

# EE/CprE/SE 492 Bi-Weekly Report 05

**October 22nd - November 4th**

**Group Number:** 18

**Project Title:** Object Detection and Identification with Sensor Fusion

**Client:** Danfoss (Michael Olson)

**Advisor:** Dr. Wang

**Team Members/Role:**

Tucker Creger - Project Manager

Eric Bishop - Software Developer

Kellen O'Connor - Deep Learning Architect

Clayton White - Hardware Design Engineer

Mitch Hagar - Radar System Lead

Nihaal Sitaraman - Hardware Developer

## **Weekly Summary:**

Over the last two week we really started the final push of real work we can get done before needing to start to document everything and work on the final poster and report.

This includes many changes to the software and working on connections, which Kellen helped with greatly. We also worked on lots of testing and tuning of the system and made some harder choices on what we want in our final system. We realized that the CAN controller was not functional and decided to scrape that part, because we could not properly convert from CAN high/low to Rx/Tx. After this we worked on testing the system and looking at the performance of the system while ran on a computer, and on the Jetson and found a larger disparity than we hoped between the two. Finally, we worked on what we want to show Danfoss, and our advisor for the progress we made, and tune that so we can have as polished of a product as possible. So this included making a stand for the camera and RADAR, so that the system is more easily manageable.

## **Past week accomplishments:**

Tucker started putting together an outline for the poster.

Tucker ordered our new webcam for testing and a battery for the system.

Kellen, Tucker, and Eric conducted testing of the full system in the Howe Atrium.

Kellen, Tucker, and Eric helped finalize what our demo will be for our client and advisor on 11/9.

Kellen resolved an issue with the Jetson that prevented our program from displaying visual outputs in a multithreaded configuration.

Kellen continued to work on the quality of the visualization classes, both bug fixes and enhancements in functionality.

Nihaal and Mitch worked with Danfoss and ETG on designing and fabricating a stand for the radar for testing.

**Pending Issues:**

- We need to test the radar and neural network detection program on the Jetson to evaluate performance.

**Individual contributions:**

Name	Accomplishments	Hours This Report	Hours Cumulative
Tucker Creger	I worked on creating an outline for the poster. I also ordered a new webcam for testing and battery for the system. I also personally purchased a 100ft open reel tape measure for testing the accuracy of the system. Additionally, I worked with Kellen and Eric on testing the whole system in the Howe Atrium.	11	53
Eric Bishop	I worked on coordinating the team for gathering our thoughts for the final outcome of the project and the goals we want to achieve for the future. Tucker, Kellen, and I worked on testing the system as the whole and started preparation for the final demo on 11/9 that I will unfortunately not be able to attend due to prior engagements.	9	44
Kellen O'Connor	I continued working on the top-down visualization UI, adding the name of the class along with the dot. Fixed a bug where the program would attempt to list multiple distances if two objects were in the same line of sight. Changed the input to the neural network to be a center-cropped portion of the image to ensure no spatial distortion was	12	59

	<p>negatively impacting network performance, resulting in increased detection range at the expense of field of view. Discovered and fixed an issue with the Jetson not displaying the visualization output when calling cv2.imshow() from multiple threads (which wasn't an issue on Windows). Worked with Tucker and Eric in Howe to classify the performance of the system for several of the criteria listed in our design document, as well as prepare for Friday's demonstration. Worked with Eric and Tucker to attempt getting the PCB/CAN controller to work but we were unsuccessful. Set up the Jetson for use with SSH, enabling us to do testing without the need for a display, keyboard, and laptop.</p> <p>Came to a conclusion regarding the performance of the Jetson and Radar which will affect our recommendations to Danfoss for pursuing both of these in further projects.</p>		
Clayton White	Discussed different mounting options for the radar, camera, and other hardware.	3	35
Mitch Hagar	Designed wood and aluminum stands. Final design for stand and mount is an aluminum H-base with an aluminum pole as the stand with mounts for camera and radar. Fabrication should be completed this week so we can demo by Friday, 11/9. I took a safety course to use Coover's wood shop in case we need to get in there for anything.	10	39
Nihaal Sitaraman	I created multiple versions of my initial stand and discussed building options with Danfoss and ETG. Designed wood and aluminum stands. Final design for stand and mount is an aluminum H-base with an aluminum pole as the stand with mounts for camera and radar. Fabrication should be completed this week so we can demo by Friday, 11/9.	12	36

**Plans for next two weeks:**

The team will be preparing for the second PIRM on 11/8. The team will also be preparing for a demonstration to Danfoss on 11/9.

Kellen will finalize software and begin working on documentation.

Tucker will continue working on the outline for the poster and the poster.

Eric will continue coordinating the final report and documentation.

**Advisor/Client Notes:**

We will be meeting with Danfoss on 11/9 and our Advisor.