

# Traffic Based Pathway Optimization

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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.

### Algorithm

The algorithm used in finding a path is a modified A\* search. The basic algorithm starts by adding a node to a list. The node knows the distance it has traveled from the start and an estimate of the distance to the destination node. The algorithm then iterates over this list removing the node with the minimum value of heuristic and distance. At each node it checks to see whether the node is the destination, if it is, it will return the path associated with that node. Otherwise it will add a new node for each of the other nodes that are connected to it. The only difference between this algorithm and the algorithm used in my model is that instead of dealing with distance, the algorithm deals with time. In addition, it weighs red lights, weather, and time of day and time of week.

### Applications

Possible applications of this algorithm are in pathfinding for Corporations such as shipping companies where delivery times can be of vital importance to the bottom line. In addition, in a large corporation networking all of the vehicles in a fleet would be fairly simple, allowing for companies to improve their pathfinding system as the years go on.

### Introduction

Many commercial GPS systems include navigators to use in a car to assist the driver in getting to a destination. Many drivers are not concerned about the distance traveled when getting to that destination, rather the time traveled is of primary concern. Often, the time it takes to travel a certain distance can vary wildly throughout the normal traffic cycle, reaching its peak during rush hour. Many human drivers often ignore the directions given by GPS systems during these times, opting for roads that they know personally are faster. If there could be a way to provide the dynamic learning aspect of a human driver with the automation of a computer, one could optimize pathways greatly.

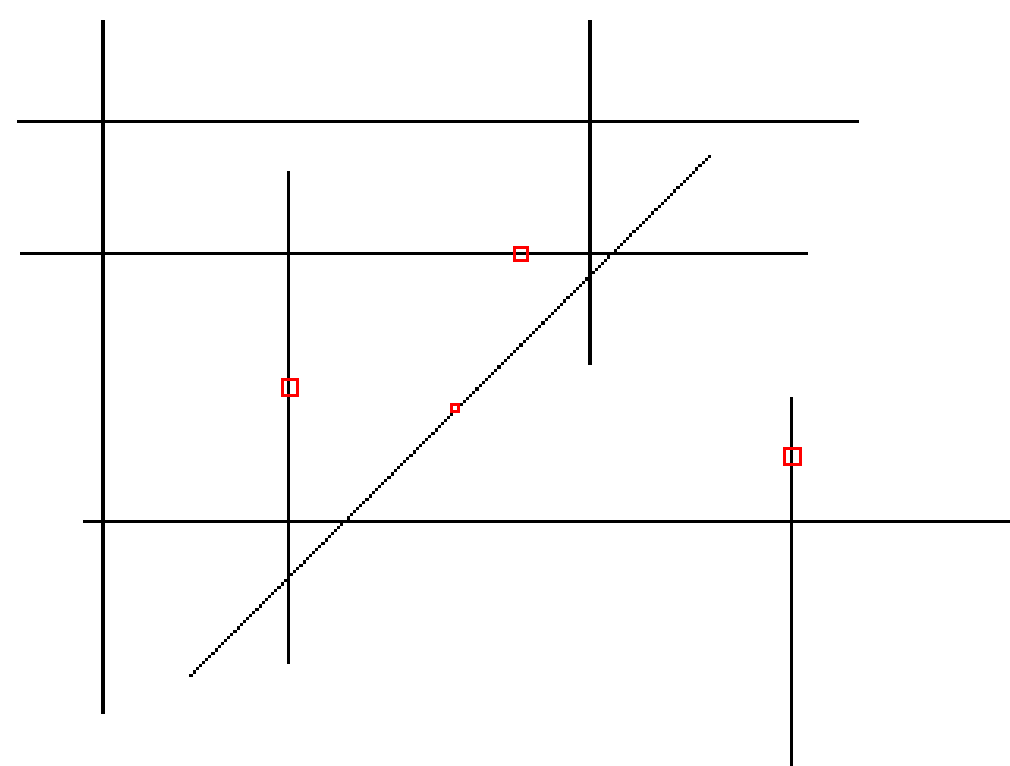


Fig. 1.0.0.0 A mockup of the traffic window.

### Traffic Simulation

Without data, the algorithm is useless. Using a traffic simulation, the algorithm will be given data to use to estimate travel times.