Computer Traffic Simulation
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Abstract

Traffic flow is an extremely complex procedure and is near impossible to figure out equations for. The best that can be done is to have complex simulations of the traffic in order to get a semi-realistic view of the traffic that can be controlled and experimented on at will. A combination of random numbers to factor for driver's abilities and cautions and amount of traffic flow together in a successful simulation could result in the traffic flow patterns that you see in real life.

Introduction

The problem of traffic is an apparent one: try driving in rush hour on any major road. Can the flow of traffic be improved though? If a lane is added, how much faster can cars get through a traffic jam? If a lane is blocked off, how much more is traffic backed up? How does the maximum speed limit affect the wave that is formed? What is the optimum speed limit for traffic flow? For saving gas? All of these questions will be answered through the simulation that is being developed.

The project is successful since the wave patterns that appear in real life also appear in the simulation. First, in order to have successful pathing around a two dimensional environment, the car looks a certain distance in front of it, on both the left and right sides of the car. If one of the two spots triggers (it detects a color that isn't road), it turns away from that spot.

The way that wave patterns are achieved in a 2 dimensional environment is to use a 2 dimensional version of the Nagel-Schreckenberg. Instead of looking ahead in the cells until you reach the first occupied cell, a 2 dimensional version would look for the first car in front of it in an arc. And instead of changing the speed with whole numbers, the speed is be a factor of the distance between the two cars, with the time delay to make the successful patterns.

The result of this project is that there is the same amount of traffic flow for 10 cars as there is for 20 cars. What this means is that as a whole, the system releases the same amount of cars no matter the number. However, to an individual car, the time it takes to get through the system is doubled.

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