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

Bryan Ward

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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.

A system such as this would be an agent based model, because each of the cars is an agent in the sytem. This project's goal would not be in the designing of a system such as this, but in the modeling of a similar system. An analysis of this system could show the benefits that could be gained.

This project ties in with a lot of other traffic simulation programs that have been done by many other people throuhgout the world. One article that I found to be particuraly interesting was a program in which all of the traffic patterns in Switzerland were modeled. There are links to several different simmilar projects off of the site http://www.vsp.tu-berlin.de/archive/sim-archive/projects/traffic/ . My project is aimed to model a slightly different

problem but the fundamentals are the same. I also will probably not have such a large scale project with as many agents as they use.

My project is going to be done is java instead of one of the many modeling languages available such as NetLogo and Mason. I feel that the time that I would have to put in to learn these new languages would be more than it would to write the program myself in java. Many of the capabilities of those languages I would not use anyways, and so this allows me to write a program that does exactly what I want - nothing more, nothing less.

My current model is very basic. I have cars which move, and roads for them to drive on. While the program at this point is very simple, a lot of the ground work for more sophisticated modeling is set. The relationship between the roads and cars allows for the model to be very flexible and allows for easier analysis when I add more roads.