Behavioral cloning is relatively simple to implement but yields optimal result efficiently. We have used behavioral cloning to train a CNN based autopilot based on an open source platform. The goal of the project was to model and optimize the autopilot in a real world setting, other than a simulated one, trying to gain valuable insights to launch a real world machine learning agent. For the performance optimization, we have employed Data Aggregation[3] to augment the training process.

As shown in the experiment results, unfortunately the tried application of Data Aggregation is far from being optimal. The best performance is achieved only with one iteration of modifying the action control by the expert without aggregating the dataset. The main cause seems to be coming from the fact that it is very hard to modify each action, so it wouldn’t perturbate the trajectory space already given. However, the agent reacts quite sensitively with the sequential dependency of each state (s, a) with each other. The CNN training and validation losses for each iteration were all less than 0.05.

References