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PROJECT FACT SHEET

Project Name: London Underground

Date: December 2004

Project Ref: 2004SAI2

Elapse Time / Completion: 2 Weeks

Reporting: Chris Thornton

Developer: Jonathan Hawkins

Main Objectives:

Artificial Intelligence

The objective of this project was to create a path finding system to work across the London Underground network. It would need to take in a start station and an end station and compute the best route across the different tube lines. The best route can mean the least number of changes and the least number of stations the tubes will have to go through to get to its destination.

This was to be done with Artificial Intelligence techniques.

Technical Environment:

Language used: Java, IDE: Eclipse
Pentium system, Windows XP Pro

Project Approach - Design / Development / Test:

The key phases of the project were:

- a) Understand the tube network, how the different lines worked
- b) Which stations were on which line, to produce an exhaustive list of stations and lines.
- c) Which stations were next to which and on what line.

This list was put into a text file and read into the program when an initialization at start up. This produced a representation of the train stations and all the lines.

It was then a case of creating different search techniques to navigate the network. Due to time constraints a neural network was not used but this would have produced an effective search strategy. The three types of searches used in this project were:

- Depth First Search
- Breadth First Search
- A Star algorithm

To test the result of the different searches certain stations were used to see if the correct lines were used and they went in the correct direction.

These had varying results but considering the complexity of the network the searches came out very well most of the time. It was possible to make it go the wrong way around a tube line at times but most of the time it worked well.

A GUI was put on the front of the searching to allow the user to select the different search types, to select the different stations from drop down lists or to write a query in natural English, i.e. "how do I get from Huston to Kings Cross".