Application of Land Use Regression Model to Predict Pollutants of NO2, CO, PM10 (Case Study: Tehran City)

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Extended abstract

Introduction
Air quality in large cities is today one of the major problems and challenges in developed and developing countries. Occurrence and intensity of air pollution in the cities are influenced by a variety of factors such as pollution sources, meteorological factors and chemical reactions between the pollutants. There are different models to predict the air pollution concentrations in cities. These models can be classified into two groups: the models based on dispersion method and the models based on land use regression (LUR). The first research on LUR model was introduced by SAVIAH project sponsored by the European Union. This study was a multicenter project in Huddersfield and London (UK), Bilthoven (Netherlands), Prague (Czech Republic) and Warsaw (Poland). The aim of SAVIAH study was to develop and validate the methods for analysis of the relationship between air pollution and health on a small scale. After this research, several studies used the application of this model for modeling of urban air quality. The purpose of this present research is to forecast the concentrations of NO2, PM10 and CO in Tehran city using the land use regression in 2010. The independent variables such as land area, road network and meteorological variables have been used for modeling of these pollutants. Although 16 cases of air quality monitoring stations (AQMs) are located in Tehran city, limitations of monitored concentration of pollutants are different because of changes in traffic, land use, elevation and surrounding environment of the air quality monitoring stations.

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Methodology

The areas of land-use and length of urban roads around the 16 AQMs have been measured by GIS techniques with input variables in land-use regression (LUR) models to explain pollution concentrations over space and time. These variables and other meteorological variables (surface and upper) have been calculated and used as explanatory factors. Pollution concentrations monitored at each AQM have also been used as the dependent variables. The areas of the five land uses including residential, commercial, industrial, transformational, and vegetative regions have been calculated using Tehran land use map obtained from Tehran municipality. These explanatory variables have been measured in 4 buffers and 16 sectors, and the wind-direction (WD) frequencies used to weight urban road length (WURL) and land uses (WLU). The meteorological factors generating chemical and physical reactions contribute to creation, destruction, and dispersion of the pollutants. Hourly measured values of temperature, humidity, and wind speed are seasonally summarized and included in the panel regression models to investigate these impacts. Eleven circular buffers from 500 to 2000 meters and sixteen sectors have been delineated around each AQM. URLs for entire transportation links have been calculated and then apportioned to each buffer and sector. WD frequencies have also been used to calculate WD-weighted URL (WURL). The same process has been applied to the five land uses (WLU). A panel data set has been created by the pooling of time-series and cross-sectional observations. It is also called as pooled dataset, time-series cross-sectional dataset, or longitudinal dataset. Regression models based on such data are called panel data regression models. Traffic flows are a key determinant of the concentrations of directly emitted and secondary pollutants. Since concentrations and traffic flows vary over space and time, it is proposed here to measure the spatiotemporal variations of the dependent and independent variables across geographical locations (AQMs) and hours of the day in a given region and period (season). As a reasonable proxy for traffic emissions, URL has been calculated for each buffer (ring and sector). Pollution concentrations display important differences between the four seasons. In order to compare the difference impacts of the explanatory variables on pollution concentrations across the four seasons, hourly concentrations are averaged over each season. This can generate four seasonal hourly panel data sets, each with 384 observations (16 AQMs × 24 hours). The four regression models have been formulated and their estimates are compared. Wind-direction-weighted URLs and land-use variables are recomputed for each season. Then, the best-radius-buffer for a variable is used. The proposed panel regression model is expressed as:

$$C_{it}^{p} = a + \sum_{j=1}^{j} \beta_j X_{itj} + \sum_{j=1}^{j} \gamma_{jt}(X_{itj}) + \sum_{j=1}^{j} \delta_{jt}(X_{itj}) + u_{it}$$

Where the indices and variables are defined as follows:

p: Pollutant (PM10, NO2, CO)

i: Cross-sectional observation (1 → 16 AQMs)

t: Time-series observation (1 → 24 hours)

C: Pollution concentration

X: Explanatory variables (for URL, four land uses, and four meteorological factors)

Uit: Error term for AQM i and hour t.

Results and discussion

The results of this research show differences among dependent and independent variables for each pollutant. Major urban road's length in four seasons has a positive impact on concentration of three pollutants but the impacts of land uses and meteorological factors are different in

seasons. For example, in case of CO, the area of residential land use has a positive impact on the concentration in four seasons that is stronger in the winter. The green space areas have negative impact on concentration of CO that is impressive in summer and spring.

