



An Evaluation of Potentials of Genetic Algorithm in Shortest Path Problem

S. Hassany Pazooky, Sh Rahmatollahi Namin, A Soleymani, and F Samadzadegan
Dept. of Surveying and Geomatics, Tehran University, Iran

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Shahin Rahmatollahi Namin, Sajjad Hassany Pazooky,
Ali Soleymani, Farhad Samadzadegan
Dept. of Surveying and Geomatics, Tehran University, Iran

ABSTRACT

One of the most typical issues considered in combinatorial systems in transportation networks, is the shortest path problem. In such networks, routing has a significant impact on the network's performance. Due to natural complexity in transportation networks and strong impact of routing in different fields of decision making, such as traffic management and vehicle routing problem (VRP), appropriate solutions to solve this problem are crucial to be determined. During last years, in order to solve the shortest path problem, different solutions are proposed. These techniques are divided into two categories of classic and evolutionary approaches. Two well-known classic algorithms are Dijkstra and A*. Dijkstra is known as a robust, but time consuming algorithm in finding the shortest path problem. A* is also another algorithm very similar to Dijkstra, less robust but with a higher performance. On the other hand, Genetic algorithms are introduced as most applicable evolutionary algorithms. Genetic Algorithm uses a parallel search method in several parts of the domain and is not trapped in local optimums.

In this paper, the potentiality of Genetic algorithm for finding the shortest path is evaluated by making a comparison between this algorithm and classic algorithms (Dijkstra and A*). Evaluation of the potential of these techniques on a transportation network in an urban area shows that due to the problem of classic methods in their small search space, GA had a better performance in finding the shortest path.