فصلنامه مدیریت شهری
(ویژه نامه لاتین)
Urban management
No.**42** Spring **2016**
141 - 148
Received *14 Apr 2015*; **Accepted** *7 Feb 2016*

Optimization Location of Class Parking, Case Study: Tehran, Iran

Fazlollah Pezhvak[1]-*Master of Urban Planning, University of Shiraz, Shiraz, Iran.*

Abstract

Proper siting of a public parking garage increasing efficiency and thus reducing the marginal park and indirectly increase the width of the streets and traffic is mental. At present, the location of public parking with traditional and is performed site visits. In this method, taking into account all factors affecting the location of public parking not possible with regard to the selected sites only a limited number of parameters such as the "land price" is performed. This would take away parking absorbent centers Travel and parking in the busy streets and increase traffic to the street. "Geographical Information Systems" (GIS) that science and technology are analyzing spatial data, in order to find the optimum system for the construction of public parking places are considered. The use of GIS in the field of land and increase the accuracy of the work is to reduce the number of hits. In this paper, weighting and combining information from different methods of allocating points such as weight, AHP nine degree and Fuzzy AHP and fuzzy index overlay method and a method using a combination of these methods were compared and the results were presented, and finally the appropriate methods.This article discusses how public parking location using GIS to consider all parameters affecting the positioning simultaneously offers. In this paper, factors affecting the location of public parking from three perspectives, 1. Near the parking lot to the Centers for Trip Attraction, 2. Factors Traffic and 3. The problem, especially in inner-city dumping ground "has been studied and given the location of these views, the conceptual model parking is provided. Below is the perfect place to build parking for the region's seven municipalities in Tehran.

Key words: *GIS, multi-criteria decision making, AHP fuzzy, overlapping index, public parking location.*

1. Corresponding Author, Tel: 09128723004, Email Address: f.pezhvak@yahoo.com

Introduction

With rapid urbanization in recent decades, increasing numbers of motorized vehicles, traffic on urban streets has become one of the problems in big cities. Urban and street, as part of urban communication systems, the major role in the movement of people and goods are responsible. If the motion in the streets disrupts, the whole system approach to urban problems and urban life that would be impossible. In this regard, public parking as an important element beck modern transportation system, the task of providing for the removal of stationary traffic levels and a decrease in traffic and crowded urban communication systems are responsible for the streets. Select a suitable location for the construction of such centers is more efficient and reduce Marginal Park. Today, the location of public parking in our cities is done traditionally and field visit which is due to lack of efficiency of these places; sometimes also creates problems such as traffic jam. Therefore, it is necessary to optimize the location of new parking system capable of simultaneously analyzing a large number of parameters to be used. One of these systems, GIS is geographic information systems. Today, the location of GIS capabilities can be used in different areas. Urban centers located in urban management are one of GIS applications. Location theory of economic activity; it has become an integral part of economic geography, regional science, and spatial economics. Location theory deals with what is where. 'What' refers to any possible type of economic activity involving stores, dwellings, plants, offices, or public facilities. 'Where' refers to areas such as regions, cities, political jurisdictions, or custom unions. The objective of location theory is to explain why particular economic activities choose to establish themselves in particular places. Here we focus on spatial competition theory between firms, where locations are subject to attracting and repelling forces. We then extend this framework in order to account for the residential choices made by consumers. Location theory addresses questions of what economic activities are located where and why. Location theory r microeconomic theory generally on the assumption that agents act in their own self-interest. Firms thus choose locations that maximize their profits and individuals choose locations that maximize their utility.

Materials and methods

Parking must be located in the GIS to the study area and the parking location parameters can be determined. Then weighting parameters and data layers should be prepared, and then the weights of each layer are combined. The result is a raster map layers combining the value of each pixel represents the suitability of the site for the construction of parking. The study area is the first step in choosing the location of work zone 7 in Tehran was chosen as the study area. It is also the capital Tehran, Iran, having multiple centers of administration, trade and services are very much in place as a cloud of the most crowded cities in Iran. Great centers of government ministries and departments, as well as all staff have created many job opportunities. This leads to uncontrolled migration of people from across the country to the city. This causes excessive movement of vehicles and traffic has been heavy. For this reason, the city had an uncontrolled growth in recent years and in line with the growth of the urban transport infrastructure is underdeveloped. Given the above, especially in the downtown areas of Tehran's traffic problem and the car park are particularly problematic shortcomings. Therefore, we selected the city as the study area is suitable.

