Journal Report 12
12/09/19-12/13/19
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Daily Log

Monday December 9

We decided to make some progress with our Lidar data. We logged into the Raspbery Pi, downloaded the RPLIDAR SDK, complied the code for Linux, then ran the program to make sure it worked. We then decided to disconnect the sensor from the monitor, and see if we could run the code from my laptop via ssh. The program ran as expected, and if we left the Lidar sensor plugged in overnight, we could gather Lidar data at TJ from our houses if we wanted.

Wednesday December 11

Tony wired another potentiometer onto the breadboard. Now we have full control of the car through the breadboard controller. We have two potentiometers - one for engine and another for steering. While we can gather both engine and steering data at the same time now, this is in no way a permanent solution. I have a working web socket, and even found a WiFi dongle that I could use to make the Pi act as an independent router. Despite the progress I made, the process is rather complicated, and we are thinking about ditching the socket idea in favor of XBees, a micro-radio technology. Mr. Seyler told us about it, and he is even offering to provide us the parts and instruciton for it. We were also added to Mr. Seyler's Google Classroom

Friday December 13

Worked on logging LIDAR data out to a text file. The programs that come in the manufacturer SDK are written in C++, but all of our other code will be run via Python, and in an effort to synchronize the different components of the training data, we decided to find a way to run it using one .py file. Tony found a way to run the lidar code via a python script using the "subroutine" package. Tony then added onto the program to write a program to combine the LIDAR output along with engine and steering data, and we plan on testing the program on Monday. Our initial plan is to take a reading 5 times per second. So every of a second, the program will get steering angle, engine duty cycle, and what is around the car with the LIDAR sensor. Our next steps are to format the data so we can feed it into a neural network. I also got two XBees and breakout boards from Mr. Seyler, who was kind enough to link them together with XCTU, a specialized XBee software.

Timeline

Date	Goal	Met
Today minus 2 weeks	Have the Raspberry Pi gather Lidar data	Yes
Today minus 1 week	Have the Raspberry Pi gather Lidar data	Yes
Today	Find a way to gather steering, throttle, and Lidar data at the same time	No, We have figured out how to gather the data separately, but are working on integration
Today plus 1 week	Find a way to gather Lidar, steering data, and throttle at the same time	No, We have figured out how to gather the data separately, but are working on integration
Today plus 2 weeks	Make the collection of data wireless using the XBees	No, we just got the XBees and are still learning how to use them
WINTER GOAL	Have training data gathered from the Lidar, steering, and engine, and format it all in one array or csv, so that it can easily be fed into a neural net, if time permits before break include camera data as well	We have gotten much closer to our goal, and we have even decided to expand it by including throttle data in our collection as well.

Reflection

This week was also very productive, and we have made major strides towards our winter goal. I modified the goal slightly to omit camera data as Tony wants focus solely on Lidar data and making the project wireless for the time being. Tony made some really important strides towards synchronizing and aggregating data, but the major problem is the fact that his methodology is wired, and impractical as a final solution. Our current solution moving forward is using the XBees to transmit the data that we need. Hopefully, the radios will be relatively easy to work with.