

Model Documentation

The code model for generating paths is described in detail.

Car Ahead

If car ahead is less than 30 s at next time period then check possible lanes to change to. Change if lane is available. Else Slow Down .224 until not less than 30s.

Checking Available Lanes

If all cars in lane are at least 30s ahead and 30s behind the car at the next time period then lane is available to change to.

Smoothing Paths

I used the spline header file to smoothly generate a path between by way points to keep jerk low.

Create 4 way points in xy coordinates (based on what lane we want to be in). Transform these coordinates back to the current reference frame. Then use the spline class to create an equation that smoothly joins the four points together.

We then use this equation to generate more intermediate points in such a way that adheres to our reference velocity. (We basically say ok if you want to go 30 meters ahead along our spline path what spacing do we need assuming the sim tries to hit one point every 0.02 seconds and fill in the points accordingly.)

Smooth Start

Start with a reference velocity of zero and slowly increase if no car ahead.