In this paper, combining the overlapping indicator to locate car models, multiplying the fuzzy sum and fuzzy gamma phase is used and the results of these methods are compared and the best model has been selected. The first layer of each subclass of the original class, combined with each other and map are generated respective classes. At this stage, only the main classes and subclasses for the combination of overlapping models parameters are

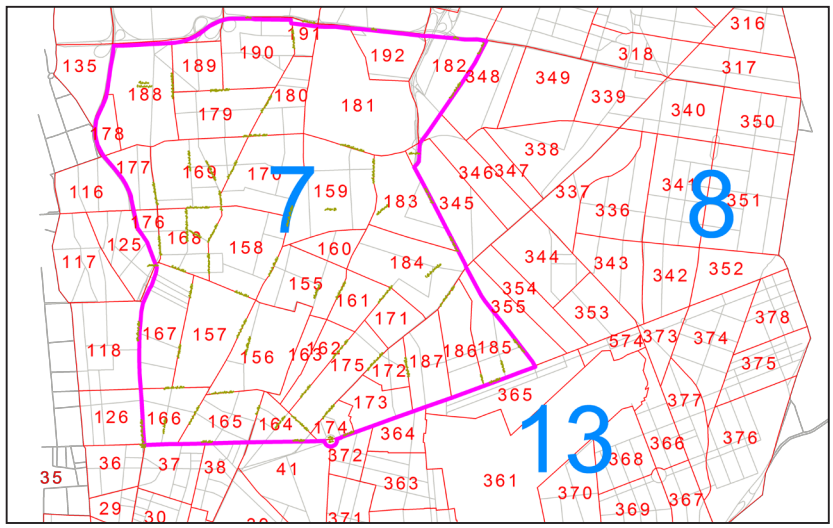


Figure 1. District 7 of Tehran Area Traffic; source: author, 2014.

used in combination.

Liturere review

Location theory[1]

While others should get some credit for earlier work (e.g., Richard Cantillon, Etienne Bonnot de Condillac, David Hume, Sir James D . Steuart, and David Ricardo), it was not until the publication of Johann Heinrich von Thünen's first volume of Der Isolierte Staat in 1826 that location theory can be said to have really gotten underway. Indeed, the prominent regional scientist Walter Isard has called von Thünen "the father of location theorists. In Der Isolierte Staat, von Thünen notes that the costs of transporting goods consumes some of Ricardo's economic rent". He notes that because these transportation costs and, of course, economic rents, vary across goods, different land uses and use intensities will result with increased distance from the marketplace. However, the discussion was criticized since Johann Heinrich von Thünen oversimplified the problem with his assumptions of, for example, isolated states or single cities. Tord Palander (1935) wrote: Market area division of two competing firms.

A German hegemony of sorts seems to have taken hold in location theory from the time of von Thünen through to Walter Christaller's 1933 book Die Zentralen Orte in Sűddeutschland, which formulated much of what is now understood as central place theory. An especially notable contribution was made by Alfred Weber, who published Über den Standort der Industrien in 1909. Working from a model akin to a physical frame adapted from some ideas by Pierre Varignon (a Varignon frame), Weber applies freight rates of resources and finished goods, along with the finished good's production function, to develop an algorithm that identifies the optimal location for manufacturing plant. He also