Influence of meteorological factors on the concentration of CO is negative for wind speed and positive for the upper air index (shelter) in the four seasons. Humidity impacts on CO concentration are positive in summer and negative in other seasons. In case of PM10, the industrial land use areas have positive and other land uses not efficient impact on the concentration in the four seasons. Impact of meteorological factors on concentration values of PM10 is negative in winter and positive in other seasons. Wind speed has negative impacts on the values in summer and spring and positive impacts in autumn and winter. In case of NO2, land use areas such as residential, commercial, industrial, and roads have positive impacts on NO2 concentrations. Among the meteorological factors, wind speed has unexpected impact on the concentration of NO2. The impact of this variable in four seasons is positive because of the chemical reactions among NO, O3 and NO2 that is prepared in low wind speed. Evaluation of model validity shows that there are more accurate predictions of CO and NO2 than PM10, particularly in spring and winter.

Conclusion
Application of land use regression model for Tehran city shows the high accuracy of the model for predictions of three pollutants in four seasons. The special features of this model are simplicity and not requiring complex data that enables its use in specific conditions.

Keywords: air pollution, land use regression model, AQM, Tehran City

Exploratory Analysis of Spatial-temporal Behavior Patterns of Visitors, (Case Study: The Cultural and Historical Complex of Saadabad)

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Extended abstract

Introduction
So far, tourism has been viewed from different perspectives and in different fields. Recently, the behaviorists have attracted the attention of tourism development researchers to identify individual characteristics, more than ever. Supply of tourism facilities and equipment that is not based on the understanding the environment will not be satisfy the public. Accordingly, the development of tourism based on the visitor behavior is an effective and desirable solution. Tourism applications are strongly affected by behavioral -activation patterns of communities. Tourist behavior is always observed in time and space, and the study of spatial temporal behavior has become increasingly popular in recent years. Tourist behavior has been studied by researchers from various perspectives. Describing tourist spatial-temporal behavior patterns results in a better understanding of tourism activities. A better understanding of the tourist behavior patterns may, in turn, provide a scientific basis for industry practices, such as attraction management, product renewal and attraction marketing. This study is practically significant for upgrading the facilities and the ultimate improvement of the quality of tourist experiences. Time is considered to be one of the three main constraints on tourism demand. Recently, tourism scholars have paid increasing attention to the effects of time factors on tourist behavior. Time, space and context were considered to be three important domains of tourist experience. The concept of time geography was proposed and developed by the geographer Hagerstrand. Hagerstrand's time geography offers a useful conceptual framework by which it is possible to study individual activity patterns under various constraints in a space–time context. The space–time path is the core concept of time-geography. It highlights the constraints imposed by activities that are finite in space and time, and the need to trade time for space when moving among activities. The space– time path represents the spatial movements of an individual over time, and offers an effective way of modelling the spatial-temporal characteristics of individual activities. By applying the concept of the space–time path, it is possible to capture and analyze

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tourist behavior information in both the temporal and spatial dimensions. This helps us improve our understanding about tourism behavior both theoretically and practically.

Methodology
This is a functional study through a heuristic method. This study focuses on the concepts of time geography and collecting data from Visitors of The Cultural and Historical Complex of Saadabad. Graph theory has been used to analyze direct and indirect relationships to depict identified behavior patterns.

This study focuses on visitors temporal-spatial behaviors and tries to recognize the spatial-temporal behavior structure patterns that can be used to update attractions facilities and improve the final quality of the visitor experience in the Cultural and Historical Complex of Saadabad and similar attractions across the country. This research seeks to know the spatial- temporal behavior pattern of the visitors to The Cultural and Historical Complex of Saadabad and the factors affecting that.

Results and Discussion
The research results revealed nine clusters of temporal-spatial behavior patterns. The spatial behavior factors had the largest contribution to the clustering analysis. The most popular tourist spots of the Saadabad complex was Mellat Palace located in district C and the Green Palace located in district E, where most of the visitors stood for 30 minutes there. The main activity in the complex was also the visit of the Palace – Museums. To depict identified behavior patterns, in alpha levels of 0, 0.25, 0.5, 0.75 and 1 were assessed and the results of Alpha=0.25 were considered for appropriate behavior patterns.

