

EE/CprE/SE 491 Weekly Report

10/15 - 10/21, 2025

sdmay26-20

AI Integrated Drone for Smart Crop Health and Growth Monitoring

Faculty Advisor/Client: Md Maruf Ahamed

Team Members:

- Jongmin Lee, jongminl@iastate.edu - Backend/AI
- Z Harvey, zdharvey@iastate.edu - Frontend/Backend
- Andres Lopez, andresl4@iastate.edu - Hardware/Firmware
- Alex Pallan, apallan@iastate.edu - Cloud/Security
- Camden Senneff, csenneff@iastate.edu - Frontend/Drone SW
- Caleb Zea, calebzea@iastate.edu - Frontend/Backend
- Srdan Kopunovic, srdank@iastate.edu - Backend

Summary of Work:

Researching different options for drones to use for projects. The frontend and backend team worked on testing out basic API calls and client-server communication in order to further understand and learn the technology the group is using, as well as started looking into implementing the backend with the cloud. We are expecting to have our needed hardware within the next 10 days, and aim to have a working drone communicating with our software in the coming weeks. The AI section of the group is also working on a test dataset for implementing it with our backend and frontend.

Work Period Accomplishments:

- Re-initialized frontend into Electron-Vite, and established a CI pipeline for frontend work to assist in testing before merging into the main branch
- Created a basic frontend framework to build upon in the coming weeks
- Created endpoints for testing client - server communication
- Created an evaluation document that takes stock of what happened with recent events and what our project entails to discuss where we go with our client and ETG

Plans for Coming Week + Action Items:

- Jongmin Lee - Continue developing the vision model by refining the test dataset. Begin preparing image capture tests once drone hardware arrives.
- Z Harvey - Work on developing frontend baseplate and getting frontend and backend connected. Will use NEST for this.

- Andres Lopez - Depending on decisions our advisors come up with, either researching how a pre-built drone can work with the requirements of the project or proceed with the plan of using betaflight and ardupilot to fly our built drone
- Alex Pallan- Start implementing AWS infrastructure according to the project timeline and communicate with the team what endpoints/connections need to be made.
- Camden Senneff - Work on new drone options or continue with building Raspberry Pi Zero images in CI for our drone, depending on the decision made there.
- Caleb Zea - work with Srdan for frontend/backend connections, start making a mock frontend, plan where to show gathered data, and things of that nature.
- Srdan Kopunovic - Explore the data structure that will be collected by the drone, and imported into the software for processing, in order to understand how to implement the required API calls and test cases.

Pending Issues:

- Jongmin Lee
 - Awaiting for decision on using custom built or pre-built since it will affects data collection and future plans
- Z Harvey
 - Connections between frontend and backend
- Andres Lopez
 - Communicating the idea of building a drone to advisors compared to the alternative of having to adapt our project around a drone off the shelf
- Alex Pallan
 - Getting the GitLab CI/CD Runner to connect/authenticate with the AWS account
 - Figuring out the API endpoints/connections to the client endpoint(s)
- Camden Senneff
 - The possibility of changing drone options will require reworking a lot of existing software.
- Caleb Zea
 - Connections between frontend and backend
- Srdan Kopunovic
 - Figuring out best approach for pipeline between AI microservice, and frontend/backend

Individual Contributions:

Team Member	Contribution	Week Hours	Total Hours
Jongmin Lee	Researched and developed the AI vision component, including dataset preparation and initial integration planning with the backend for plant and field image recognition.	6	21
Z Harvey	Added my section for the website, did the weekly report and assisted Caleb with frontend mock. Was focused on IRL progress for this week.	3	15
Andres Lopez	Looked over a document that Camden drafted regarding the current situation of our project. Researched more alternative actions due to current circumstances.	2	9
Alex Pallan	Completed my section of the website and created a detailed plan/schedule for rolling out different components of the cloud infrastructure for the project. Also started looking forwards at how communicating the cloud would look like depending on what the changing frontend/backend is.	3	13
Camden Senneff	Spent some time developing CI to automatically build ready-to-flash Raspberry Pi images that can run on the drone. Continued researching alternative drone options and drafted a document explaining our options and the rationale behind our choice.	6	23
Caleb Zea	Re-Recompiled frontend in Electron-Vite due to compatibility issues between .NET MAUI and CI/CD pipelines. Created a CI file for the new frontend, as well as created some sizing features for buttons to re-familiarize with TypeScript, CSS, and React. Created Linux build pipeline as part of the CI work. The Windows counterpart is still throwing errors, but it is not currently needed for testing.	5	21
Srdan Kopunovic	Created test API calls to ensure properly working backend code. Started planning required API and Test implementations, as well as microservice pipeline. Prepared environment to test deployment on server.	5	25