

Universiti Teknologi MARA

**Finding Minimum Path by Using Genetic Algorithm
(GA)**

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DECLARATION

I certify that this thesis and the research to which it refers are the product of my own work and that any ideas or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.

May 31, 2007

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ABSTRACT

In this paper we considered finding minimum path problem which is known as shortest path problem. This problem generalizes several traditional shortest path problems and has applications in transportation and communication networks. The objective of this problem is to determine the shortest routes or paths between two points so that it can minimize the cost and time. This problem is simple and can be solved easily. However, practical transportation networks will become much more complicated and needed to solve efficiently. Roadways and telephone systems are the examples of them.

Genetic Algorithms (GA), pioneered by John Holland, applies the principle of evolution found in nature to the problem of finding an optimal solution. It makes use of three basic operations in order to optimize this problem. They are: 1) *Reproduction* means the creation of new generations, 2) *Crossover* means interchanging of parts of parent strings into the child string, and 3) *Mutation* means the random bit flip. Although this problem can be solved by GA, other methods also exist. Dijkstra's Algorithm is one of them. This approach solves the single-source shortest path problem with nonnegative edge weights. In this paper, GA has been applied to find the minimum path, then result will be compared with Dijkstra's algorithm are presented.

Keywords: Shortest path problem, Genetic Algorithm (GA), Dijkstra's Algorithm