



## **Investigation of Different Algorithms for Modeling Optimum Path Finding for Emergency Evacuation**

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Considering wide changes in the environment, after occurrence of disasters, realtime planning based on up-to-date information describing current emergency situation is essential for emergency evacuation of victims to the safe areas at the shortest period of time. In most cases, the best choice is using the shortest path. But under disaster conditions, there are many parameters that need considered for such path finding. For example, destruction of bridges or buildings in an earthquake would make the shortest path to be closed and hence other alternatives should be used for evacuation. Control and distribution of traffic is another factor that should be considered for emergency evacuation planning.

With respect to above description, having a flexible model for path finding can improve and facilitate evacuation planning based on current emergency situation (Mansourian et al. 2006, have suggested a model for data collection and sharing to present current emergency situation to emergency managers<sup>1</sup>)

In the context of a joint research project in K.N. Toosi University of Technology and Tehran University, design and development of a proper and flexible model for finding optimum path for emergency evacuation and implementation of the model in GIS environment is ongoing. The main steps of this project are:

1. 1. defining affecting criteria and parameters on evacuation planning particularly path finding problem
2. 2. Investigating AC<sup>2</sup>, PSO<sup>3</sup> and GA<sup>4</sup> algorithms which can be used as a base for path finding modeling for emergency evacuation
3. 3. Developing models for optimum path finding for emergency evacuation by integrating the investigated algorithms with defined parameters
4. 4. Implementing the model in GIS environment
5. 5. Testing the models, comparing the results and finally refining and suggesting a proper model

This paper describes the results of the project till now with emphasize on the two early steps.

1 A. Mansourian, A. Rajabifard, M.J. Valadan Zoej, I. Williamson (2006), Using SDI and web-based system to facilitate disaster management, *Journal of Computer & Geosciences*, 32 (2006) 303-315.

2 Ant Colony

3 Particle Swarm Optimization

4 Genetic Algorithm