TJHSST Senior Research Project Proposal: Map Navigation Using A* Search 2006-2007

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September 19, 2006

My project will deal with maps and pathfinding. The primary goal of the project would be to use an extension of the A* search algorithm to find both the shortest distance path and afterwards the fastest path through a given map. Eventually, I hope to include realistic artificial intelligence concepts such as speed limits, street lights, and traffic jams. In the end, it will hopefully be able to take in an image of connected and color-coded dots to represent a map, and you would be able to select two locations and have the program determine the shortest and the fastest paths through the map in a relatively smart manner. The maps themselves will be fairly abstract.

This topic has obviously been covered in programs such as google maps and mapquest. But most such programs only consider the maximum speed limit. I'm sure that some research has been done in the field and I will spend a good deal of time researching the topic before coding the complex parts of the program. Also, learning the A* search in the Artificial Intelligence class will help me progress with my own work.

I will be working with the Python computer language. This language is very easy to use, very feature-rich, and fast because it is interpreted and not compiled like Java. I will start out from very basic maps and go on to more complex ones with added features. This should allow me to check my solutions manually in the early stages, ensuring that at least the basic parts of my program work perfectly. By advancing from smaller maps and fewer features to a more powerful program, I will be able to track my progress every few weeks.

In the process of testing I may create a random map generator, which would help me test out new features and progress throughout the development phase. In the end, I'm hoping to have a nice GUI to present the abstract concepts that I will be working on throughout the year.