INTERNET OF THINGS

SAMUEL LEES (CLASS OF 2017) AND
MATTHEW LINDLY (CLASS OF 2017)

Report V1, 12.07

Cal Poly CSC 458 SmartGarden Presentation

Context

- Problem:
  Watering succulents incorrectly is common and can be a detriment to the plant's health

- Solution:
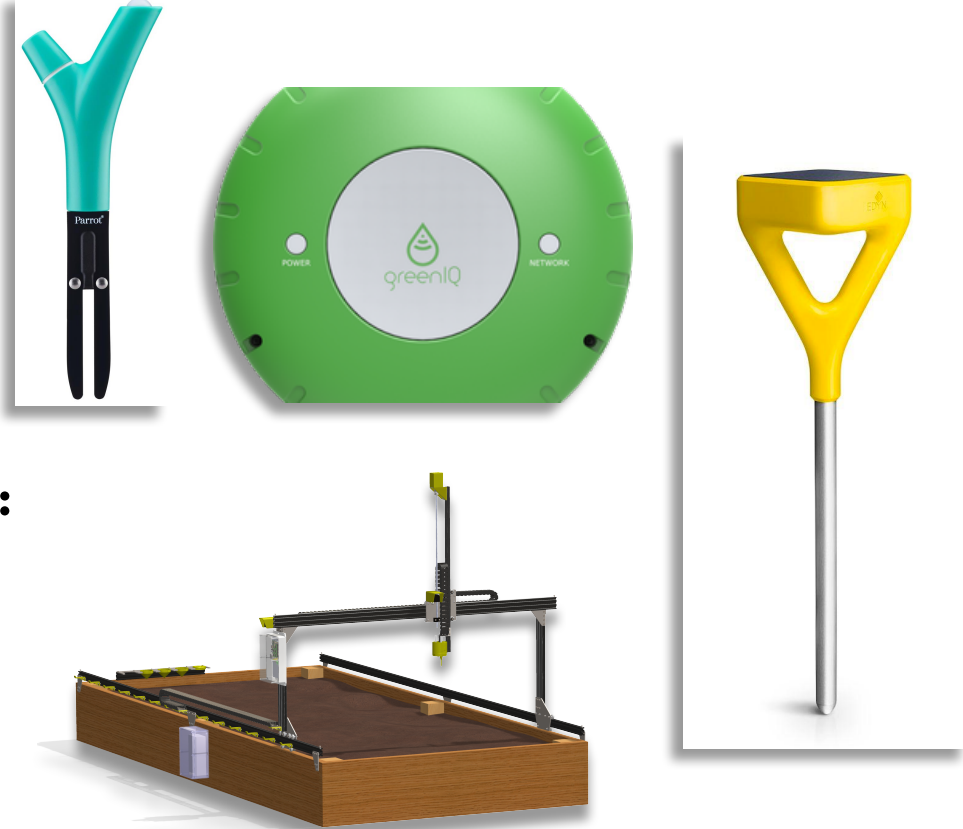 Configure a Raspberry Pi to measure soil moisture, store data, and alert the user appropriately

Functional Specification

□ Similar Projects

  ◘ Parrot Flower Power

  ◘ Edyn Smart Garden Sensor

  ◘ GreenIQ Smart Garden Hub

  ◘ FarmBot

□ Other products are either:

  ◘ Optimized for commercial use

  ◘ Cost prohibitive

References:
www.global.parrot.com/au/products/flower-power/
www.edyn.com
www.greeniq.co
www. farmbot.io

Functional Specification Table

Requirement	Engineering Specification	Detailed Description
1. Moisture Sensor	YL-69 Sensor	Measures analog value of current moisture
2. Edge Node	Raspberry Pi 3	Provides a small form factor at the edge
3. Code	Multi-Language Integration	Interfaces various languages
4. Communication	CoAP Protocol	Connects the client to the sever
5. Data Storage	SQLite	Stores historically collected data
6. DNS Resolution	No-IP	Streamlines GUI access
7. Presentation	Apache 2 Web Server	Serves GUI content as HTML/CSS/PHP/JS
8. Graphics	Google Charts	Presentation layer for data display
9. GUI Interaction	HTML Forms	Configures graph based on post requests
10. Notifications	IFTTT Integration	Sends various notifications to user

Technical Details

- Challenges
  - Analog-to-Digital Conversion
  - CoAP Troubleshooting
  - Cross-Language Integration
  - Database Schema Design
  - Data Analytics/Integrity

Technical Implementation

- Approach
  - Develop Local Node Solution
  - Integrate with CoAP Communication
  - Develop User Interface and Data Analytics
- Methods
  - Cloud-based Server for Data Collection
  - Web Interface for Data Monitoring
  - IFTTT for Notifications

Demonstration

- Web Interface
  - Real-Time Moisture Gauges
  - Historical Moisture Data
- IFTTT Notifications
  - Push Notifications
  - Emails
  - Phone Call
  - Google Calendar Events
  - Wunderlist To-Dos

Conclusion

- Future Features
  - Predictive Notifications
  - Automated Watering
  - Multiple Sensors
  - Encryption
  - Authentication

Thank You!

The End!