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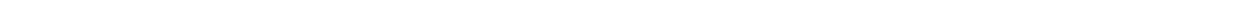
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Analytical Hierarchy Process (AHP)

Multi Criteria Decision Making

Ranking

Rating

Pairwise Comparison

ETM+

ArcView3.2

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Expert choice

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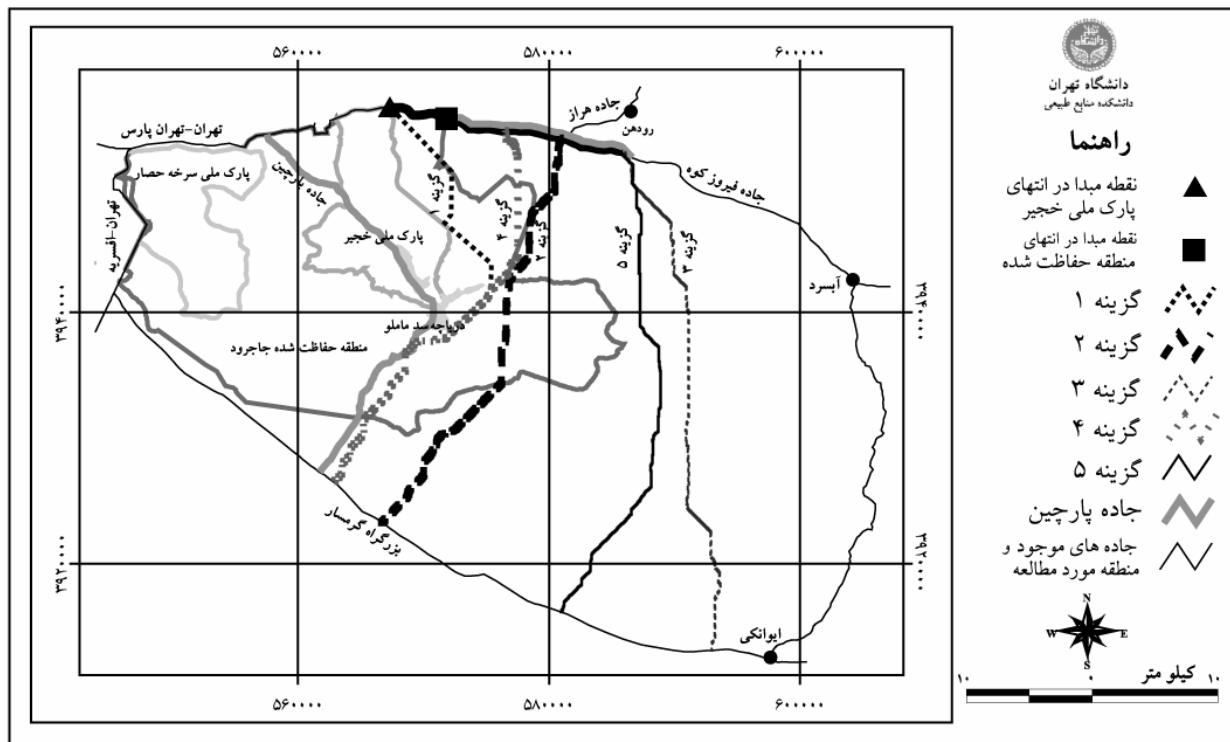
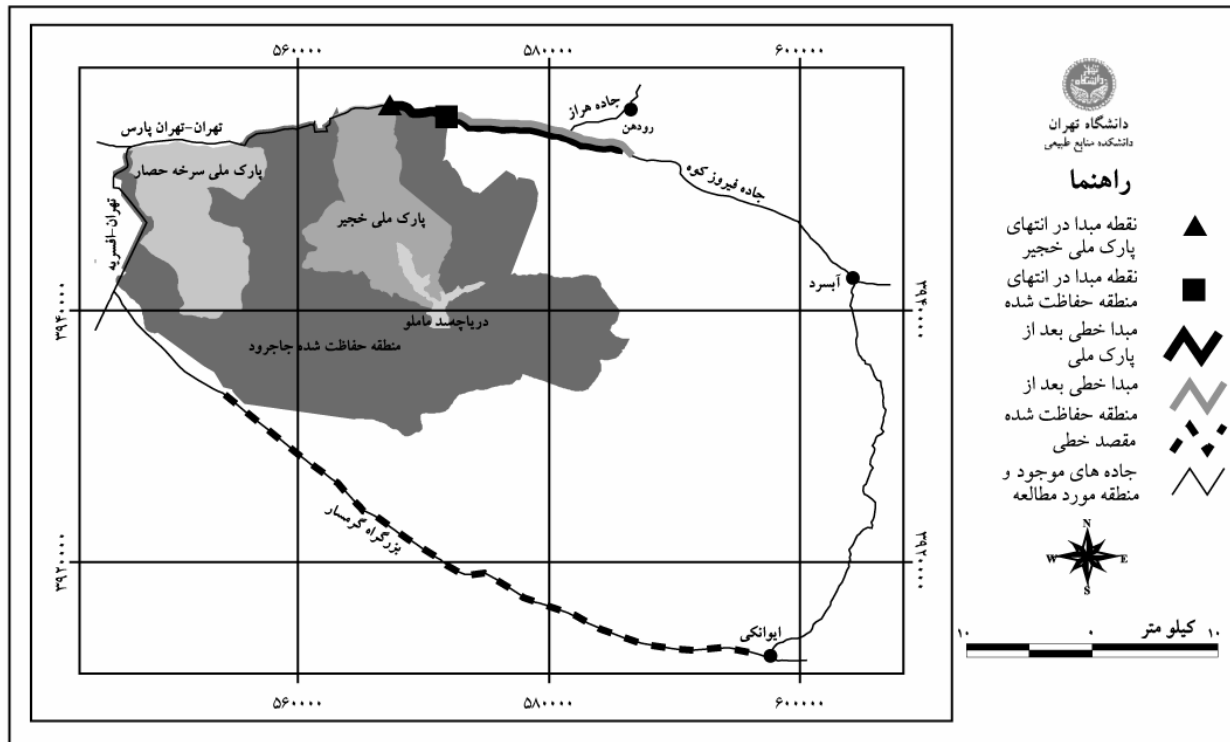
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Pathway

Friction
Overlay
Cost Surface





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Routing using GIS with consideration of environmental principles (Case study: Parchin Road)

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Abstract

The aim of the present study was to determine a method to find optimum routing considering effective environmental parameters by using GIS. For this purpose, an optimum route for a by-pass road in east of Tehran (Parchin Road) was studied. First, environmental factors, such as geology, erosion, soil type, slopes, land use, hydrography, faults and elevation were identified. Soil and land use maps were generated by employing Satellite image. Other maps were compiled and digitized. These factors were prioritized according to the pairwise comparison method. A questionnaire was designed to seek experts' opinions on the relative importance of above factors. According to the importance of the parameters, the friction and cost maps were prepared. In two scenarios, several proposed points for the start were specified and various routes were automatically plotted by means of the GIS. The routes were compared as well as maps of other effective parameters. Finally, the optimum route was determined using the Analytical Hierarchy Process. The resulted route is satisfactorily corresponds with pre-determined priorities and limitations. Results of this research showed that identifying effective parameters and using GIS facilitate determination of optimum routes by considering environmental principles.

Key words: Automatic routing, Optimum route, Analytical Hierarchy Process, Environmental consideration, Friction map, GIS