

David Perez
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CSCE 460

Lab 4 Part 2 - Follow the Gap on Real Car

The algorithm implementation for this lab was almost identical to the one used in simulations. One of the differences was changing the drive topic to the one used on the real car. The algorithm that I used relies a bit on setting distances past a threshold to nan values. Since my implementation seeks to adjust the vehicles to the largest distance in the max gap of non zero values this tends to have a significant impact on performance. For instance, if the closest distance and its surrounding values in a bubble radius are set to zero, then if large distances weren't set to nan, the vehicle would steer towards the distance right next to the bubbled values. Setting a max threshold for large values ensures that there remains enough distance between the vehicle and obstacle without having an unnecessarily large bubble radius.

When it came to testing my algorithm on the real car I ran into the surprising luck of having the PD controller tunes still being adequate on the real car track. The parameters for the k_p and k_d values were the same as those used in simulation as well as setting distances greater than 2 meters to nan values also directly transferred over to the real track. The parameter that did need some adjustment was the bubble radius. On the simulation, a bubble radius of 10 for both sides of the closest index seemed to work well. On the real track however, a bubble radius of 15 had the best performance during testing.