EE/CprE/SE 491 WEEKLY REPORT 8

4/1 – 4/9

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

The most notable achievement of this past week was revising our road map to reflect updated information and our defined project. We created roles and created a very detailed outline of how the rest of this semester and the following semester will be. As far as this semester, we have divided into a hardware and software team. The hardware team will be responsible for acquiring the proper infrastructure (base station and user equipment/camera). This includes researching the appropriate infrastructure for the application, affordability, and compatibility with open-source RAN solutions. On the software side, they will be responsible for setting up the RAN solution. With or without the hardware, they should be well versed in setting up and documenting the process for future teams. By the end of the semester, we hope to at the very least make an initial connection between a UE and BS.

Project Road Map.docx

Past Week Accomplishments

Samuel Rettig: Contributed to roadmap via confiming roles, as well as making sure it is as good as possible. Continued to read "5G in bullets" to better understand the open source program.

Cristofer Espinoza: This week, I contributed to making the road map with my teammates. I have decided to join the software team, so I have been putting in more of an effort to read into 5G in

Bullets and being able to set up the RAN solution even without the equipment. We also have a separate team from hardware and software that I have decided to join for the next two weeks, the application team. In this team, I have been researching where we can use video feeds for ag (5G Video Feed Ag Application)This is referred to as "computer vision". I have created a diagram to better understand the scope of our project.
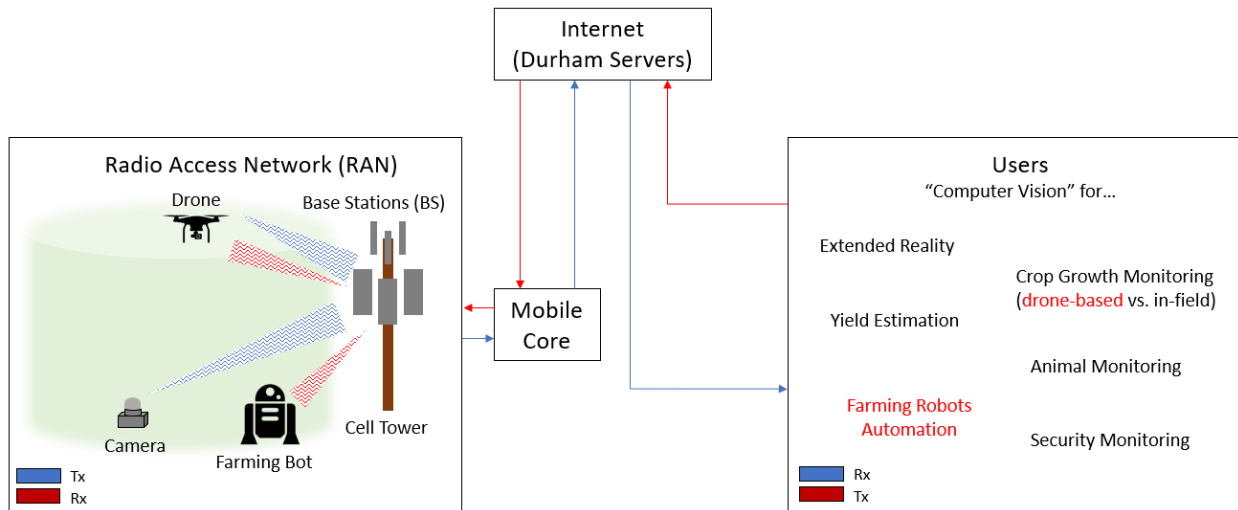
Jake Roskopf:

This week I worked on finding different applications that apply our research of video feeds over the ARA network. I also read more background on current research that is being done by the ISU Digital Ag group to see how we can integrate our ideas with theirs. I also was reading into some of the specs for the insta360 camera that John Deere is implementing to see if we want to go forward with their camera or purchase our own.

Vibhu Dhavala: This week I continued to read 5G in bullets and advancing through that book. I did not work on the software as much as I feel I have hit a wall that needs explanation. The team held a meeting to define team roles and I worked on the software team

Caleb Kitzelman: This week we defined teams and split us up into teams with our respective talents in mind. I've been assigned to our hardware and applications team, and I've begun looking into some hardware that might be used for our projects. We've also created a roadmap for how we're going to spend our time for the rest of the semester. Also read more about 5G in bullets.

Andrew: I joined the hardware team and have begun researching the equipment that ARA has installed and the user equipment we will need to connect to it.

Pending Issues *(If applicable: Were there any unexpected complications? Please elaborate.)*

Samuel Rettig: I would like to meet with the graduate students to have their help in overcoming the hurdle of not only making the initial connection, but to understand the general flow of execution of the program.

Cristofer Espinoza: The graduate students have not been the most responsive, who we were hoping could assist in demoing the open-source RAN solution and how they are currently using it. We have our bi-weekly meeting with Dr Hongwei to discuss how we should go about this issue.

Jake Roskopf: We still need to gather a list of the needed hardware that we want for our project so we get it ordered have it to test next fall.

Vibhu Dhavala: I a hoping we can talk to some graduate students to explain the code realted to 5g testing

Caleb Kitzelman: I would like to make sure we have enough put together to allow us to work on the project over the summer when we have free time.

Andrew: None as of right now

Individual Contributions *(Creating this section is optional, but it is **Required to include the "Hours Worked for the Week" and their "Total Cumulative Hours" for the project for eachmember somewhere relevant in your report. Your individual weekly hours should be at a minimum of 6-8 hours for this course. So please manage your time well. Also, ensure that individual contributions support your claim to the weekly hours. Be honest with the reports.***)

NAME	Individual Contributions	Hours this week	HOURS cumulative
Jake	Refined research on applications and hardware	3	30
Samuel	Continue reading 5G in bullets book + reading code	4	30
Cristofer	Continued reading "5G in Bullets", how to set up srsRAN Project5g, and computer vision.	6	29
Caleb	Team meeting and continued reading about 5G in bullets.	3	33
Andrew	Began researching what user equipment we will need to connect to the ARA network	4	43
Vibhu	Continued reading 5g in bullets and working with SRS ran	4	30

Plans For the Upcoming Week

Samuel Rettig: Since my role is to create documentation for the open source code + help create and set up the initial connection, I would like to delve deeper into the program to help facilitate both tasks. If the graduate students can possibly meet this week, that would be a large step towards this goal.

Cristofer Espinoza: In the meeting with Dr. Hongwei, I hope to clarify the best way to contact his graduate students. Joshua, one of his graduate students, had also mentioned that they only had one or two students who were really putting in the work on a similar project before they shifted to a more learning approach. I am interested in seeing if they would be able to assist with their project experience. I will also continue to research computer vision ag applications and how to set up the RAN solution.

Jake Roskopf: I plan to meet with the applications team to investigate at least 3 possible use cases that we can implement with the video feed. This will allow us to move forward to focus on the needed hardware on the project.

Vibhu Dhavala: I hope to be able to delve further into the code and work wit Sam to further our understadning.

Caleb Kitzelman: Meet with Dr. Hongwei and discuss our roadmap and project plans. Hopefully get into contact with the graduate students to see testing of the current systems in place. I plan to investigate possible hardware we could need for our project and as part of the applications team I

plan to look at some different possibilities we could work on with live video feed and live data analysis.

Andrew: Continue researching what user equipment we will need and potentially work on contacting various people to obtain more information.