

EE/CprE/SE 492 Weekly Report

4/10 - 4/07, 2026

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/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/Cloud

Summary of Work:

- Frontend
 - Implemented new API
 - Added drone -> frontend image transfer that then POSTs to the new API once merged
 - Updated Flight Data UI for better user experience
 - Tested frontend -> backend API using buttons and test data to validate connection and transfer
 - Added functionality to take a screenshot of Google Maps API instance with polygons and gridlines to show to users on the fields page.
 - Added a new fields page that shows users their fields, and allows them to schedule flights for specific fields. All is hooked up to the new API.
- Backend
 - Completed main architecture design, integrating the layered system and proper authorization
 - Removed: Image Service, Interface, Controller, and Database Context
 - Integrated old Location and LocationImage models into a single Intersection model
 - Created: Service, Interface, Controller, and Database Context for handling Intersection metadata and file byte stream data
 - Completed configuring Deployment stage in Gitlab pipeline, automatically updating, packaging, and deploying the latest program version to university team server in development environment
 - Integrated Intersection Coordinates and Vertex Coordinates in Field Model
 - Adjusted Flight and Flight Data relationship from one-to-many to

one-to-one, utilizing multiple intersection coordinates saved when client creates a Field object

- Cloud
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- Drone
 - Ordered and will install a MicroUSB connector so the Pi can now be powered off of the drone's power supply instead of a separate USB cable (this is the final step to complete the drone hardware)
- AI
 - Began working on refactoring the AI service to work with the new backend image API, which will be ready to integrate with the final AI model within a couple days
 - Solved auto labeler pipeline error and finished processing the images, ready to train the model. Began training the model.

Plans for Coming Week + Action Items:

- Jongmin Lee - By Thursday, finish training the model and connect it to the Python Microservice to work with the backend so we can test the final pipeline.
- Z Harvey - Ensure that everything frontend related is done, field functionality, flights, and pages should all be good to go by Thursday this week.
- Andres Lopez - Finish testing the flight loop.
- Alex Pallan - Finish up the poster for our presentation day using feedback from the Symposium and from the lecture session. Also start working on the updated design document and start on the final presentation.
- Camden Senneff - By Thursday, get the Python microservice communicating with the backend (needs API calls adjusted) so we can hook up the model. Set up CI to deploy to the server automatically.
- Caleb Zea - validate complete image passthrough, rather than individual parts. Get some real test data and pass it through to validate a complete drone -> frontend -> backend -> AI -> backend -> frontend loop. Need to understand image logic for when we are wanting to send image paths vs complete image data
- Srdan Kopunovic - Update Unit Tests to handle newly refactored backend codebase, separating concerns for each service. Create integration tests that will test the full functionality of the API, services, and database functionality all in

stage. Add database migration stage within the CI/CD pipeline, after Integration Test and before Deployment stages.

Pending Issues:

- Jongmin Lee
 - Due to the quite large number of images time it takes to train the model is being bottlenecked.
- Z Harvey
 - Fixing merge conflicts with all of our frontend functionality.
- Andres Lopez
 - Finishing the flight loop
- Alex Pallan
 - Current poster is not optimal and technically does not meet all specifications requested.
 - We have no start to the final presentation.
- Camden Senneff
 - Need everything else merged (planned by this Thursday) and good weather to do a complete test flight next week
- Caleb Zea
 - Lots of merge conflicts coming up, with merging in new API as well as page refactoring to make it easier to edit individual pages UI
- Srdan Kopunovic
 - Create a separate stage in the pipeline for Integration Tests, done after successfully completing Unit Tests, as well as a Database Migration stage, ensuring server database can properly manage new schema design changes without crashing the program or causing data loss

Individual Contributions:

Team Member	Contribution	Week Hours	Total Hours
Jongmin Lee	Finalized image processing pipeline to process the image for the data that needs to be used to train the model without any bugs or errors. Began training the model through cluster.	10	68
Z Harvey	Added functionality to take a screenshot of Google Maps API instance with polygons and gridlines to show to users on the fields page. Added a new fields page that shows users their fields, and allows them to schedule flights for specific fields. Got everything hooked up to our new API. All frontend field functionality is tied to the backend now.	11	55
Andres Lopez	Working on the flight loop	6	50
Alex Pallan	Added the system overview and other modifications to the Symposium poster. Went and got it printed out at Copyworks (it was \$82.18). Finalized the registration of the drone with the FAA and did some catching up on local airspace and laws/policies that would be relevant for a potential flight.	7	49
Camden Senneff	Drone hardware finalization, got Micro-USB connectors to run the Pi off of the drone's power supply Began work to refactor the Python AI service to be compatible with the backend	9	81
Caleb Zea	Updating Flight Data page UI, refactoring, updating, and re-integrating API, testing the new API, drone -> frontend image transfer, creating and reviewing merge requests, and merge conflicts	11	56
Srdan Kopunovic	Finalized backend refactor to handle newly discussed client-server data flow. Merged old Location and LocationImage objects into one model to handle both. Added Coordinate data for Intersections and Vertices for Field Mode. adjusted Flight and FlightData relationship to one-to-one. Configured continuous deployment stage in pipeline to automatically package and deploy program to team server.	15	65