1. Thünen, Johann Heinrich von. 1783–1850. Der Isolierte Staat in Beziehung auf Landwirtschaft und Nationalökonomie, oder Untersuchungen über den Einfluss, den die Getreidepreise, der Reichtum des Bodens und die Abgaben auf den Ackerbau ausüben, Vol. 1,. and Der Isolierte Staat., Vol II: Der Naturgeässe Arbeitslohn und dessen Verhältnis zum Zinsfuss und zur Landrente, Part 1 (Partial translation into English by Carla M. Wartenberg in 1966 as Isolated State. New York: Pergamon Press.) For more information, see Scott Crosier's Johann-Heinrich von Thünen: Balancing Land-Use Allocation with Transport Cost. & 2. Dempsey, Bernard W. 1960. The Frontier Wage Chicago: Loyola University Press. In pages 187–367 Dempsey has translated von Thünen 1863 piece Der Isolierte Staat, Vol II, Part 2 as The Isolated State in Relation to Agriculture and Political Economy, Vol. II: The Natural Wage and Its Relation to the Rate of Interest and to Economic Rent. & 3. Richards, H. A. (1962). Transportation Costs and Plant Location: A Review of Principal Theories. Transportation Journal, 2(2), 19–24. & 4. Weber, Alfred. 1929. (translated by Carl J. Friedrich from Weber's 1909 book). Theory of the Location of Industries. Chicago: The University of Chicago Press. For more details see David Fearon's Alfred Weber: Theory of the Location of Industries, 1909. & 5. Glatte, Thomas 2015. Location Strategies: Methods and their methodological limitations Journal for Engineering, Design and Technology, Volume 13, Issue 3, p. 435 – 462. & 6. Glatte, Thomas 2013. Industrial Production Site Selection Expert Verlag, Renningen, Germany. & 7. Hidden Treasures at the Australian Museum. Catalyst, ABC. 26 August 2010. Retrieved 2010-08-27.

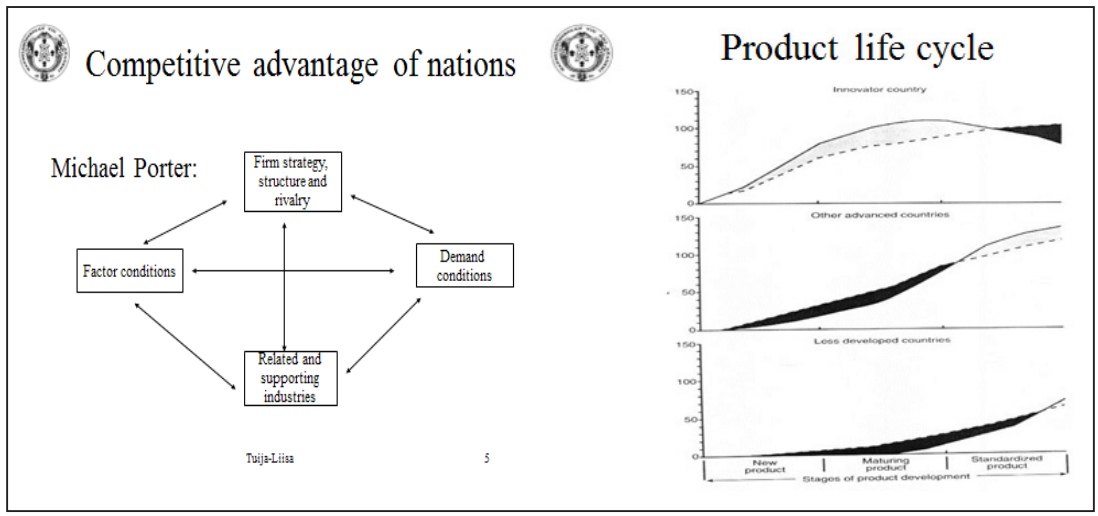
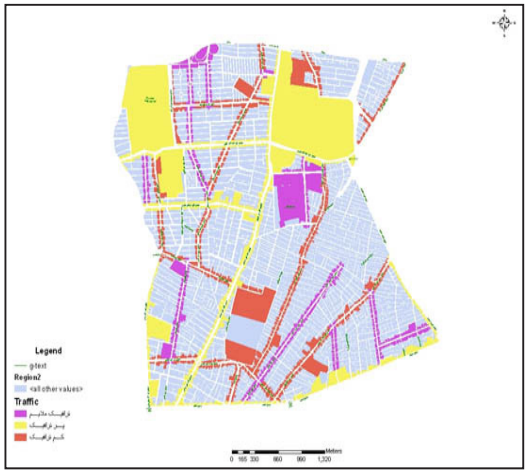


