

EE/CprE/SE 491 Weekly Report #10

Oct 12th - Oct 26th

Group Number: 3

Project Title: Squirrel

Client: Bob Thompson; Advisor: Gary Tuttle

Team Members: Isaac Tegeler, Devon Driscoll, Richard Cushing, Dan Gilbert, Abraham

Contreras-Ramos, Cole Patton

Weekly Summary:

Finished live squirrel detection, completed code to test for motor control, worked on wiring our parts that were ordered, and continued to work towards printing parts for the mechanical system.

Past week accomplishments

Isaac: Retrieved ordered parts from ETG and started work on wiring the parts together. I ran into a couple of unexpected issues here. The main one was that I forgot my electronics equipment at home in Des Moines and needed to go pick that up. The other issue that I ran into was that I was unsure how to wire all of the parts to the power supply so I got Abraham to help with that. I cut some thicker wire for connecting our stepper motors' controllers to the power supply so that they do not melt, and also modified a power cable to be able to attach it to the power supply.

Cole: Corrected detection code dependencies and finished live squirrel detection code. Live detection is successfully running on the Jetson Nano with the Raspberry Pi camera.

Richard: Met with Tuttle about progress. Ordered more PLA to ensure more reliable prints, ABS only was able to print 2 more parts as warping and heat issues persisted across all. Scheduled meeting in machine shop to make cuts on PVC pipes,

Abraham: Started connecting power supply and motors together. Testing power supply.

Dan: Continued 3d printing prefab gimbal system. Since the past status report we used up the last of the PLA and had to switch to ABS. The ABS prints continually failed which caused us to lose valuable printing time. We have ordered new PLA and resumed printing. Additionally, scheduled time in the machine shop to make cuts on the PVC pipes used for the targeting system.

Devon: Working on getting familiar with raspberry pi coding with python.

Pending issues:

We have solved most of the pending design issues and we are now at high risk for those that are remaining. One of these major risks is that we likely need most parts to be printed before the end of October if we want to have time to assemble and test everything. Additionally we are behind on writing the code. We need to work more on completing code for motor control.

Hours Worked

| <u>Name</u> | <u>Contributions</u> | <u>Hours this week</u> | <u>Hours cumulative</u> |
|--------------------|--|-------------------------------|--------------------------------|
| Isaac | Worked on connecting parts to the power supply, and worked with Abraham to start wiring everything together. | 8 | 38 |
| Cole | Finished correcting dependencies to get | 15 | 40 |

| | | | |
|---------|---|----|----|
| | the detection code to run. Finished live detection code so it runs in real time through the Raspberry Pi camera | | |
| Devon | Python skeleton code | 4 | 29 |
| Richard | Meeting with Tuttle, printing out the multiple 3D printed parts of the Camera Gimble | 15 | 39 |
| Abraham | Wire together power supply and motors. | 8 | 26 |
| Dan | continued printing parts for prefab gimbal, ordered materials, contacted machine shop, meetings, prim | 6 | 33 |

Plans for the upcoming week

Isaac:

I am blocked until Abraham finishes wiring everything to the power supply. Once that is done I will pick it up from him, connect the controllers to bread boards, and then wire the bread boards to the Jetson. Once everything is wired I will test and debug the code that Devon and I wrote for the control. My goal is to complete this by the second week of November.

Cole: The live detection is running slow, with a bit of a delay. I plan on performing Quantization:

“a process of approximating a neural network that uses floating-point numbers by a neural network of low bit width numbers. This technique helps reduce both the memory requirement and computational cost of using neural networks at the cost of modest decrease in accuracy.”

Depending on how much of a speed we get from that, I might also retrain the detection with a

much smaller model and weights file. This should (hopefully) make the detection run significantly faster. I'll also work on fixing the delay if it's still a problem after the faster detection.

Devon: Continue working on functions in our API on our repository.

Richard: Continue printing the rest of the 3D parts. Possibly go to try to cut pieces we bought.

Abraham: Finish wiring motors to power supply and test it to make sure it runs well.

Dan: Finish printing and testing parts for gimbal. Make cuts in PVC pipes for the targeting system. Assemble gimbal/ targeting prototype. Meet with Dr. Tuttle again. Plan final steps.