

Traffic Based Pathway Optimization

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The goal of this project is to make an application capable of finding a path that is optimal in terms of time. This is done by keeping track of travel times at many times of day and weather and using this data to estimate the time traveled.

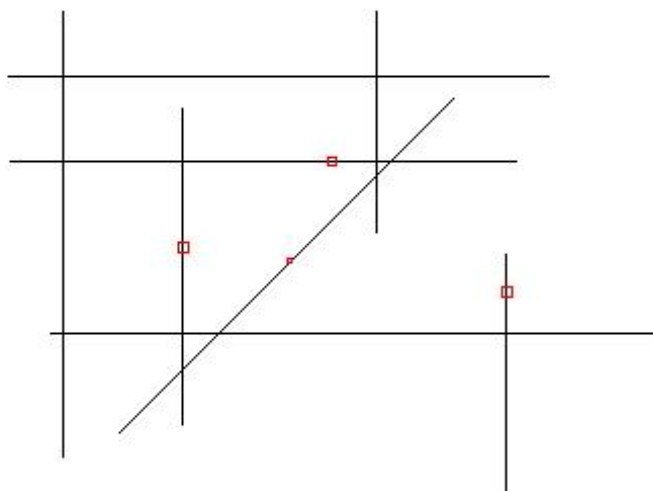
Abstract

Keywords: Pathfinding, Traffic Simulation

1 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.

Figure 1: Mockup of simple GUI to view traffic simulation.



2 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 be-

tween 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 weather and other contextual data in the estimation of time.

3 Development

Development was started by writing an algorithm to use an A* search to find a pathway. I then modified this to work with road segments instead of road nodes. This was done because in a roadway simulation, one moer often thinks about the roads that one travels on rather than the

intersections one travels through. After this was accomplished, I started inputting data for the roads. I soon realized that inputting the data for hundreds of roads would be a time consuming process indeed. Because of this, a parser for Census roadway data was implemented. In addition, the A* search was modified to accom-

modate this different format of roadway data.

4 Traffic Simulation

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

References

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