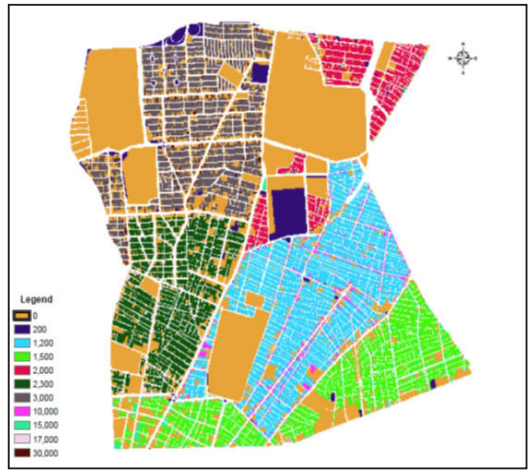
Figure 1. product life cycle; source: tujja-Lisa, 2011.

introduces distortions induced by labor and both agglomerative and deglomerative forces. Weber then discusses groupings of production units, anticipating Lösch's market areas. Carl Wilhelm Friedrich Launhardt conceived much of that for which Alfred Weber received credit, prior to Weber's work. Moreover, his contributions are surprisingly more modern in their analytical content than are Weber's. This suggests that Launhardt was ahead of his time and not readily understood by many of his contemporaries. Whether Weber was familiar with Launhardt's publications remains unclear. Weber was most certainly influenced by others, most notably Wilhelm Roscher and Albert Schäffle, who seem likely to have read Launhardt's work. Regardless, location theoretical thought blossomed only after Weber's book was published. Literature on site selection theory used to look until recent years at the various issues only from a national point of view. By large, there are no international reviews to be found in these publications. In the US, a country in which industrial site selection played a role very early on, resulting in a very early search for methodical approaches, Edgar M. Hoover was one of the leading pioneers in the field of site analysis. In his book "The Location of Economic Activity", Hoover compiled crucial criteria of industrial site selection as early as 1948 that still apply today. There were, however, some quite early attempts to combine theories of international trade with nationally oriented site theories in order to develop a site theory with an international perspective. One of these early authors was Ohlin (1952), followed by Sabathil (1969) , Moore (1978), Tesch (1980), and Goette (1994). Nevertheless, even to this day, this situation has only changed to some extent.

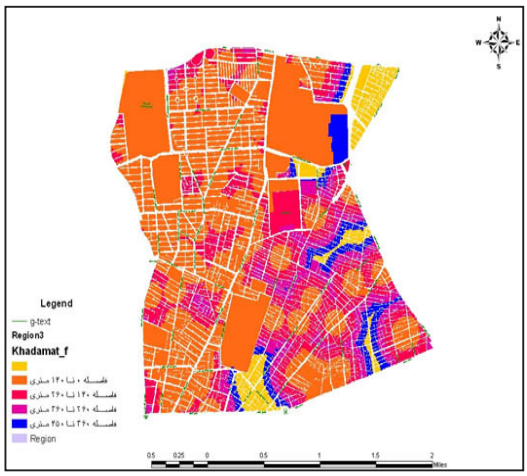
Even though since the 1990s it has no longer been only major corporations that expand abroad, and any foreign direct investment results in a site selection, there are still very few well-researched studies on this topic. A specifically international site selection theory is still not discernible. Many current and more recent publications either review site decisions made by individual corporations or analyze them as reference cases. Other publications focus on a cost-specific approach largely driven by site relocations in the context of cost structure optimization within major corporations. However, these publications only rarely and at best cursorily deal with issues of construction and real estate aspects. Theodor Sabathil's 1969 dissertation is considered one of the early in-depth studies in the area of international site selection. Therein, Sabathil largely focused on country selection, which is part of the site se-



