
EE/CprE/SE 491 WEEKLY REPORT 2

09/20/2024 – 09/26/2024

Group number: sdmay25-04

Project title: Wireless Mesh Network for Pesticide Spray Monitoring and Mapping

Client: Claussen Lab- Iowa State University

Advisor: Nathan Niehart

Team Members/Role:

Ashley Falcon: IDEs and Microcontrollers; Group Communicator

Drew Scheidler: Mesh Networking; Note Taker

Hector Perez Prieto: Microcontroller and IDE's

Henry Hingst: Mesh Networking, Group Leader

Yok Quan Ong: Microcontrollers

Wesley Smith: Microcontroller Research; Note Taker

o **Weekly Summary**

- This week, we met with our client and advisor.
 - Exemplified what they have as baseline material for the project
 - A diagram of a circuit they created using a microcontroller to read from the IDE node and write to an SD card.
 - Code to run this system.
 - Explained that they aren't sure how they want to deploy this project or who its end users will be.
 - They want to use it themselves to test the efficacy of their sensors.
 - They also might want to deploy it as a product for farmers.
- We also met as a group to discuss what we learned about our clients' need for their product.
 - We have many questions for our client. Our first meeting with them helped us learn what they're looking for but their scope is still quite broad. We need to have more meetings with them soon in order to narrow the scope of our project and create a requirements list.

- We also conducted product research to determine the best approach for our project.
 - We determined that some products can fill at least part of our client's needs, but no product exists that fills all of their needs at a reasonable cost.

o **Past week accomplishments**

- ***Ashley Falcon:***

- Client and Advisor Meeting Setup
- Did research on potentiostats
 - Looked at basic applications
 - Will work to maintain a specific voltage level
- We refined our sketch note to reflect better what we learned from our client meeting
 - 3 microcontrollers, each with 3 IDEs
 - Mesh network between

- ***Drew Scheidler:***

- Reviewed available code from clients:
 - With the goal to understand the existing code and how it works with the ESP32s and IDEs for collecting and transmitting data.
 - Identified which parts of the code could be used as-is and noted any areas that need adjustments or improvements.
- Reviewed client resources, including schematic:
 - With the goal to understand the hardware setup, how everything connects, and how data flows through the system.
 - Gained insight into how the components work together and identified potential hardware limitations or power requirements that could affect the software.
- Brainstormed interface for central node:
 - With the goal to design a user-friendly interface for pulling and analyzing data from the central node.
 - Considered how users will interact with the system, focusing on simplicity and ease of data access, and explored options for displaying and storing the data.

- ***Hector Perez Prieto:***

- Looked into the resources provided by our client regarding schematics and code for our spray sensor
- Researched the capabilities of the microcontrollers that the client would

like us to use for their project

- **Henry Hingst:**
 - Research into LoRa & Zigbee accessories for ESP32 boards to facilitate our mesh networking needs.
 - Both LoRa & Zigbee boards should greatly increase our range.
 - Zigbee has an advantage in that it has easier to use libraries.
 - Either board type will cost ~\$20-\$50
 - Created a list of questions for our client in regard to the mesh network aspect of the project.
 - The main questions revolve around how the sensors are going to be distributed (shorter or longer range) and who the end user will be (the researchers or farmers).
- **Yok Quan Ong:**
 - Product research that similar to our product
 - Looked into different ESP that has the same capabilities
 - Looked into the resources provided by the client regarding schematics and PCB
- **Wesley Smith:**
 - Researched Libelium and Arable wireless mesh network products that analyzed crops similarly to what we're trying to accomplish
 - Things like product advantages/disadvantages and user pros/cons
 - The Libelium product was almost spot on what were trying to create, it's a mesh network that analyzes pesticide spray
 - Analyzed the schematic and code provided by our client and looking into the capabilities and data sheets of the parts they're currently using
 - They provided a lot of possible Zigbee libraries it looked like they were trying to implement so Wifi with an antenna or Zigbee is our best bet moving forward
 - Also formed some client questions based on what the client provided for the next meeting with them

o **Pending issues**

Two team members missed the client meeting because of the career fair. We also wanted to meet with our advisor again this week, but he was unavailable.

o Individual contributions

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Ashley Falcon	Client Meeting Setup, Product Research	3	6
Drew Scheidler	Client & Requirements Discussion	4	7
Hector Perez Prieto	Research on schematic and code provided to us by the client	3	6
Henry Hingst	Networking boards research & networking questions for the client.	3	6
Yok Quan Ong	Research provided materials	3	6
Wesley Smith	Product Research & Research into client provided materials	6	9

o Plans for the upcoming week

We need to meet with Professor Neihart early this upcoming week to discuss quite a few questions about our project, clients, and requirements. Henry and Drew will look into Wi-Fi mesh networks. Ashley, Drew, Hector, and Yok will look into recreating the sensor reading design (provided by the client). Finally, we'll need to set up another meeting with our clients as soon as possible to discuss the scope of our project. We plan on visiting the lab to get a walk-through of how IDEs are made as context for our project.