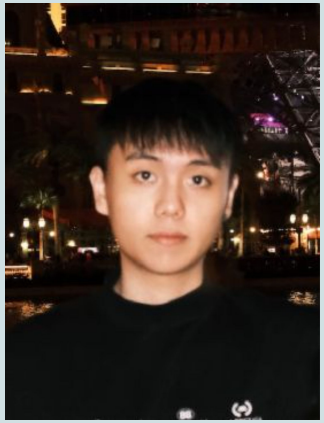
Team Equal Drip



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Problem Context:

- Majority live in urban areas with limited space for outdoor gardening
- 90% of households own at least one indoor plant
- Over 60% of adults report lack of time as a major barrier to plant care
- 50% of indoor plants die within the first year due to neglect
- 77% of Americans use smartphones, supporting the feasibility of app-based plant care solutions
- Growing trend in online communities for hobbies like indoor gardening

Problem Statement

How might indoor plant owners achieve an automated plant care system through the use of mobile app and sensor technology so that they can ensure the health and survival of high-end houseplants while reducing the time and effort required for plant care?

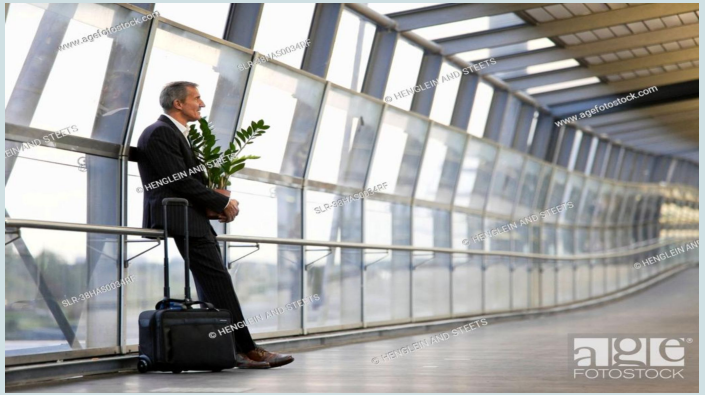
Key Research Insights

- Over 65% of indoor plant owners prefer using automated tools for plant care
- 70% of frequent travelers report losing plants due to neglect during trips
- The market for smart home devices is projected to reach $174 billion by 2025, indicating widespread acceptance
- High-end plants often suffer from improper care, with incorrect moisture levels responsible for up to 80% of plant issues
- Usability tests show that 95% of users prefer simple and intuitive interfaces, opting for ease of use over complex features

Personas

Jen, the Plant Lover

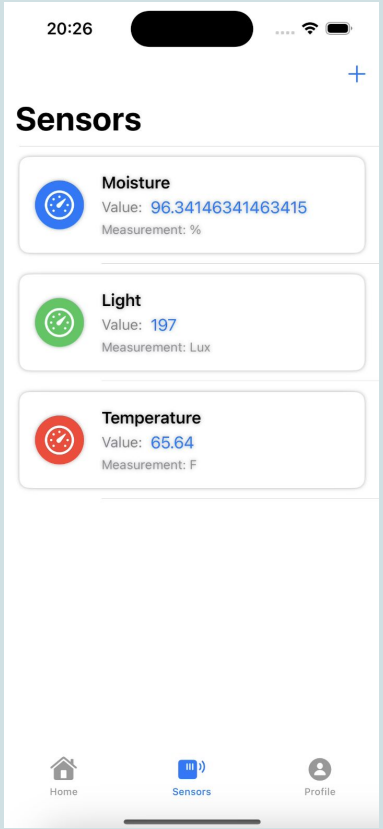
- **Age**: 65
- **Lifestyle**: Homebound with a passion for nurturing rare plants.
- **Challenge**: Managing the complexities of plant care, especially with watering needs.

