EE 491 Senior Design Group Meeting

Safe Communication Between Lead and Following Vehicle

Week 6 Report

Team Members:

Bradley Stiff- Software Lead, Project Lead Justin Wheeler- Software Lead Sanguk Park- Scribe Lead, Communication Lead Zhize Ma- Scribe Lead, Hardware Lead Junho Chun- Hardware Lead Yifan Lu- Hardware Lead Jose Candelario- Project Lead, Communication Lead

This Week Accomplishments:

After the previous week, we found out what our specific role was with Vishal and what the rest of the groups were responsible for. For this project, we were to figure the following things for a smooth data transmission between the lead and following vehicle:

- Figure out a circuit that can transfer the information that we want
- What frequency is suitable for direct transmission between the vehicle
- Choose what we want to send and figure out how we will send that to the GPS
- Choose an antenna that can send and receive data over long distances
- We chose a DSRC receiver which is adequate for both transmitting and receiving data over long ranges which we created the diagram of how it will operate

transm. ter

The diagram is messy so to explain it shortly I will simplify it into 4 steps:

- 1. We were to find out the output format of the GPS
- 2. The GPS data would then go to a microcontroller which would converts the GPS data into the format for the DSRC transceiver
- 3. The data output by the DSRC will go through another microcontroller that converts the DSRC data into a format that the ROS can receive
- 4. The transformed data is then sent to the ROS where the robotics and controls team can observe the data that is being sent between the two cars

After making this proposed format, we had a meeting with Dr. Chinmay Hegde to confirm if this idea was valid and if there were any improvements we could make in our design layout. Initially, our hardware team planned to make a DSRC transmitter by cascading the output frequency of the GPS with a carrier frequency, while Junho was responsible for transmitting the cascaded frequency from the antenna. Dr. Hegde told us that building a DSRC using any method would take a very long time, especially having two microcontrollers between it; so it was best for our group to purchase a DSRC transceiver, so that we can solely focus on data transmission. After the meeting with Dr. Hegde, we were to simply purchase the DSRC transceiver and figure these 4 things:

- Figure out the range and if the range is not sufficient, build the antenna
- Modulate Data into the DSRC transceiver
- Do the research of finding the DSRC with bot the range and modulation of the receiver
- May need to build the antenna

For this week, we mainly found suitable models that fit the needs above. We found one model that suited us in all aspects which is shown below:

Team Member	Contribution	Weekly Hours	Total Hours
Brad Stiff	Researched the GPS to further understand how it worked(transmission, data format). Read documentation to determine how ROS package worked with GPS. Explored microcontroller options.	4	23
Jose Candelari o	Mainly took charge of the wiring of the ESR. Also looked into more information on applying DSRC for the communication.	8	32
Junho Chun	Figure out how to transmit the cascaded frequency from an antenna and research for transmitter	3	19
Justin Wheeler	Researched MTi 100 Series GPS to understand what interfaces it supported and its data format. Figured out we were using the wrong version of ROS. Discussed with controls team to determine what data they were expecting.	4	16
Sang Uk Park	Wrote the weekly report, helped with creating the wire for the ESR radar system. Gathered data for the ESR and the data display between it through meeting with the radar lead.	5	24
Yifan Lu	Researched the MTi 100 Series GPS to understand the output serial that it gives out.	3	21
Zhize Ma	Research and thinking different method beside DSRC could send data. Understand DSRC	3	20

Goals for Next Week

Make sure that we gather correct specs for the GPS and possible make a visit to INTRANS to find specific ports that we can use to power the different devices and have both the list of power ports and device model. From there we can start to plan on powering the devices.