sdmay19-10: Distributed Wild Bird Surveillance and Recognition System

Week 5 Report
September 30 - October 7

Team Members

Claudia Athens — *Systems Integration Lead*
Ben Simon — *User Interaction Lead*
Francisco Arreola — *Infrastructure Lead*
Pierce Adajar — *Machine Learning Lead*

Client

Dr. Joseph Zambreno

Faculty Advisor

Craig Rupp

Summary of Progress this Report

This week we began to formulate our options for notifications and how to group detections on a web server. Further, we met with our client to discuss what was being done for the machine learning prototype and our classification rates. On the hardware team we have received a camera and have started setting up a Jetson board. We currently have a Jetson flashed and running in Dr. Zambreno's lab.

Past Week's Accomplishments

This last week we got the Jetson board up and running. This entailed installing a version of linux to flash the board and install updates. Further, we were able to get the onboard camera to work and display images. Next, we started archetyping how we will store and send images to the cloud. We decided to store all of our weights for each image as it would only help us create a more fluid front end.

Pending Issues

We are having issues sourcing web drivers from our camera provider. This is due to their website only working well with corporate emails. Claudia is talking to customer support to get a copy of the drivers.

Plans for Upcoming Reporting Period

We will continue to implement a streaming service and further increase our classification. We also hope to set up the 4k camera this week to collect images/videos.

Individual Plans:

Ben:

- Continue to implement a prototype web page
  - Learn docker, CSS, and bootstrap
  - Learn how to use google cloud
- Research streaming tools to view stream on webpage

Claudia:

- Will be at SWE Conference til Saturday, so I'll be doing less this reporting period.
  - Begin work with camera once drivers are sent to me.

- Propose consumer case solution to client and group.
  - Need to propose solutions for camera lens protection.

Francisco:

- Finish research into cloud streaming solutions.
- Continue work on implementation of cloud picture storage.

Pierce:

- Implement and train a SqueezeNet-based architecture, and evaluate its performance.
- Test various pre-trained models' performance on the dataset, and evaluate their feasibility on the Jetson.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Claudia Athens	This week I primarily worked on the camera and the Jetson. I got the Jetson setup and flashed with Pierce. I have been in contact with E-Con to get documentation for the camera. Also, I have been looking into how to interface the camera with the Jetson and the resources NVIDIA provides to do this.	11	46
Ben Simon	This week I continued my research with website development. I have found a bootstrap template that should work well for demo website. I have looked into Docker a little this week, but I will need to research this more next week before I can use it.	6	41.5
Francisco Arreola	This week I continued my research into cloud providers. I have completed my research related to storage costs, but I still need to look into streaming limitations. Additionally I began with implementing a simple storage webserver.	10	43.5
Pierce Adajar	This week, I worked with Claudia on getting the Jetson flashed with the necessary software. Additionally, I have been conducting market research on various Convolutional Neural Net architectures for testing on our dataset.	12	46.5

Meeting Notes With Client

This week we met with our client to discuss our lack of progress with detection. As of this last week, we were only able to correctly identify about 10% of birds. This was much lower than other people have achieved using the same neural net architectures.

In our client meeting, we voiced our concerns about the neural network. In response, our client stated we

still have a lot of areas to experiment with. Two of the areas of note were training a network using squeeze net and utilizing heuristics to narrow down from the top three detections. As a result of the meeting, we are planning to experiment with different neural networks. We think that after a week or so of experimenting we will have a higher rate of detection than our previous 10%.

Gitlab Activity Summary

- Oct. 7th: modified network architecture (reduced memory footprint) to get the network to train. Also some layer / training reconfiguration to attempt to increase accuracy.