EE/CprE/SE 491 Weekly Report #8

Sept 15 - Sept 28 2020

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

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## **Weekly Summary:**

Worked on getting our CAD - models completed, started printing, and began filling out the

program skeleton with actual code. Evaluated major sources of risk as we are halfway through

the semester. As a result we decided to schedule a meeting with our advisor as we see some

risk of not being able to complete the project in time.

## **Past week accomplishments**

Isaac: Went into the week planning to have some test code ready for the PIR sensor, but was

very busy with other courses the past two weeks. Additionally found that we are at high risk for

completion of the mechanical systems. I met with Ricky and we discussed some solutions to

that risk. One option that we want to discuss with our advisor is scrapping our current work on

the targeting system and using a pre-designed and 3d-print ready gimbal system for a camera

to replace our targeting system. There are a lot of advantages to using the new model primarily

that all of the additional required parts are listed, and we know that it will work as it came with a

demo video. I also tried to mitigate some of the risk by modeling some parts that Ricky

mentioned he and Dan had yet to look at and try to get dimensions or design for. This included

a four-bar linkage.

Cole: Did extensive research on running the YOLO detection on live video. Started preparing the detection code to utilize our API; currently printing out the coordinates at the center of the detected squirrel, along with the confidence rating as it evaluates each image. Also worked on optimizing the detection and increased the detection speed from .7 fps to 1.2 fps.

Richard: Calculated sizing and torque requirements for gears, updated mechanical design sketches and measurements. 3d printed initial gears for the targeting system. Purchased PVC pipes and PVC shower drain for base box. Found possibilities for water insulation and boxes for protecting the launch system. Designed Pitch frame. Looking into the camera gimbal which can save a significant amount of time with the trial and error of the mechanism. Contacted advisor for the time slot of the Senior Design lab.

Abraham:

Dan: Continued modeling and 3d printing gears for targeting system, purchased pvc pipes, connecters, and flanges for targeting/launching systems, Started exploring alternative methods for targeting system

Devon: Got some testing with the Python scripts done. Research on how to emulate using an LCD without having a physical device to work with.

**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**

| Name | Contributions | Hours this week | Hours cumulative |
|---|---|---|---|
| Isaac | Evaluated High risks as we are ½ of the way through the semester. Worked on trying to mitigate some of these risks including creating cad-models | 6 | 18 |
| Cole | Worked on speeding up the detection and preparing the code to send coordinates to the targeting and launching systems. | 5 | 19 |
| Devon | Python skeleton code, LCD skeleton code | 5 | 19 |
| Richard | Drew details and dimensions for parts of original gimbal Pitch frame design, 3d printed Yaw/Pitch gear, purchased parts, risk meetings, future mechanical design planning | 10 | 24 |
| Abraham | Research, circuit design, meetings | 4 | 12 |
| Dan | Gear design, sliced and printed preliminary gears, part research, purchased parts, | 8 | 22 |

| | modified designs meetings, | | |
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**Plans for the upcoming week**

**Isaac:**

Next week I will meet with Tuttle and based on that meeting will readjust my targets for this week. Right now I plan to focus on getting all the work done that I can for having all CAD-models completed with a tentative target of mid October for completion of all modeling in order for us to have time to print the parts. If I have more time I will also create and test code to fill out our skeleton for the PIR sensor. I will also work with Cole and Devon to figure out what work can be done on motor control, and how to test our code on the Jetson.

**Cole:** Main goal is to get the detection code to use frames from live video instead of just an array of images. The power cord and memory card for the Jetson Nano have been delivered, so I'll be able to work on getting the detection to run on the Jetson Nano. If there's time, I'll also work to merge the detection code with our main API.

**Devon**: Continue working on functions in our API on our repository. Work on LCD notifications.

**Richard**: Determine pros and cons of camera gimbal, meet with Isaac and Tuttle to determine targets. Possibly start designing a new layout for the launching system. Begin cutting PVC parts to connect the bottom box. Possibly 3d print all of the camera gimbal design.

**Abraham:** continue research. Calculate how much power would be consumed by each component. Coordinate with group members to find out how to efficiently supply power. Look into reducing physical vibration due to AC power.

**Dan:** Continue printing and testing parts for the gearing system(yaw/pitch gear). Reevaluate targeting gears and determine whether or not to utilize a gimbal.