Conclusion
This study focuses on intra-attraction tourist temporal-spatial behavior patterns and attempts to clarify the patterns using the concept of the space–time path of time geography. The Cultural and Historical Complex of Saadabad has been considered as a case study. Tourist spatial-temporal behavior can be described and clarified by some factors including temporal behavior, spatial behavior, activity choice and path characteristics. After a qualitative reasoning process, the results of the clustering analysis can be presented as visual images. Describing the intra-attraction tourist temporal-spatial behavior patterns can help us to better understand tourist activities and demand among attractions. The research results of the Cultural and Historical Complex of Saadabad revealed nine clusters of temporal-spatial behavior patterns, rather than a homogeneous social group. Spatial behavior factors made the largest contribution to the clustering analysis in this case. The results of the quantitative study suggest that a stay of at least 10 minutes and at most 45 minutes is the threshold for stay time for the identification of a stay point. The results of this study help people get a better understanding of intra-destination tourist behavior patterns in The Cultural and Historical Complex of Saadabad in a more accurate and structural way. A better understanding of tourist behavior patterns should provide a more scientific basis for industry practices, such as location of service, guide identification system and intra-attraction transportations. Therefore, this study has practical significance for the upgrading of attraction facilities and ultimately the improvement of the quality of tourist experiences. In a similar study in China, Huang Xiao-Ting and Wu Bi-Hu identified seven clusters of temporal-spatial behavior patterns in the Summer Palace. In the mentioned study, temporal behavior factors had the largest influence on the clustering analysis.

Application of LTM Model for Modeling of Physical Development of the Ilkhichi City

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Extended Abstract

Introduction

Fast and uncontrollable urbanization growth causes loss of lands and its recourses. This leads to a decrease in green areas, open spaces and serious environmental and social problems. Therefore, an essential step to urban planning, management and evaluation of its effects is to simulate physical development of the city. The aim of this study is to understand parameters of physical development in Ilkhichi city with regard to sustainable spatial development of urban issues from ecological and environmental perspectives in the next two decades.

Changes in the land uses in 1984-2011 have been evaluated with emphasis on sprawl expansion of Ilkhichi city using Landsat 5 multi temporal satellite images and object-oriented techniques. Based on the results, urban area of Bonab, with an area of 94.59 hectares in 1984 has reached to 438.57 ha in 2011. About 195.84 hectares of the mentioned lands has developed on the gardens and agricultural lands. This demands management of future development based on the principles of sustainable development. Therefore, effective factors of physical development in Ilkhichi urban area have been classified into 12 layers. The LTM method has been employed to produce the possibility of urban development map. After predicting the future pattern of urban development in Ilkhichi city, the protection of gardens and green spaces strategy in the urban development process was operated using hexagonal layout of possibility of urban development map..

Rapid urbanization brings opportunities to new urban developments. However, it also causes serious losses of arable lands, as occurred in other developed countries. The term urban sprawl is so cloudy and confused that more precise language is needed to characterize what is bad urban growth.

In order to keep ecosystems functioning well, it is necessary for environmental researchers, managers, and decision makers to understand the spatial dynamics of an ecosystem. Importantly, remotely sensed imagery provides an efficient means to obtain information on temporal trends and spatial distribution of urban areas for understanding, modeling, and projecting land change.

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In this study, changes of land use are analyzed in Bonab County using satellite images during 1989-2005. We have also proposed recommendation for reducing settlement sprawls and environmental problems in this area.

Methodology

Change detection is an important process for monitoring and managing natural resources and urban development because it provides quantitative analysis of spatial distribution in the area of interest. For monitoring the changes in land use of Ilkhichi, TM digital data of Landsat have been used in this study. The path/row number of TM and ETM+ imagery is 168/34. Main reason to use TM and ETM+ data was that of high resolution images for time series is not available to extract green area land use. The Land Transformation Model is a land use forecasting model as well as a tool that can be used to examine the spatial and temporal aspects of driving forces of land use change. The model uses a set of spatial interaction rules and machine learning, through neural net technology, to determine the nature of spatial interactions of drivers such as transportation, urban infrastructure and proximity to lakes and rivers that have historically contributed toward land use change in the past. Effective factors of physical development of Ilkhichi city based on research literature is identified in 12 indicators and artificial neural network based on LTM Model for preparing Urban Development probability map.