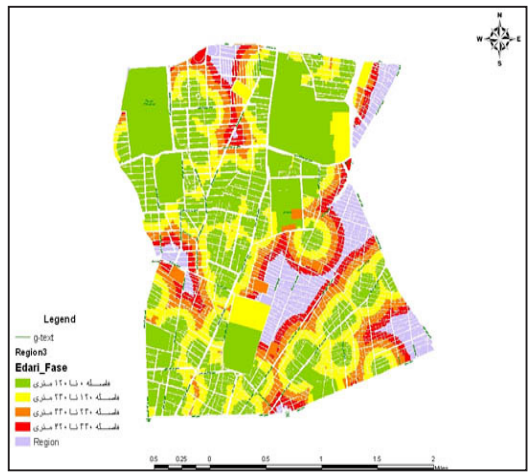
Map 2. Access layer, Source: Author, 2013.



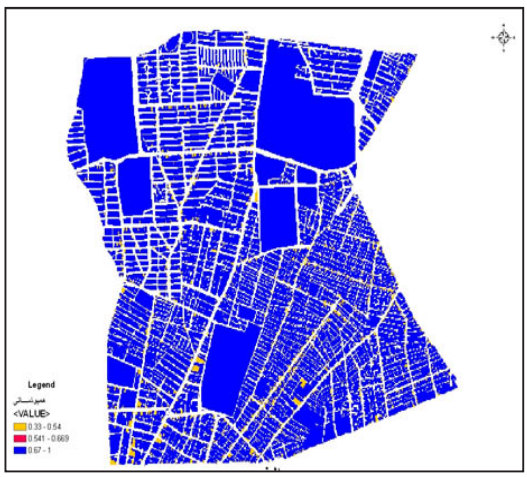
Map 1. Property values, Source: Author, 2013.



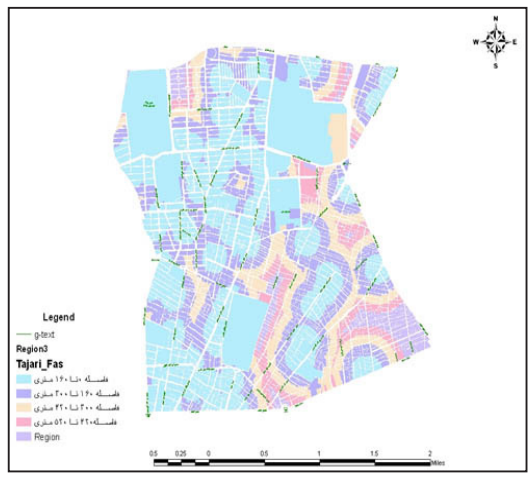
Map 4. Layers at the service centers, Source: Author, 2013.



Map 3. Travel distance from the center of the absorber layer, source: author, 2013.

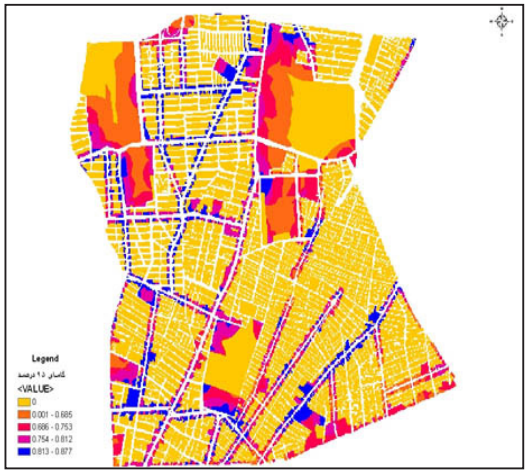


Map 6. Combining the results of an overlap, Source: Author, 2013.

