EE/CprE/SE 491 Weekly Report 2
2/8 - 2/15
Group: sddec19-14

User Information Augmentation

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

Weekly Summary:

This week, our goal was to research the equipment we would use for our project. This project will involve the use of various pieces of hardware and we want to make sure whatever hardware we use will be able to 1: connect to our computer and 2: provide the functions we need. One main piece of hardware we were researching was a vision tracking system. There are a few different types of vision tracking systems out there involving wearable devices and non-wearable. After discussing it with our client, we found out they would prefer to not have a wearable device.

Another piece of equipment we were looking for was an eye tracking system that is open source. Due to the fact that vision tracking is a relatively new technology, there were only a few non-wearable options. We have decided to go with the "Tobii eye tracking" device since our advisor sent us a github repository for it. This is a sensor that will be placed in front of the operator and has the capability to track eye movement. The client said he will order this hardware for us along with a few cameras to complete the system. A final goal of this week was to get the intellectual property and NDA signed which we have done.

Past Week accomplishments:

Last week, we wanted to meet with the client and elicit the requirements. However, It was difficult to get in contact with them for reasons related to their business travels. We finally met online with them last week and obtained a clearer understanding of the project and what use cases we can aim for. Due to the fact that we have to order hardware, there is not much room for technical advances in our project just yet. As a team we have discussed our schedules and set up group chats and meeting times so once we obtain the hardware needed, we can work together on storing it securely for work.

Pending issues we have so far include lack of hardware. The hardware has to be ordered as the client wanted us to do our own research on to what equipment we will use. Now that we know what eye tracking system we will use it will be ordered and we will have to wait for shipping.

Pending issues:

- Determining whether the processor on the Nvidia is compatible with the libraries used for the eye tracker.

- Installing OS on Nvidia Jetson board.

- Obtaining actual vision tracker used for our application.

- Figuring out how to project data onto the screen in front of the user.

Individual contributions:

Each of us have developed a schedule and joined our group conversations through Slack. We have all done individual research on eye tracking systems and looked into open source software. Similar to the pending issues, it was hard for any technical progress to be made as we don't have hardware to program.

Plans for upcoming week: We do have the Jetson TX2 controller now so this week our goal is to flash the operating system and start to learn how the development on that controller will work. We will need a linux computer to be a host for the OS to get flashed on. We will also try to connect one of the cameras to the controller and start to control through our TX2 controller.

Omar Abbas: This week, I worked on researching the Tobii eye tracker and studying the OpenCV library given to me by our advisor. There is not much else to do since most of this project requires configuration and that would require having the hardware. I've also emailed the Virtual reality center on campus in hopes of obtaining more insight on how they deal with their problems regarding eye tracking and system integration.

Jonah Bartz: Was in charge of handling the paperwork at Danfoss and delivering them to our client. In addition to handling installing the OS onto the Jetson.

Dennis Xu: I researched on how difficult it would be to use a Tobii eye tracker. I found that for the normal sdk it would have issues since it's only for x86 processors. We later found out their pro sdk would work with python which the Jeston could run.

Aaron Michael: Looked at the Tobii pro SDK and found some software we can use somewhere in our code. This was something we were thinking of doing instead of using the OpenCv library as it may be more suitable for the Tobii eye tracker.

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Name	Individual Contribution	Hours this week	Hours Cumulative
Omar Abbas	Got in touch with virtual reality center on campus to find out more about how they dealt with eye tracking. Found tutorials on programming our objects.	2	3
Jonah Bartz	Handled official paperwork regarding the project at the client company campus. Researched different open source software and what programing languages were used with the Nvidia TX2.	4	5
Dennix Xu	Compared different processors with tobii, SMI, and IScan, and if they will even be compatible with the nvidia jetson.	2	3
Aaron Michael	Researched more of Tobii SDK and deciding how we should move forward with software. Compared different projection styles (front projection vs back projection) and what projection film will work best for projecting on glass.	3	4

Plans for upcoming week:

We will not have many individual tasks for the next week as an agreement has been made to meet on Saturday to configure the OS on to the Nvidia Jetson keyboard, and study a little further on how we can project information on to the window screen. In later weekly reports, we will have more to show for individually.

Our goal is to connect eye vision to a projector so that a certain HUD will appear where ever it looks within a certain area.

Figure above is from an application Sygic. This is the purpose we hope to accomplish, but instead of it being in a video game, it will be in real life. The only difference aside from it happening in reality and at real time is eye trigger. Certain HUD's such as the one above will not appear unless the eye of the user looks there. This is one of the use cases for our project.