

EE/CprE/SE 491 Weekly Report

10/09 - 10/15, 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 - Frontend/Backend/Hardware
- Z Harvey, zdharvey@iastate.edu - Frontend/Backend/Hardware
- Andres Lopez, andresl4@iastate.edu - Hardware/Firmware
- Alex Pallan, apallan@iastate.edu - Frontend/Backend/Hardware
- Camden Senneff, csenneff@iastate.edu - Frontend/Backend/Hardware
- Caleb Zea, calebzea@iastate.edu - Frontend/Backend/Hardware
- Srdan Kopunovic, srdank@iastate.edu - Frontend/Backend/Hardware

Summary of Work:

This work period was mainly starting proper setup of the project, including having a base backend layout, with the initial models and configurations created, a template frontend setup, that is configured for version control development, as well as progress on initial AI model to be used for microservice implementation. Currently anticipating parts delivery by the end of next week, and planning on establishing client-server communication by the end of next week.

Work Period Accomplishments:

- Design Document
 - Section 3 of design document
 - Created a project timeline
 - Created execution plan
- Hardware parts list development
 - Found alternative links to approved ETG suppliers
 - Submitted to ETG for ordering
- Frontend development
 - Re-initialized frontend
 - Updated .gitignore
 - Added launch scripts for both Windows and Android versions
- Backend Implementation
 - Updated Initial Table Design
 - Started Working on Project Database
 - Explored Spatial Data Storage Solutions

- Drone Software Implementation
 - Created cross-compiling C++ project (targeting local architecture & Pi)
 - Created CI pipeline and testing framework

Plans for Coming Week + Action Items:

- Jongmin Lee - Focus on training a general-purpose vision model on public datasets since we weren't able to get specific datasets for our needs.
- Z Harvey - start to develop frontend UI
- Andres Lopez - If the parts come next week, build and get the drone flying. Proceed to integrate raspberry Pi onto drone so we can begin communication between user and drone.
- Alex Pallan- Understand the backend we are planning and begin deploying the infrastructure to AWS and creating the necessary connections to the project
- Camden Senneff - Help Andres build the drone, if needed and if the parts show up this week. Continue working on getting our pilot software and drone control framework set up.
- Caleb Zea - start to develop frontend UI
- Srdan Kopunovic - Refine the database implementation, including creating additional Models, create and test API on university server. Start working on testing communication between backend and frontend.

Pending Issues:

- Jongmin Lee
 - Specific datasets for our project are difficult to find and would require time to collect if we had to do so ourselves.
- Z Harvey
 - Companies didn't respond to my emails, we're gonna have to get our dataset from scratch. Additionally have to figure out how to get our frontend compatible with everything else.
- Andres Lopez
 - Too much excitement for getting my hands on a drone. I believe running embedded linux on the computer could allow greater communication between us and the drone. Look into implementing linux on the drone.
- Alex Pallan
 - IAM stuff with AWS to make sure the gitlab runner is given the proper permissions to deploy infrastructure. I am following a tutorial on how to get it done
- Camden Senneff
 - .NET MAUI doesn't actually work with Linux, so I'm going to look into options for getting it to work (or I'll need to set it up to run in a VM), this might pair with getting it to build in CI (since the CI is also running Linux).
- Caleb Zea
 - Googling .NET UI items, working through PATH variables with the team so that the Android script will path to the correct functions
- Srdan Kopunovic
 - Explore best approach for storing and serving spatial data for accurate flight logs, visualization, as well as data accuracy.

Individual Contributions:

Team Member	Contribution	Week Hours	Total Hours
Jongmin Lee	Begin to training vision models with public dataset to make a general purpose vision model and trying to see how the outcome comes out.	9	15
Z Harvey	Did my part of the weekly report, and design document. Found alternatives for frontend options if we have to move away from MAUI. Found compatibility issues for frontend.	3	12
Andres Lopez	I wrote my part of the weekly report :)	0	7
Alex Pallan	Created an AWS account and am starting to get the actual infrastructure deployed to our cloud environment. Getting the IAM specifically configured has been a hassle, but I have a pretty good grasp on it I feel.	3	10
Camden Senneff	Created a C++ project to run on the onboard Raspberry Pi that'll handle communicating flight plans with the FC and collecting data from our sensors. Set up cross-compile to the Pi and created a CI pipeline to automate building and testing in GitLab. Researched the UART communication protocol we'll use to talk to the Betaflight FC. Refined and submitted drone parts list.	6	17
Caleb Zea	Re-initialized the frontend so that it will actually run the app. Built batch scripts to compile and run the Windows and Android versions of the app. Updated .gitignore to reflect compiled files. Started the basis of a CI file for Frontend	7	16
Srdan Kopunovic	Further refined the entity relationships for created Models. Explored best solutions for spatial data storage, and started implementing first API's.	6	15