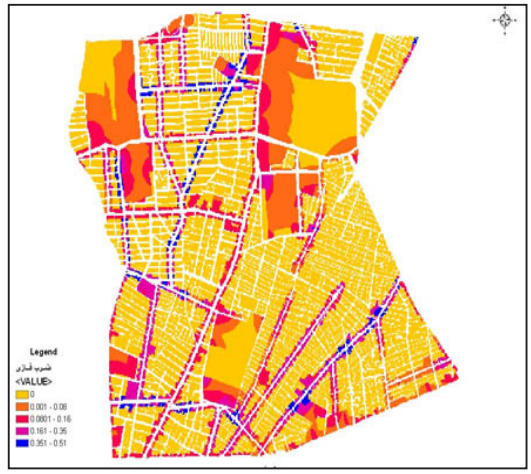


Map 5. Layer distance of commercial centers; Reference: Author, 2013.

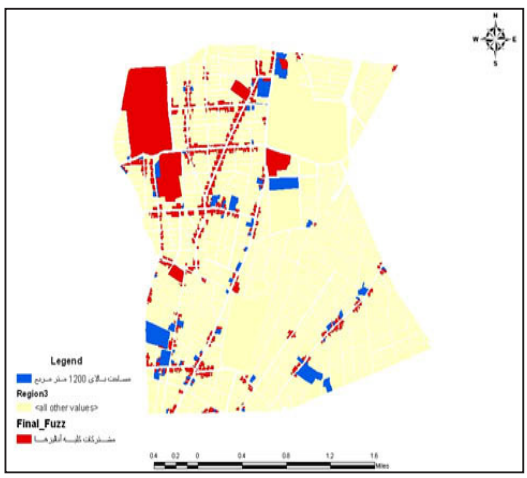
مدیریت شهری
فصلنامه مدیریت شهری
(ویژه نامه لاتین)
Urban Management
No.42 Spring 2016



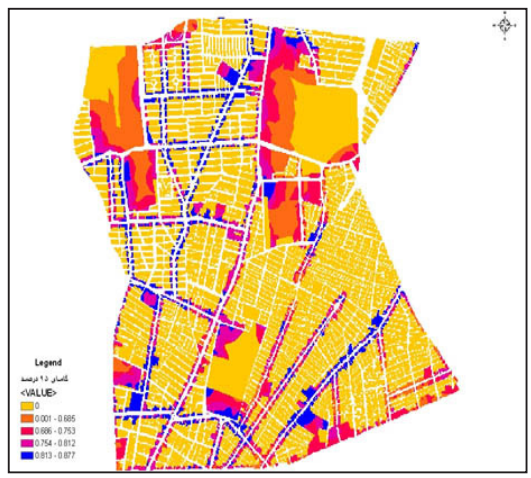
Map 8. The results of the gamma phase modulation method, source: author, 2013.



Map 7. Combining the results of the multiplication phase, Source: Author, 2013.



Map 10. All plaques analyzed by a polytheist selected sizes above 1200 meters is blue, Source: Author, 2013.



Map 9. Results obtained using phase modulation, source: author, 2013.

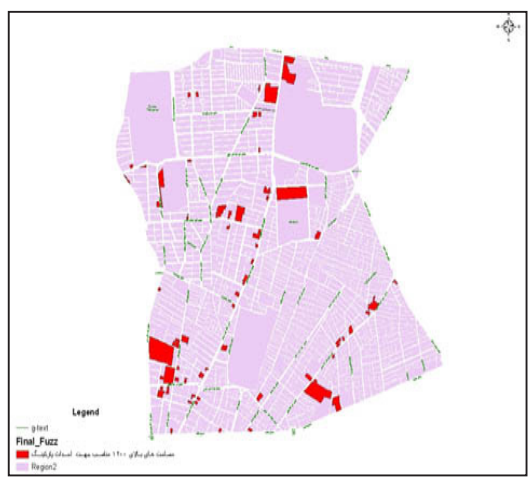
فصلنامه مدیریت شهری
(ویژه نامه لاتین)
Urban Management
No.42 Spring 2016

lection process. In this context, Sabathil compiled a comprehensive catalogue of site factors and a theoretical approach to site selection; the latter does not go into great detail. Neither does Sabathil take any legal, natural, or cultural site factors into consideration. However, he discusses in particular company-specific framework conditions and psychological factors.

