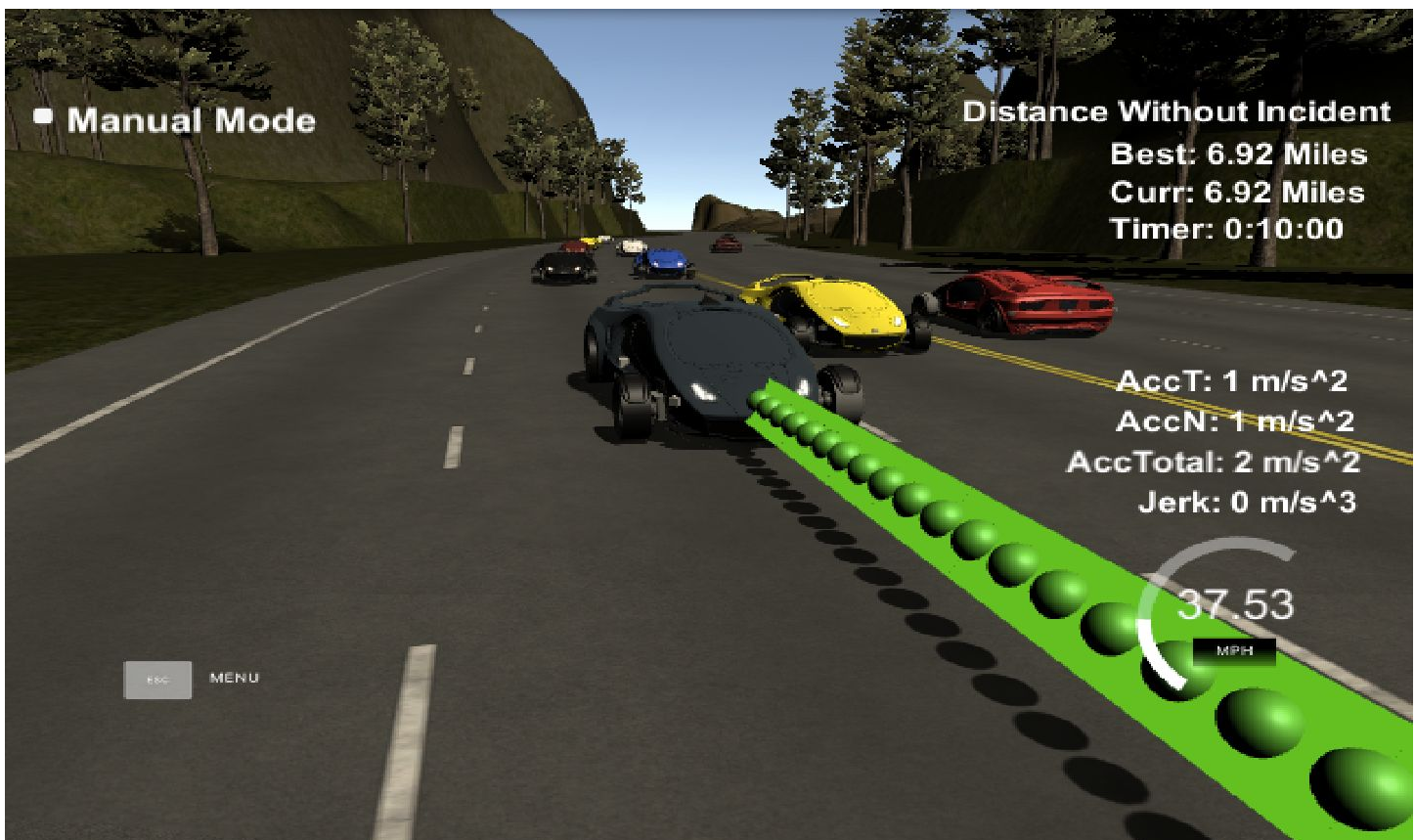# Term 3 Project 1 (Path Planning)

I completed this project by following along with the Q&A Session and classroom tutorials. The first thing I did was get the car to move in a straight line. I used the starter-code in the classroom to do this. After successfully getting the car moving, I made the car drive within its lane. There were still some issues though. The car accelerated too fast, and it had no knowledge of its position in relation to other vehicles. I knew that in order to complete the project, I would need to solve both of these problems.

The next thing I did was get the car to smoothly accelerate. Originally, the car was jumping from 0mph to 50mph in a very short time, and the vehicle was exceeding the acceleration and jerk requirements. I needed to incrementally increase my acceleration rather than speeding up too quickly. I did this by using the sensor data and Spline library(1). The sensors were used to determine if any vehicles existed in the car's lane. If a car did, I made the variable too_close true. I would use the variable later to determine what action to take.

The next thing I did was to determine if the lanes were available to change into. I knew that if I got too close to a car, the optimal solution would be to change lanes rather than to accelerate. I used the sensor data to determine if the lane lines near my vehicle were available to shift into.

The last step we using both of the above discoveries to plan a path of action. When a car realized that it was too close to a vehicle in its lane, it was then forced to make a decision. If the surrounding lanes were available to shift to, the car would change lanes. If not, my car would slow down to avoid a collision.

This strategy was a success. My car was able to drive for 10min straight within all the required limits and without a collision!

(1) - Spline library found here: http://kluge.in-chemnitz.de/opensource/spline/