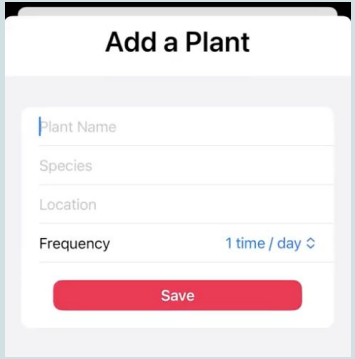


Plankton, a traveling businessman

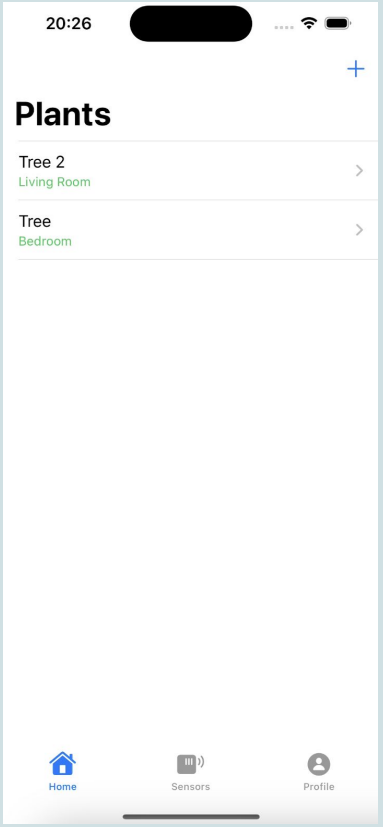
- **Age**: 55
- **Lifestyle**: Business traveler with a deep appreciation for his indoor plants.
- **Challenge**: Ensuring plant care with a busy travel schedule, and concerns about plant health while away.

Solution Approach: Mobile App





- Plant information display at the home page
- Feature to add new plant to the app
- Data tracking of the plant.
- Display current value of the plant.



Solution Approach: Hardware

Raspberry Pi 3 Model A+

- Allows us to physically connect sensors
- Hosts Python scripts needed to collect data from sensors
- Runs 24/7, taking in sensor data every hour
- Sends data to online database that our mobile app pulls from

Hardware

Hardware Deconstructed:

Raspberry Pi 3 Model A+

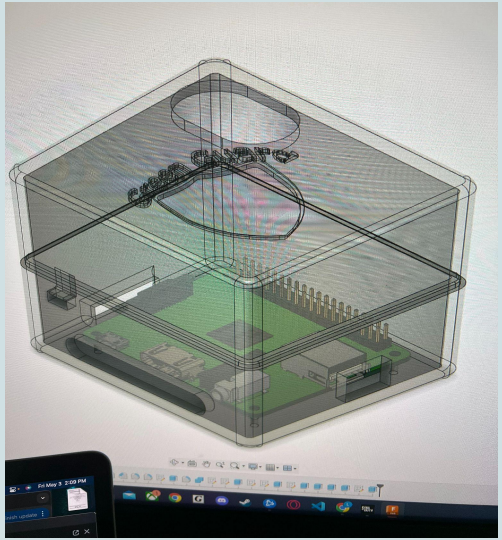
AVANI uHAT

Moisture Sensor

Temperature Sensor

Light Sensor

Case Evolution



User Testing & Validation

- Conducted 6 User Interviews; 5 with our Mobile App & 1 with our Hardware
- We had our Users navigate through our App both freely & with directions from the interviewer

Learned:

- Moisture % is the most important aspect of our interface
- Interactive elements were too small
- Uncertainty around what info would save when navigating pages
- (Hardware) Wires weren't organized, looked unappealing

Influenced:

- Emphasized Moisture % in App
- Enlarged interactive elements
- Added more information about when information is saving
- (Hardware) Increased size of case to help manage & hide wires

Demo Video

Ethical Considerations

- Ensuring the system is accessible to all users
- Implemented strict data encryption to protect user privacy
- Optimized sensor and device operations for minimal power usage
- Helps reduce water waste by ensuring plants receive enough amount of water
- Provide users with tools and information to care for their plants effectively

Next Steps Beyond Capstone

- Add a Water tank system with a nozzle controlled by a solenoid valve
- Consider adding a walkthrough video or an interactive tutorial
- Have the sensors connected to an individual system like an ESP32 and send data to the Pi
- Explore the possibility of integrating with smart home systems

Thank you!