

PID Project Reflection

Describe the effect each of the P, I, D components had in your implementation.

PID stands for proportional–integral–derivative. Its a control mechanism which constantly corrects based on the error value until a desired set point is reached.

P – describes how the car is holding the middle of the road, this component produces an output that is proportional to the current error, CTE.

I – stands for consistency, this component is the sum of the instantaneous error over time and gives the accumulated offset that should have been corrected previously.

D – is responsible for oscillations, this component is proportional to the rate of change of CTE.

Video of my drive is available on: <https://www.youtube.com/watch?v=igqF8mZKTq4&t=175s>

Describe how the final hyperparameters were chosen.

For the final hyperparameters for P, I, D coefficients I choose: -5, 0, -13. All parameters have to be set at the beginning when we execute the code (`./pid -5 0 13`). This way provide me the possibility to change parameter values without making the new build of the code.

This have been done through manual tuning. At the beginning I set all parameters to zeros. First I have started with tuning the proportional parameter, in order to keep car to the center of the road. I was increasing it's value. The car was oscillating very much and that is the reason why I had to increase the derivative parameter. I have noticed that integral parameter didn't have much influence, so I leave it to zero. Probably more playing with tuning of the parameters would held to even better driving. Of course, there is also the possibility to use twiddle as Sebastian describe in lessons. That can be second or additional option in order to have even better drive.