# Application and Comparison of Analytical Hierarchy Process (AHP) and Network Methods in Routing of Pipeline Water Transmission System, from Taleghan's Dam to Hashtgerd New City, Tehran, Iran

Saeid Gharehhassanloo, Student Master of Geographical information system, Shahid Rajaee Teacher Training University, Faculty of Civil Engineering, Tehran, Iran

Mahdi Arabi, Assistant Professor and PhD in urban Regional planning and GIS, Faculty member of Shaid Rajaee Teacher Training University, Faculty of Civil Engineering, Tehran, Iran

## Abstract:

Determination of optimal path by considering technical and engineering, environment and cost management visions. In this point of view from Taleghan's dam to Hashtgerd New City case study we need to distinguish and apply the essential parameters such as topographic and morphologic conditions, environmental issues by consideration on sustainable development, population distribution patterns, roads and etc. by using base map and extraction of expected points geometrical location from Google Earth, position land surveying done. Then the mentioned co-parameters data layer loaded in GIS environment and after allocation the special coefficient and value for weighting parameters and combine them based on Multi Criteria Evaluation method and the cost map made based on Analytical Hierarchy process method which Lead to determination optimal path by using Least Cost Path Algorithm method. proving Pathways include of ABFA path and two evaluated optimum path compared and indicated that two optimum pathways overlapped mostly. Cost comparison between optimum path and ABFA path show 14% decrease in expenditure. Which the main extra expense of ABFA path because of more intersection with rivers and roads and necessity construct of bridge to keep water natural regimes, passing unauthorized areas and personal parcels need to pay and routing only by personal experience ignoring academic science, data analyzing software which cause to increasing the length of water supply pipeline.

Keywords: Weighting, Water pipeline, Taleghan dam, Hashtgerd New City, Analytical Hierarchy process, Optimal routing

## Image

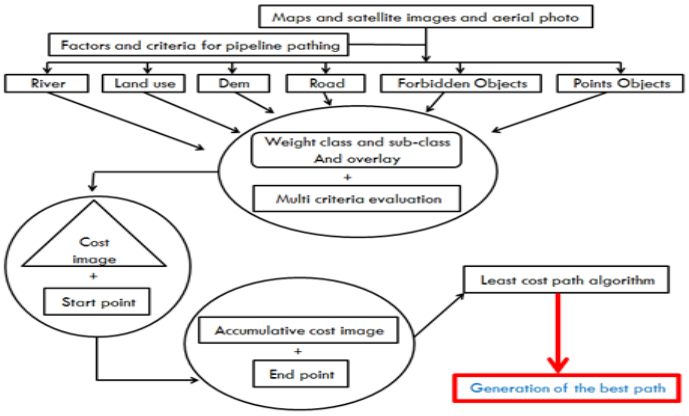



Figure 1: Overview of implementation steps and analysis results

## Recent publications

1. Karam, Abdolamir. (2005). Land suitability analysis for physical development in the North West of Shiraz based approach using multi-criteria evaluation in GIS. Geographical Journal, Issue 54, pp. 93-106.
2. Malczewski, J. (1999). GIS, and multi-criteria decision analysis, John Wiley & Sons, Inc, Canada, 392. pp.
3. Stefanakis, E., and M.Kavouras. (1995). Determination of the optimum path on the earth surface. proc 17th International Cartographic Association Conference, Spain, Pp: 268–282.
4. Tarantilis, C.D, D.Diakoulaki, and C.T.Kiranoudis. (2004). Combination of geographical information system, and efficient routing algorithms for real life distribution operations. Eur.J.Operat. Res., 152:437-453.5.
5. Tomlin, D. (1999). Geographic information Systems and Cartographic Modeling, Prentice-Hall Inc., New Jersey, xi-xiv, Pp: 119-122.

## Biography



Saeid gharehhassanloo has his expertise in evaluation and passion in determining optimal path of water pipeline. His open and contextual evaluation model based on determining optimal path which cause deduction of cost path. he has built this model after period of experience in research, evaluation, teaching in university and cooperation with Alborz province water and wastewater are made. The research foundation is based on Multi Criteria Evaluation, Least Cost Path Algorithm and Analytical Hierarchy Process which is methodology that utilizes the ArcGIS software. This approach is responsive to all stakeholders (civil engineer, managers, consultants and etc) has a different way of focusing.

Email:saeidgharehhassanloo@gmail.com

**Notes/Comments:**