Finding and Results

Parking models used in locating them

The main class on the first layer in each class, corresponding to combine and map key classes are produced. At this stage to combine classes and classes on the main index has been used



Map 11. All analyzes are common in the area of 78 places over 1200 square meters and has parking for construction; Reference: Author, 2013.

only a combined model overlap. In Figures 3 to 5, main courses made is shown. The main results are shown in maps 1 to 11.

The major classes based on the layer models combining the information listed above, can be combined with each other.

With regard to regional integration models to integrate information 78 options for parking for each method was chosen. The 78 options were similar in all 4 places, but their priorities are different at different ways of combining layers. To compare these two methods, the first option any method other methods have been compared with the first option. In this comparison the position of the selected locations in each of the main criteria location, in Table 6, are shown in this table for each criterion 6 modes best, good, etc., and is considered the worst. According to maps 6 and 9, the index and the fuzzy overlay techniques are the same because of the lack of weighting fuzzy layers. Fuzzy parameters catchy beat travel centers and well-being almost ignored other parameters, select the location of your choice, while absorbing centers Travel Location parking is the most important parameter.

Conclusions

Now, locate parking in the traditional way is done using the inability to locate all parameters simultaneously and time-consuming, it is a major disadvantage. These disadvantages are the lack of efficiency of the construction of car parks. This increases the tendency to use the proper tools capable of simultaneously mixing large numbers of parameters where they are. Therefore, in this paper, a method is proposed for locating parking using GIS. The main results of this method to locate parking, as follows:

1.Use this method rather than the traditional method of locating parking, speeding up the process and locate the proper performance car parks will be constructed.

2.Weights derived from AHP and AHP Fuzzy, little difference in the study. The distance of the main criteria weights are high;

3. The method of AHP Fuzzy, the weighting can not see the results, so you can use the AHP method to locate parking.

4. Combination of methods to locate parking, fuzzy multiplication technique was introduced as the weakest recovery methods and aggregate fuzzy fusion was introduced as the best method.

References

1-Ahadnejad Reveshti, Mohsen(2007), Site selection study for fire extinguisher stations using network analysis and A.H.P Model,Case study: city of Zanjan, Map Asia Journal.

2-Bertolini.M, M,Braglia (2006), Aplication of the AHP Metodology in Making a Propozal for a Public Work Contract,17 january, International Journal of Project Management,Volume 24, Issue 5, PP 422-430.

3-Bowen, William. M (1993), AHP: Multiple Criteria Evaluation, in Klosterman R.et al, Spreadsheet models for urban and regional analysis, new Brunswick: center for urban policy Research.

4-Dey,P.K, Ramcharan,E.K (2008), Analytic hierarchy process helpsselect site for limestone guarry expalision in Barbados. Journal of Environmental management,Vol88,pp1384-1395.

5-Weant, R.A. (1978) Parking Garage Planning and Operation. ENO Foundation for Transportation INC.

6-Kligman (2002) Traffic Engineering in Newton Retrieved 02/06/2003, from worlde wide web: www.wpi.edu/~mrmcd

7-C.M.Tam, Thomask.l.Tong, Gerald W.C.Chiu (2003) Comparing non Structural FuzzyDecision Support System and AHP in Decision Making for Costruction Problems, from world wide web: www.Elsevier.com/locate/ejor.

8-Malczewski , J . (1999) GIS and Multi Criteria Decision Analysis. 1th edition. John Wiley & Sons INC.

9-4.Pan, J. Teklu, Y., Rahman, S. and Castro A.D., 2000, An Interval-based MADM Approach to the Identification of Candidate Alternatives in Strategic Resource Planning, IEEE Transaction on Power System, Vol. 15, NO.4, Pp.1441-1446.

10-5.Bernhard Wolfslehner, Harald Vacik, Man-

fred J. Lexer, 2005, Application of The Analytic Network Process in Multi-Criteria Analysis of Sustainable Forest Management, Forest Ecology and Management, 207, Pp.157-170.
11-6.Saaty, Thomas L.; "Fundamentals of the Analytic Network Process", ISAHP Japan, pp. 12–14, 1999.