

EE/CprE/SE 491 Weekly Report 5

Group: sddec19-14

Client & Advisor: Danfoss Power Solutions(Radek) / Dr. Alexzander

Team Members:

Omar Abbas - meeting scribe/report manager

Dennis Xu - chief engineer/meeting facilitator

Aaron Michael - chief architect

Jonah Bartz - continuous integration

User Information Augmentation

3/9 - 3/15

Weekly Summary:

This week mainly revolved around our synthesis of the design document. Since we have had trouble installing the Tobii eye tracker to the Jetson TX2, we have begun taking in alternatives so that we can fit them in our design document. We have met with faculty members that work at the VRAC to get a feel of their setup for Human-Machine interface and cleared the air on technical matters we were concerned about. In addition, we have now implemented generic object detection on the TX2 and will proceed with having it detect only certain objects as intended by the user.

Past Week accomplishments:

Omar Abbas:

- Implemented Object detection on Jetson Tx2 using OrbFeatureDetector class using C++ code
- Visited VRAC center on campus to get a feel of their setup and understand why they have is as such. I met with a Graduate Research Assistant at the Advanced Learning and Cognition lab whom kindly showed me around and highlighted some issues they have had with the eye tracker.
- Consulted familiar faculty members for more insight on going about installing the eye tracker SDK to the Jetson, in which I have been given several alternatives.

Dennis Xu:

- Got a USB hub to we can plug multiple things in
- Worked together to try to get WINE or virtualization working on the Jeston TX2
 - Virtualization doesn't seem to work on the Jeston but we might be able to get some version of WINE
- Worked together to create a design of the hardware and the software systems

Aaron Michael:

- Worked with the group on design ideas.
- Created a rough design layout of the system.
- Looked into standards relating to the project.

Jonah Bartz:

- Brainstormed design ideas
- Drew rough draft design templates on white board for design document
- Emailed Tobii and ARM to try and get a conversion of x86 to ARM processor to get tobii to connect to Jetson

As a whole we also officially decided on what areas of the project we will each specialize in.

Pending issues:

- We still have the issue with getting the tobii eye tracker to work on the Jetson TX2
- The USB hub we were using stopped working
- Learning OpenCV library which will allow us to perform image detection using the TX2.
- Connect Tobii eye tracker to the Jetson in order to trade information.
- Use OpenCV to detect objects in front of the TX2, and use Tobii Eye tracker to determine whether the person saw the object or not.

On a note, if the eye tracker is unable to be installed to the Jetson TX2, we may be obligated to seek alternatives. One such alternative is a different eye tracker. Another is to use a microcontroller to be the middle-man between the eye tracker and the Jetson and have it transmit data between them via UART since the data the eye tracker will be returning is not that big and can be done using a simple UART device.

These alternatives are being evaluated and will be inserted to our design document accordingly.

