

EE/CprE/SE 491 WEEKLY REPORT 2

Report Details:

Timeframe: 9/4/2025 - 10/7/2025

Group number: 21 (*sdmay26-21*)

Project Title: A Smart Aquatic Ecosystem

Client &/Advisor: Md Maruf Ahamed

Team Members/Role:

Griffin Urban — Frontend Developer

Daniel Pender — Hardware

Aden Koziol — AI Population Tracking

Ryan Holden — Backend/Frontend Developer

Marina Mannan — Embedded Systems Engineer

Carson Irving — Backend/Frontend/AI

Max Purvis — Hardware

Weekly Summary

Our overall objective this week was to get most of the individual systems up and running. This is important because without each part getting off the ground, it makes it much harder to bring everything together. Of the sensors that we have purchased, they have all been set up and display reasonable values for the tests we have been able to put them through. We have set up a basic backend that can receive sensor data. In addition, we have begun training an AI tracking system. The AI is still in the early prototype stage due to limited libraries for data. The backend has basic HTTP requests available and is running, and we have looked into hosting it and a database using Microsoft Azure's free services.

Past Week Accomplishments

- **Aden:** Did research on what cameras and AI software/libraries to use for the project. Ordered a camera compatible with our Arduino. Started working on a prototype for the AI population tracking system
- **Marina:** Set up the Arduino IDE and worked on code to display sensor readings in the serial monitor. In addition, I did some research on how to store the collected data for use in the backend.
- **Carson:** Created a basic API for the backend, set up backend structure. Investigated various server hosting solutions. Created a mock database to test pulling information to the API and Frontend
- **Max:** Set up the temp and turbidity sensors with the Arduino and tested and calibrated them. Got the values to display on an LCD screen as well as in the serial monitor.
- **Danny:** Worked with Max to get the sensors we have to get a readable output. Some slight calibration fixes for the sensors. Start designing an apparatus for automatic fish food.
- **Ryan:** Created a React app that sends HTTP post requests with a button click. Tested sending post requests over localhost using the backend API controllers.

- **Griffin:** Helped create and debug the React test-app for client-server connection, and basic frontend display. Verified React test-app functionality from multiple machines, tested server connections to the .NET framework.

Pending Issues

- N/A

Individual Contributions

<u>NAME</u>	<u>Individual Contributions</u> <i>(Quick list of contributions. This should be short.)</i>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Aden	Camera and AI Research Ordered Camera Started prototype AI population tracking	8	9
Marina	Arduino sketch to display data Research on how to use logged data Drafted an outline for data flow	6	8
Carson	Basic API Http Requests Setup Backend, Backend Structure Looked into hosting solutions Working on setting up a mock DB to test the backend	8	11
Max	Sensor research and setup Arduino script to get data from sensors Calibration	8	11
Danny	Sensor calibration Sensor output functions Feeder design	6	9
Ryan	Created a React app for the frontend Sent post requests on button press	7	8
Griffin	Create/Debug React test-app for frontend<- backend connectivity	6	8

Comments and Extended Discussion

- N/A

Plans for Upcoming Week

- **Aden:** Continue working on the prototype. Look into machine learning and make some training data.
- **Marina:** Set up a database with sensor data and look into how that information can be used to track fishtank analytics and program the Arduino. Work on Python HTTP requests.
- **Carson:** Get the mock Database Completely working, that will allow me to start working on the GET HTTP requests. It will also allow me to start testing PUTS and DELETES. I would also like to find an actual hosting service that will work (hopefully free). I have been looking at Azure web app hosting, as we are using .NET Core 9, which is supported. Also, if I can find a suitable host, I might be able to skip the mock database and move right into working with our actual database.
- **Max:** Do more research on O2 and pH sensors while we wait for them to get here and figure out how to program them for the Arduino. Work on a design to feed the fish.
- **Danny:** Purchase the rest of the sensors and start a sustained test for the fish tank we have. Finalize a design to automatically feed the fish.
- **Ryan:** Continue developing frontend and backend functionality. Work with Carson to set up a server so we can constantly display updated data on the frontend.
- **Griffin:** Work on developing frontend functionality with more HTTP methods.

Summary of Weekly Advisor Meeting

After speaking with Dr. Ahamed during our initial meeting, we decided that a bi-weekly meeting schedule would fit the team and Dr. Ahamed's schedules better. Therefore, there was no advisor meeting this week.