
EE/CprE/SE 491 WEEKLY REPORT 9

4/9 - 4/15

Group number: 12

Project title: Application Exploration of 5G-and-Beyond Wireless Systems and Rural Broadband

Client &/Advisor: Hongwei Zhang

Team Members/Role:

Caleb Kitzelman – Manager, Hardware

Cristofer Espinoza – Communicator, Software

Andrew French – Hardware

Jake Roskopf – Documenter, Hardware

Samuel Rettig – Document manager, Software,

Vibhu Dhavala – Software

Weekly Summary

This past week we had our biweekly meeting with our client/advisor Dr Hongwei. We were accompanied by a couple of his colleagues involved in the ARA project or have experience in similar applications like Marie-jose Montpetit and Myra Cohen. He had also invited his graduate researcher Elisabeth who is currently looking into VR related applications utilizing the ARA network.

In this meeting we discussed the revised road map we had created in the previous week and what our goals should be this upcoming last quarter of the semester. Originally, we had created a goal of having a connection between a UE and BS by the end of the semester then try to optimize the connection and use a camera to get a video feed. After our meeting, we were informed that another student working for Hongwei was already in the process of successfully getting a video feed. Therefore, our priorities are now shifted to more VR research (equipment and software) in preparation for a successful video feed.

We then had a meeting with Elisabeth later in the week for more information on progress regarding VR related research for the ARA project. We were informed of GStreamer, a framework for creating streaming media applications.

As a result, our team is currently split between hardware and software where we are researching the appropriate VR equipment as well as GStreamer.

Past Week Accomplishments

Samuel Rettig: After attending the meeting with Elisabeth, I looked into GStreamer. I also watched a video that Jake found- This presenter created and ran an application within the Magic Leap One. Based off what I have learned, I hope to create and use my phone + computer as a testbed for using GStreamer, as getting that up and running will allow for us to connect to it via the ARA wireless network.

Cristofer Espinoza: This week I have been communicating with Elisabeth for information related to video feed using the ARA network. There is currently an undergraduate student who plans on successfully completing this task this weekend, so we are hoping to be able to collaborate with this student soon. We have disbanded understanding the open source 5G RAN solution code for the time being. I have also started looking into GStreamer.

Jake Roskopf: This week I worked with the XR research team to start putting together a detailed comparison of different XR headsets. I researched the Meta Quest Pro 2 headset. I also began looking into the developer guides for each set to get a better understanding of how we can create an application with gear.

Vibhu Dhavala: This week I spent some time researching the various XR headsets that are available to our group and comparing their usability. I also began to look at the gstreamer software. I looked at which components of the software would be useful for translating to our XR program. I also downloaded gstreamer from github and began looking into setting up an app that displays simple video feed

Caleb Kitzelman: This last week we met with some graduate students on the project and learned more about where we should focus on applications and what resources we have available to work with. Met with the hardware team as well and decided on which headsets to focus on and how we will split our focus. Spent some time finding out some basic XR headset information then began looking deeper into the Microsoft HoloLens headset.

Andrew: This last week I conducted research on the Meta Quest, Magic Leap, and HoloLens headsets. I was specifically looking at what software was available for developers for each headset and whether the headsets were compatible with gstreamer.

Individual Contributions

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Jake	XR headset research	6	36
Samuel	Gstreamer research + trying to set up test	4	34
Cristofe r	Resource communication and GStreamer research.	2	31
Caleb	XR Headset Research (HoloLens, Varjo XR-3)	3	36
Andrew	XR headset research	5	48
Vibhu		6	35

Plans For the Upcoming Week

Samuel Rettig: Continue to learn more about GStreamer + set up a test bed for the software. I plan to use my computer as the hotspot, with my phone as the receiving piece of hardware. If I can make *some* kind of connection I can better consider how to utilize the ARA wireless network through the headset (and hopefully make that connection!)

Cristofer Espinoza: The pace of progress regarding the video feed is dependent on the graduate students since we are trying to avoid reinventing the wheel and trying to start from scratch. While we wait for updates, I will be looking into GStreamer. As an electrical, this will be a great opportunity for me to learn and expand my technical skills. It will be a great way to show versatility. I plan to start with general research on what GStreamer is and current applications. Since I do not have much experience in this area, creating a good foundation of knowledge is essential to move forward efficiently. I will likely have to touch base and meet with our Software students for questions after research within this upcoming week. Elisabeth may also be a great resource as she is COM S and provided this information.

Jake Roskopf: I plan to finish up the XR write-up with the XR research team and present our findings to Dr. Hongwei. Once we get the approval to get a headset, we can move forward with working on making the XR set compatible with Gstreamer and begin the framework of our application.

Vibhu Dhavala: this next week I plan to continue to use gstreamer and setting up a basic video app to test the components of gstreamer

Caleb Kitzelman: I plan to finish research on the XR equipment and begin the comparisons of each headset. I plan to work with the XR research team with this, and create a visual/presentation to relay our findings to the rest of the team and Dr. Hongwei.

Andrew: I plan to finish research on the XR equipment and complete the report for Dr. Hongwei on the information we found and our recommendation for purchase.