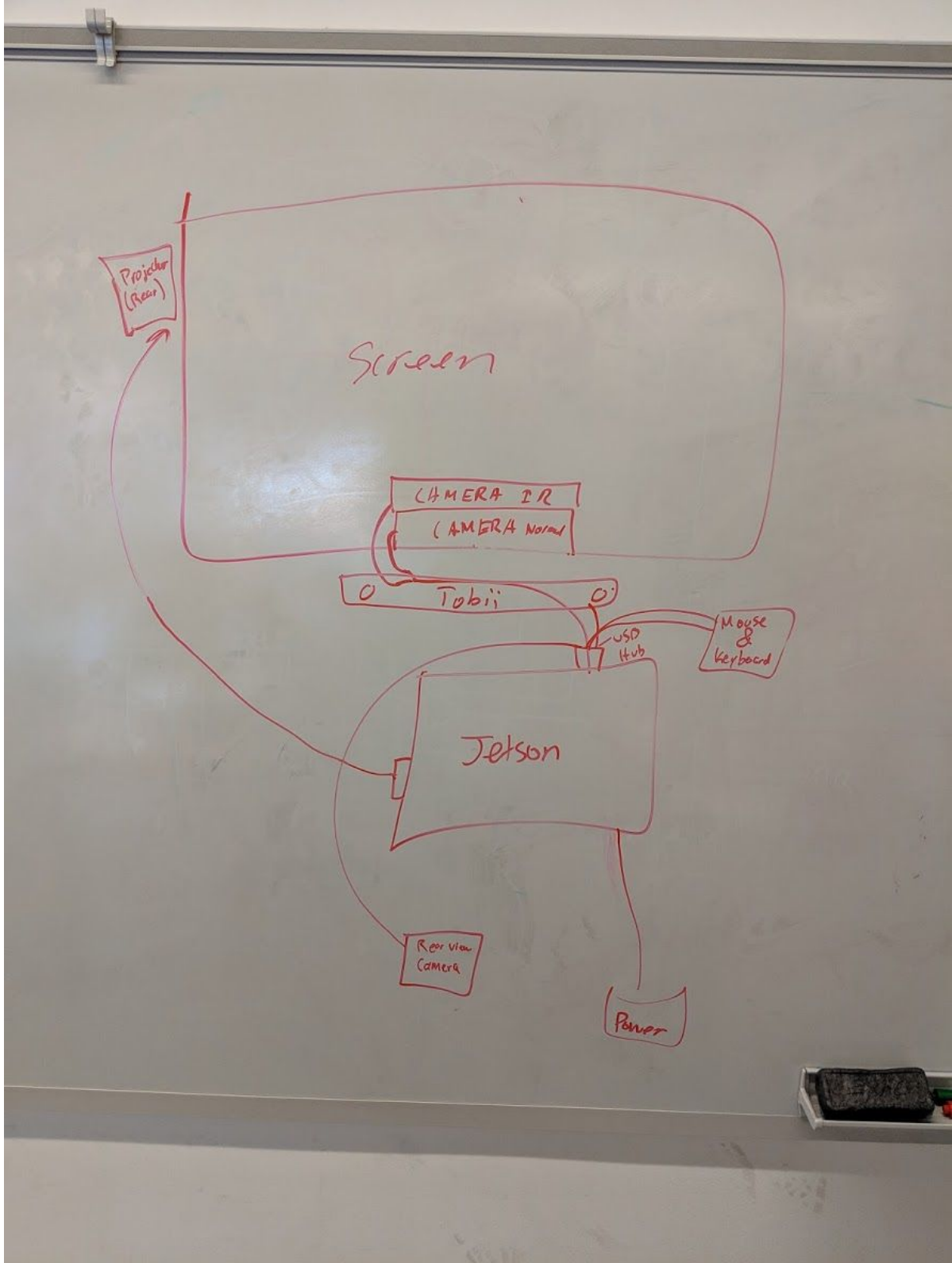
Individual contributions:

Name	Individual Contribution	Hours this week	Hours Cumulative
Omar Abbas	Fixed object detection Met with VRAC employees Consulted CPRE faculty members for insight	4	16
Jonah Bartz	Designed some software and hardware diagrams to get a general idea of the overall design for our project	3	14
Dennix Xu	Provided feedback for our design document and solutions to our eye tracker issue. Did some research on solutions for this.	4	15.5
Aaron Michael	Looked into standards relating to the project. Reviewed our project plan.	3	15

Plans for upcoming week:

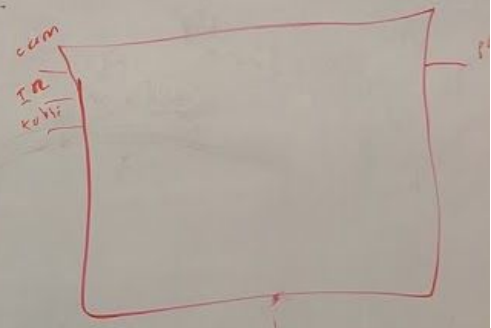
With next week being spring break, most of us won't have access to the hardware. We plan on using this time to finish our design document. We also will hopefully find a solution to the connection problem with the Tobii eye tracker. This will either involve help from a third party like Tobii or ARM themselves, or we will know to switch to a different eye tracker all together. Our plan is to properly set up VNC and have the jetson constantly running in Omar's apartment so that we may be able to ssh into it when we need to. Omar will also attempt to get mimic virtualization and try to get WINE to work on the Jetson, as if that works, we are able to install the tobii eye tracker.

Pictures:



Tobii → Jetson:
(x86)????? (Arm)

- Tobii API ??



Software

- ← same →
- | | |
|----------------------------|--------------------|
| <u>Camera (normal)</u> | <u>Camera (IR)</u> |
| - OpenCV, object detection | " " |
| - Image processing | " " |

Python? program

- thread for camera(s)
- thread for Tobii
- central thread for processing data
- thread for outputting processed data



Tobii

- Notification if user is distracted / not looking @ windshield
- create box (windshield)

How do threads talk?