Name(s)	Project Number
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Project Title

Intelligent Intersections in Various Vehicle Traffic Networks and the Resulting Changes in Network Efficiency

Abstract

Objectives/Goals
This experiment is designed to determine if street intersections can learn to increase the efficiency vehicle transport in a network over time.

Methods/Materials
A laptop and Visual Studio for the C# language were used to create a computer simulation from scratch. The simulation allows the user to #draw# a road network where vehicles are added to the network according to a pattern that models real life. The intersections store data about how many cars are waiting in each direction every time the configuration of the traffic lights changes. Intersections use this data to determine if certain lights should stay green for more or less time in future cycles. In each test, a percentage value is set which determines how drastically the intersections respond to the data they record. Tests were applied in simple road networks with both four-way and three-way intersections.

Results
Due to favorable values for deviation between trials, the experiment has yielded relatively firm results. The experiment demonstrated that the intersection logic and learning capabilities initially benefited intersections by increasing the number of cars they could process in a one-hour interval. As the #learning# percentage and the time over which the simulation was run increased, intersections actually lost efficiency.

Conclusions/Discussion
It was concluded that agents which learn slowly over time, rather than responding very rapidly to their environments, are able to execute their tasks most efficiently over time. This behavior - learning best at a modest pace - demonstrates that simulated intersections were learning much like humans do. These results have implications for urban planning and artificial intelligence in computer programs.

Summary Statement

This experiment uses a computer simulation and the principles of artificial intellegence to determine if road networks can be made more efficient if intersection control systems learn and adapt to traffic patterns automatically.

Help Received