Journal Report 3

9/16/19-9/20/19
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Daily Log

Monday September 9

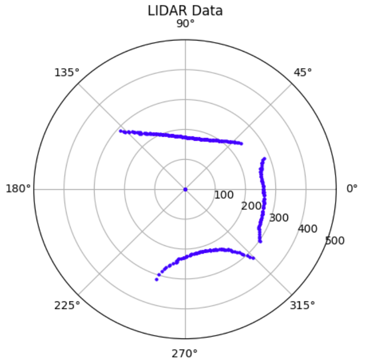
We went to the Robotics Lab to figure out how to make the Rustler move using the remote. Additionally, we need to find a way to read the signals the receiver is outputting to the steering servos, since we want to control the car without using the remote. We were able to get the front tires to turn, but we are still trying to make the motor drive the car forward.

Wednesday September 11

Worked on defining road rules. They are pretty similar to what we have in real life, and all measurements are defined with variables relative to each other to ensure they work later if we port to a larger go kart (e.g k = inch (constant for line width) and s = 8k(stop sign height)). Got the Rustler to move forward. There the cable that connects the battery to the ESC seems to have a loose connection, so I got a binder clip to hold them in place. We think there may be a reverse but havent found it yet.

Friday September 13

Between this class, and the last, I found a tutorial on how to configure the ”sport mode” setting on the ESC. This sport mode will allow us to drive in reverse as well, as apposed to the original ”race mode” that it was in earlier. We also drive the Rustler to look for some calibration problems with the car. When you are stopped and trim is set at center and turn the wheels all the way to the left or right while the car is stationary, when you apply throttle again, the car will steer slightly in the direction that you previously turned the wheels, even though the tires look like they are pointing straight. I don’t anticipate this to be a large deal for our purposes, because we will naturally correct for this when gathering test data, and our neural net should do the same. Tony also wrote some code in Python using matplotlib to visualize the data coming in from the LIDAR sensor. Below is a screenshot of data collected using the ultra_simple program, which returns (theta, r) values.



Timeline

Date	Goal	Met
Today minus 2 weeks	N/A	N/A
Today minus 1 week	Download dependencies and setup a GitHub repository and acquire a remote-control car	Yes, got permission from Kusko, and have a repo on both Tony's computer and my computer
Today	Create "road" patterns for car to follow and have Lidar code compiled and running	Yes, Tony started making the rules set that the car would follow, and we both got the sdk demos to compile and run
Today plus 1 week	Find/Place an order for a Raspberry Pi and have the Lidar data visualized	No, we originally wanted to use an Arduino, but realized that we could be much more effieciecnt with a Pi, and data visualization seems reflected
Today plus 2 weeks	Hook up the Pi to the Rustler, and write a program to steer the car from the Pi.	No, we need to acquire a Pi first

Reflection

Having the car up and running is nice, and now that we know how the system works, we are going to have to replace the radio receiver with our own micro-controller, I personally think that a Raspberry Pi will work the best, and we will have to see if the SysLab already has one, and if not, we will have to order one. There also seems to be a problem with the Lidar, looking at the aforementioned picture of the environment vs. the graph, the curved trash can should be on the left of the Lidar, but it shows up on the right. This may be a problem with either the demo code, the hardware, or the way we are plotting the points. I suspect that we need to reflect the graph over the polar axis to have the real image.

Although we have created road rules, we also don't know what the best method of implementing these rules. I personally think we should take tape and tape down the road at the back of the school. We might need permission from SysLab/ TJ Admin to do such a project though. The plan of having modular courses that we tape on science fair poster board may work, but we would need a lot of poster board to make this work considering the size and speed of the Rustler.