

Preliminary Proposal of Learning Traffic Light Simulation

Lynn Jepsen

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Abstract

This project is meant to simulate a busy traffic light. The program tries to recognize patterns in the intersection and make the light as efficient as possible by minimizing waiting time for cars

1. 1st Quarter

I would first start off by trying to make a very simple version of a traffic light simulation. Basically one way roads that cross over each other. The cars would all go the same speed, stop instantaneously, etc. I would have a weight sensor at each light and that would be the input into the light. I hope to make it seem like you are watching a traffic light that is running all day except that you can speed it up or slow it down. Once I complete this, I would then try and write the learning portion of the program. I might change the traffic density in one direction to be much higher than the other direction and find a way for the computer to recognize this. I will give it other problems at different "times of the day" and "days of the week". If I get all of this done then I will be most happy.

2. 2nd Quarter

Now that the basic program is done, hopefully, I will begin to add in real world complications. My first would be to add to the layout of the intersection; make it so that you can have any number of lanes. I also would like for the computer to tell me what the best possible layout would be (within reason, I don't want 100 lanes in each direction).

This complication would mean that I would also have to find a way of modeling when a car will switch lanes. My second task would be changing the stopping and starting of the cars. First off I would add in reaction time and maybe make it a little different for every car just to see how much one stupid guy can block everything up. I would also add in acceleration and again make it a little different for every car. I would like to somehow incorporate the fact that drivers like to always be a certain distance from the car ahead of them depending on how fast they are going. Finally I would like to look at the speeds of cars. Instead of having all cars go at the same speed, I would have each car have an individual speed and also vary their speed slightly as they drive because no one drives at a constant speed.

3. 3rd Quarter

By third quarter I should have a pretty decent simulation. My next task would be to add in cars that can turn. First of all this would affect the layout of the intersection. It needs left turn lanes, but how long and how many? I would like the computer to tell me these things based on traffic density. I will once again change the input, based on time of day and such, and see what the computer says. I think this will take some time, which is why I saved it for third quarter, but once I finish this I think my simulation could be called complete. I would then probably experiment with different situations and see what the computer says to do.

4. Extras

Depending on how much I get done I might continue with some extra variables I thought up. I have noticed on the road that sometime there are big electronic signs that tell you how fast you are going. I was wondering if I could somehow hook that up to the traffic light up ahead and use that additional information to make the light more efficient. If you saw a car coming down the road at 40 mph then you would know when to change the light. I also wanted to look at safety issues. Such as how far apart do cars have to be in order to be safe but also not cause too much back up or how long a light has to stay yellow in order to still keep people safe but not hold up too much traffic.