Results and discussion

In 1984-2011, based on Change detection map and initial state and final state matrix, barren land area has decreased from 66.627 hectares to 52.479, the built area has increased from 59.94 hectares to 57.438, agricultural land has decreased from 572.76 hectares to 387.90 hectares and garden land has decreased from 33.93 to 22.95 hectares. In this period, the population of the city has reached from 7446 to 15231. This means reduction in the population density from 78 to 34 people. Based on the Holdern model, sprawl index of Ilkhichi city is 53 percent and the biggest role in the development of buildup area belongs to reduction of farming and agricultural lands. About 195.84 hectares of the mentioned lands has developed on the garden and agricultural land. This involves management of future development based on the principles of sustainable development.

Conclusion

After predicting the future pattern of urban development in Ilkhichi city, the protection of gardens and green spaces in the urban development process was operated using hexagonal layout of possibility of urban development map. This can provide the necessary space for the development, extension of the natural green belt about 5 km long, restriction of urban development in buffer of green belt, protection of the ecological reserves of Ilkhichi city, and sprawl expansion control. Urban managers are able to decrease the horizontal expansion for detailed monitoring on proposed green belt, the use of mass production methods and the high-rise building (Compact City), the use of low-yielding land available inside the city (Infill development), and the urban development far away from the agricultural land.

Keywords: Ilkhichi city, Sprawl, artificial neural networks, land use changes, Object Oriented Classification

Studies in Recognition of Natural Environment Impacts on Evolution of Political Governance in Iran

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Extended abstract

Introduction
Despite that determinism approaches have been abandoned in geographical studies, but in the studies of political geography, natural and physical features have effective role in political processes of any country. In other word, the natural factors have always been considered as one of the important foundations in governance system making. For example, Aristotle believed that weather conditions have important effects on the evolution of societies. Thus, this approach cannot analyze the government and politics in a territory only based on sociological approaches such as Weber's theory or Marx's theory. Although in geographical studies giving importance to a single factor represents the geographical determinism and this idea has lost its importance in the history of geography, but the influence of the natural environment on the process of political structures cannot be overlooked and, therefore, the historical evolution of a country should not be studied without attention to natural aspect of territory. In other words, taking the environmental aspect of political process into account is becoming one of the major functions of political geography. In this study, we have argued about the effects that the natural features of Iranian plateau might have on political process aspects including the type of governance system, structure of power and political culture in twentieth century. In this approach, it seems that dominant political structure and process in Iran has reacted to physical conditions of Iran plateau.

Methodology
In this research, applying description and analytical approaches we have attempted to examine the relation between natural characteristics of Iran plateau and governmental characteristics in twentieth century. This research seeks to answer the question: "Does physical geographical factors have had impacts on evolution of features and characteristics of Iran political structure?" To answer this question, refering to valid bibliography, it was attempted to explain the set of natural factors that have played an effective role on Iranian political structure.

Results and discussion
The effects of physical characteristics of the Iran's plateau on the evolution of governmental structure of Iran can be summarized as following:

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1. Distribution of natural resources in Iran is not equal and Iran has been located in arid and semi-arid belt. The average rainfall is about 240 mm, which is less than a third of the world average and despite the fact that Iran has about 2.1 percent of the Earth's land and one percent of the population in the world, but it received only 0.36% of annual rainfall. On the other hand, geographical distribution of natural resources and fossil fuels are not the same in the whole country. In this regard, the sources of power and wealth in a country are located in a restricted area. Therefore, only central governments are able to distribute the benefits of those resources fairly between different regions of the country. Thus, this condition is one of the fundamental factors that encourage a centralized government in Iran.

2. Before the contemporary century; governmental structure of Iran has been affected by tribes. The political history of Iran, in fact, is the story of the tribes that gained political power on the whole country by defeating another dominant tribe. These political events have been affected by diversity and independent geomorphological and hydrological basins that can be seen in Iran. Obviously, this environmental background had created the tribal pattern livelihood that resulted in a lot of historical events before contemporary century.

3. In recent centuries, revenues from oil exports as an environmental factor gradually found greater role in economy of Iran. On the other hand, the oil income collecting in the hands of government is one major factor for making the centralized political system in Iran in twentieth century. As a result of this process, public institutions and governmental apparatus expanded highly and, in the opposite point, private institutions and non-profit organizations have played negligible role in decision making in political system in Iran. Thus, governmental system relying on this process does not consider the private and civil institutions.

