CS 472 Pex 2 Work Log

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Data Collection:

Originally we collected a large quantity of data including fast driving, slow driving, correcting once driven off the track, etc. All together we had around 15 separate collection attempts of about 5 minutes a piece. This data ultimately ended up being useless later on because trying to train the model on all of this data took an immense amount of time and the model did not seem to perform that much better. Additionally, during this stage we ran into an issue where our camera needed to be unplugged and replugged to begin recording properly. This resulted in about 30 minutes of training footage lost. I think that having such a wide variety of different data of varying quality made it harder for the model to actually learn behaviors because the variety meant the model never quite nailed down just following the line normally. We ultimately just ended up training our model on one singular 7ish minute collection of slow driving with a focus on smoother turns.

Preprocessing:

We tried a couple extra preprocessing steps other than just applying the filter for just black and white. We tried edge detection using CV2's built in canny edge detection, but the one model we trained using it did not seem to perform much better and once it departed the track it was never capable of returning. We also altered the cropping of the image at the beginning to try and isolate a field of view more optimal for learning, but we realized just angling the camera further down seemed to help more and we just went back to the default cropping. We ran into an error at one point during the preprocessing of the original large collection of training data because a few of our frames were collected while the camera was not operating correctly and resulted in a typing error. We manually deleted these frames and it was processed correctly.

Model Creation/Training:

Our biggest constraint on actual model generation was just the time needed to train a new model locally on the machines. We took about 12 different attempts at training models with about 9 of these attempts using the original large collection of data. Some of the variations in the models we tried were in the preprocessing steps, a few had varying CNN filter sizes, we changed the number of dense layers and the size of them 3 times, we originally had dropout layers and

then we took them out at the end and had better results. Other than some memory issues, we never ran into any issues actually training the models. However, despite the different variations we never got a very good model from the original data and we lost a huge amount of time trying to get something to work training all those models on such a huge chunk of data.

Work Contributions:

We both worked equally on the project. 50/50 split.