# Journal Report 18

2/17/20-2/21/20

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## Daily Log

### Wednesday February 19

Tony continued working on the program to sync up data from the Arduino and data gathered on the Pi from the LIDAR sensor. The program creates a mapping of time to the two steering information points, and a mapping of time to a list of tuples of (theta, distance) pairs. I tried to get my neural net to train, but the model didn't like the shapes it was being fed, so I modified the format of its input data and output data. This lessened the degree of the error message, but there is still one inconsistency that still exists.

### Friday February 21

Tony continued working on the program from Wednesday. I finally got the neural network to train. The error came from the loss function I was using. I got my original code from an online tutorial, and the person there used "sparse-categorical-crossentropy." I learned how this optimizer works and how it is used for the classification of data, not what I wanted my neural net to do. Keras was taking my output and automatically one-hot encoding it, so the output shape was not what it was expecting. I changed the error to "mean-squared-error," and the net trained for the first time. With one epoch, it reached accuracy in the low to mid 90s, which is as good as I expect, as it would be over fitting if it generalized that well to the semi-random smaller movements of human action.

## Timeline

| Date | Goal | Met |
|---|---|---|
| Today minus 2 weeks | Make the collection of data wireless using the XBees | Yes |
| Today minus 1 week | Control the car wirelessly using our controller | Yes |
| Today | Control the car wirelessly using our controller | Yes |
| Today plus 1 week | Refine wireless gathering method, and have a reliable system to gather data | No |
| Today plus 2 weeks | Gather training data | No |

## Reflection

Last week was another big week, as we finally got a neural net to work as a proof of concept. As of now, it technically hasn't converged for the data related to this project, but the data that we have fed it is very similar, so we do not expect too many issues. The net is also relatively simple, and we have a good understanding of its architecture and behavior. The next step is to smooth out our motor controls, gather data, format it, and feed it into the neural network to train.