

Preliminary Proposal of Learning Traffic Light Simulation

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Abstract

I am interested in modeling and machine learning, so I tried to find a problem in the real world that could be modeled and then somehow fixed by a computer learning about it. I thought that a traffic light would be a sufficiently complicated problem and involving enough variables that it required a computer to solve it.

1 Proposed Project

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, both average waiting and total waiting time. The patterns would be related to the time of day and the day of the week. At first I would purposely input recognizable patterns and see if the program would catch it, but eventually the plan would be to possibly use this program somehow at a real intersection

2 Background Research

I have googled traffic simulation and found some information online. Most of the simulations were just simple intersections. I did see a math equation, Phillip Spencer developed it, that modeled how a car stops and starts. I would like to look around some more to see if I can find any other equations that can effectively model different aspects of traffic behavior. I also tried

to find all kinds of variables that would effect a traffic light. They include number of lanes, speed of cars, turning cars, etc. However, I haven't seen any simulations that learn over time.

3 Procedure

Since this is a modeling program I guess I should try and learn some of the modeling languages like NetLogo or something. I have also seen Java Applets online that model traffic, so I could possibly just use Java. I will start off with a very simple simulation of a traffic light and then try to make the program learn. Since there are so many different variables I want to include, I will add in variables as I go along.

4 Results

I hope that by the end I will have a somewhat realistic model of a traffic light that can be used to see what causes the most back up. I then would like for it to learn and fix the problems. Then the computer could tell me what the biggest problems were and how it fixed them.