

EE/CprE/SE 492 Bi-Weekly Report 02

September 10th - September 23rd

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 have finished the design of the PCB and resolved a sourcing issue with one of our parts. We have also continued work and testing on the software side of our project to have a demonstration at our advisor meeting. We were also able to get an NDA in place with the radar supplier to get access to the CAN messaging protocol. This was a critical part of being able to integrate with the radar as planned.

Past week accomplishments:

Tucker picked up the parts for the harness from ETG. Additionally, he picked up the sockets we were having trouble sourcing from Radek at Danfoss.

Kellen, Eric, and Tucker worked on a short outside demonstration of the radar and a python script to read the CAN messages from the radar.

Tucker was able to sign an NDA to get the CAN messaging protocol information from the radar supplier.

Kellen wrote Python scripts to calculate the distortion parameters for his webcam, and map world points to the image.

Kellen implemented ResNet-50 with the calibrated webcam script, setting up the group for the ability to localize and classify objects in an image for the first time.

Eric researched new templates for our senior design website to make it look nicer.

Pending Issues:

- We are waiting on ETG to order another part for the harness
- We are waiting on ETG to order our PCB

Individual contributions:

Name	Accomplishments	Hours This Report	Hours Cumulative
Tucker Creger	I picked up parts from Danfoss and ETG. This eliminated one of the sourcing issues we had. Worked with Kellen and Eric on a short outside demonstration of the radar with the supplier's GUI. I also worked with Kellen and Eric on a python script to read CAN data from the RADAR. I also worked on getting the CAN database information for the radar for us to be able to interpret the data from the radar.	16	24
Eric Bishop	I worked helping connect and test the radar to our personal computers to look at the precision and range on the radar. Also looked at various scripts and worked along with Kellen and Tucker to create a demo to show to our client, advisor, and class for our current progress so far. Looked at the raw CAN data, and realized that we will have to have Preco, the company of our radar, send us the data about what this can message contains. Also	11	20

	looked into various templates we can use for our website to make it look nice.		
Kellen O'Connor	I worked on scripts that allow a user to calibrate their camera (determine focal length, principal point, and distortion parameters as per OpenCV documentation). With the calibrated camera, I was able to map world points in the X-Y plane to image coordinates, assuming an object of known height. I tested this with the radar GUI at one of our meetings to confirm its operation. This sets us up to take a CAN message from the radar, which contains an object's X-Y position, and run it through a classifier or match it with the SSD output. I also wrote a script that uses a pre-trained ResNet-50 model with Keras to crop an image to an object's location (determined from radar) and classify it.	14	24
Clayton White	Finished PCB layout and we have the .brd files ready to send to ETG. Worked with Mitch on finding the blueprints for correct through hole	7	12

	components. Verified board layout with Dr. Gary Tuttle.		
Mitch Hagar	Finished PCB design, met with Dr. Tuttle to verify layout. Updated timeline in Visio. Changed our groups folder layout in google drive.	7	12
Nihaal Sitaraman	Worked on the PCB but did not see the end of it. Worked with Clayton and Mitch to place and find components on Multisim and Ultiboard. Met with Dr. Tuttle to verify that our design would work.	5	11

Plans for next two weeks:

Tucker will be working on building the harness once the last part comes in.

Kellen, Tucker, and Eric will be working on installing drivers to the Jetson to test the radar over CAN with it.

Clayton, Nihaal, and Mitch will solder the PCB through hole components to the board once it is received.

Kellen, Tucker, and Eric will work on parsing CAN messages in real time and mapping them to image points for classification.

Kellen will be working more towards SSD implementation, rather than a classifier.

Clayton, Nihaal, and Mitch will also be working on putting together information for our poster and demonstration.

Advisor/Client Notes:

We will be meeting with Danfoss on 9/27 and our advisor on 10/4.