Product Research

sdmay25-04

Ashley Falcon, Henry Hingst, Wesley Smith,
Yok Quan Ong, Drew Scheidler, Hector Perez Prieto

Advisor: Nathan Neihart
Client: Claussen Labs

Project Overview

Goal: Wireless Mesh Network for Pesticide Spray Monitoring and Mapping

- Collect resistance data from IDEs (Interdigitated Electrodes) at various levels of crop canopy
- ESP32s will also be placed at various levels and create a "mesh network"
- Measurements will be sent to a centralized device to be pulled by user
    - Centralized device will be a Raspberry Pi
    - Transmitted over bluetooth or wifi
    - Text files must be user friendly
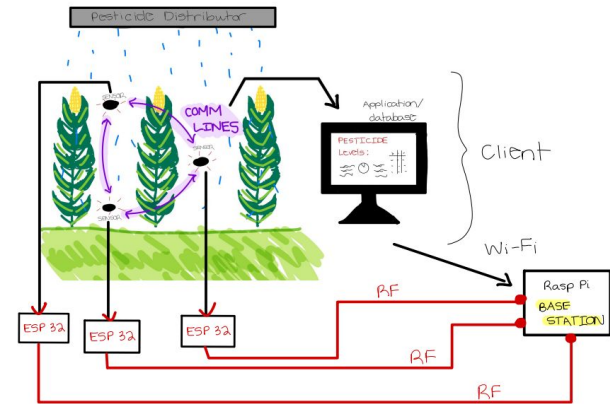
Problem Statement

Context:

- World population and food demand is ever-growing
- Proper distribution of pesticides is essential to maintaining and improving crop yields

Our solution:

- Collect data to reveal most effective pesticide distribution method
    - Drone spray, boom spray, airplanes, etc.
- Measurements will be far easier to collect and interpret

Related Product (Libelium Waspmote)

- Utilizes LoRa and Zigbee to create a scalable Wireless Mesh Network
- Customizable Sensors
- Cloud based real time data collection and analysis
- High Cost ($5,000 - $20,000)
- Durable and weather resistant
- Solar powered
- Learning curve involved for the average user

Related Product (Arable Mark 3)

- Wireless connectivity (cellular or long-range bluetooth)
- Supports wireless mesh network
- Comprehensive Data Collection (humidity, temperature)
- Cloud-based analytics
  - Provides software platform
- All in one monitoring including crop and weather
- High cost($2500-$3000) + subscription fee($150-$300/year)
- Sensor reading depends on weather conditions
- Limited coverage

Related Product (iMETOS 3.3)

- Supports a wide range of sensors able to measure beyond just weather parameters
- Data analysis capabilities (trend analysis and historical data comparison)
- Lowest cost ($1,500 - $3,000)
- Solar powered
- Weather resistant
- More of just a data logger
- Doesn't natively support a wireless mesh network

Market Gap

- Data analysis capabilities
  - Needs to be accessible and convenient
- Overcomplicated products
  - More capabilities than needed
  - Our device would be simpler
- High cost
  - Need more affordable product

Where we fit in

- An affordable and simplified device
  - Will be specific to pesticide distribution
- Easy interface and accessible raw data
- Network will decrease time needed in field to collect data
  - Will simplify data collection and analysis

Conclusion

- There is a growing demand for robust agricultural technology
  - Reliance on pesticides to maintain high yields of crop
- Current products are complicated and overkill for pesticide distribution
  - Our design would be affordable and specific
- Our product would make data collection far easier
  - Which allows researchers at Claussen Labs to determine which pesticide distribution methods are most effective

Questions? Comments? Suggestions?