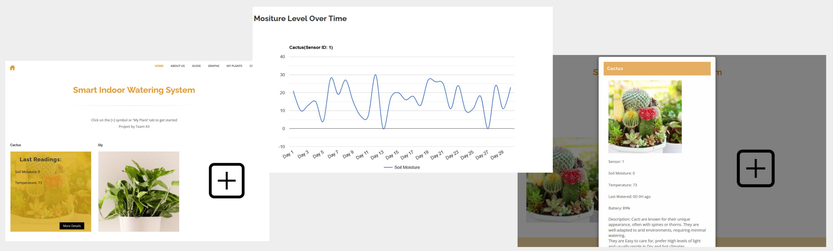
Main Unit



Field Sensor Unit and Watering Enclosure

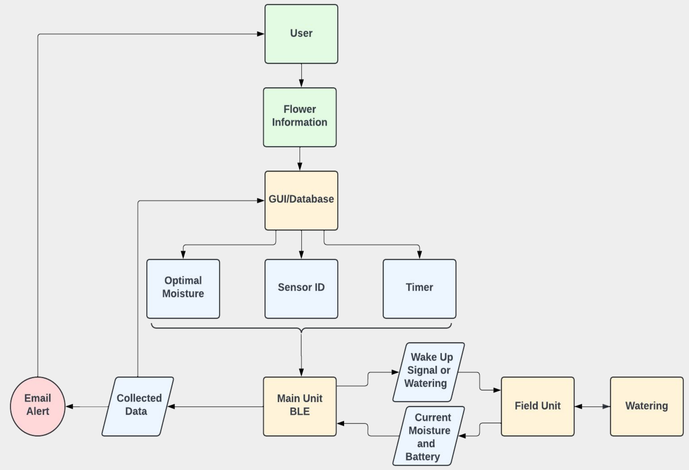
Graphic User Interface:

- GUI allows users to connect their potted plants into the system, adding custom plant profiles and watering characteristics.
- Users can monitor the health of each plant, seeing its current moisture levels, how often its being watered, and view historical data on the plants health.



- Through the interconnected system, users can take a hands off approach while still maintaining the health of their plants. Receiving live plant updates and notifications as backup if any interference is needed

User Process Flowchart



Results

- Smart Indoor Watering System successfully monitored the moisture of potted plants automatically for 120 iterations (1 hour, 1 iteration every 30 seconds).
- Throughout the test, SIWS measured soil moisture to within 5% accuracy on a scale of 0 to 100, or open air to submerged.
- Using moisture levels, the FSU tells the pump how long to water and when.
- SIWS successfully used most recent soil moisture data as a feedback to control watering duration.
- SIWS supports up to 3 devices connected externally, allowing users to view data from anywhere in the house.

References

[1]Ritschel, C. (2020, January 27). *Millennials find caring for plants daunting, survey finds.* The Independent. https://www.independent.co.uk/life-style/millennials-plants-water-alive-indoor-anxiety-survey-a9304596.html