

Modeling of Optimized Traffic Patterns Using GPS and Wireless Communications Between Traffic Lights and Vehicles

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Introduction

In the last few years GPS navigation systems as well as wireless communications systems, such as bluetooth, wireless internet, and cell phones, have becoming increasingly popular and accessible. The marriage of these two systems could allow for more efficient traffic patterns as traffic could be dynamically regulated by wireless communication between vehicles and/or traffic regulators such as lights. Vehicles could be automatically routed the fastest route based on the volume of traffic on given roads and highways. Traffic lights could be optimized to be more efficient by knowing the exact location of nearby vehicles, and where those vehicles are going, if their navigation systems transmit that data. Speed limit signs could be dynamically adjusted based on the volume of traffic on the road, and the conditions from a local weather report. By implementing systems such as these, people could reduce travel time, and in turn reduce the use of fossil fuels that waste natural resources as well as pollute the environment.

Purpose

The purpose of this project is to model a theoretical system in which traffic would be dynamically routed to equalize traffic volume. This system would also adjust traffic lights based on traffic. This will also teach me a lot about agent based modeling and artificial intelligence.

Progress

My progress this quarter has been mostly in the visualization of the simulation. For this I have chosen to use java instead of some of the other modeling languages available such as NetLogo or Mason. I chose to code things myself in java because I would have absolute control of how thing worked and I wouldn't have to spend time learning the different language.

The graphic to the left is an example of the output of my program at this point. The way the code is organized allows me to easily add more roads and cars to the simulation to. The relationship that I have coded between the roads and the cars allows me to more easily add roads and cars later to build a network of roads that the cars can travel on.

In the next quarter I plan on making cars adjust their speed based on other cars around them, and to implement traffic lights at intersections.