4. Iran's foreign relations have been affected by territory geographical position in twentieth century. This is resulted from the facts that Iran is located among influence spheres of the world super powers. In other words, land and marine super powers constantly have competition with each other about Iran in twentieth century. Iran with the rich fossil and mineral resources has important geopolitical position. For examples, the occupation of Iran during World War II, contracts 1907-Join Iran before the revolution, Baghdad and CENTO Pact, and military role of Iran in the Persian Gulf during the 1970srepresents the historical impacts of this geographical position. From another side, during past two centuries Iran territory was a platform for competition between global super powers due to having geopolitic position for appropriate transportation.

Conclusion

The results of this research have revealed that natural features of Iran's plateau such as distribution of natural resources and geographical position has had effective roles in political process and structure in Iran. In this approach, the ecological foundations were taken important as the fundamental factor discriminating Iran history from the west history. Thus, before the Constitutional Revolution of Iran, for unequal distribution of physical factors such as fertility soil and drinking water in the natural geography of Iran, exploration for biological resources was become one dominant aspect of the Iran community. Nomads have palyed an important role in the evolution of Iranian politics in previous century. Due to Iran's geopolitical situation in the South West Asia there was constant process of political interaction between super powers about. Overall, it can be said that due to natural factors such as geographical position, climate and soil characteristics in Iran's plateau, some geopolitical situation and geo-economic conditions as structural factors have had effective role in shaping events in Iran's evolution into a centralized government in contemporary century.

The Factors Influencing Decisions of Farmers in Applying Soil and Water Resource Protection Methods in Jaidar Plain, Poldokhtar

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Extended abstract

Introduction

Reduction in natural resources is today one of the main threats for human life in many regions of the world. It is recently intensified as a result of population increase and changes in human activities. This has led to some restrictions in rural areas. As the rural life is mainly dependent upon the agricultural activities, conservation of the soil and water resources can help protect the rural economy. As the soil erosion is serious for the farmers and improvement of soil fertility is essential for their life, the farmers make actions to implement the soil and water conservation programs. Therefore, it is necessary for the farmers to understand the causes and effects of degradation of natural resources and their actions in that they are the primary stakeholders exploiting the resources. In this study, we have evaluated the factors affecting the decisions of the farmers about using the conservation plans in Jaidar Plain, Poldokhtar, Iran. This research attempts to examine the most important factors of the procedure.

Methodology

This is an applied research by a descriptive-analytical method. The data have been gathered by two methods of survey and library. The statistical population is including rural families in the Jaidar Plain. Using Cochran formula and systematic sampling, we have selected 120 family heads as the samples. Referring to the samples in the villages, questionnaires have been distributed among the sample respondents. In this study, two kinds of questionnaires, structured and non-structured, have been employed for data collection. After the data have been gathered, SPSS application has been used for descriptive and inferential analyses. To analyze the influences of private, social, economic, psychologic and physical factors on the decisions of the farmers in applying the conservation methods, the statistical tests of T test, Chi-square, and logit model have been employed.

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Results and discussion

From all the respondents, about 58% of them are applying the soil and water conservation methods and about 42 % do not use the methods. Analyses of the influences of personal and social factors on the decisions of the farmers in using the conservation methods have indicated that there is a significant positive relationship between personal factors and the decisions of the farmers. The variables including age, gender, education level, training and technical knowledge of the farmers are effective on their decisions about using the conservation plans. The analyses of the effects of the social factors on the decisions of the respondents have revealed that almost all the social factors are effective on the decision makings of the farmers. In this case, the social participation has the highest influence on the decision makings. In other words, the higher the participation level is, the more the workforces of mutual participation are intended to apply the conservation plans to protect natural soil and water resources. The results of economic factors have also demonstrated that the numbers of workforce in a family have higher influence on the decision makings of the farmers. In other words, the higher the number of the workforces is in a family, the more workforces there would be for conservation of the soil and water resources in that family. The results of chi-square test on the psychological factors have also indicated that the psychological factors in all aspects are relatively effective on the decision making. It can be said that there is a significant positive relationship between the psychological factors and the agricultural decisions. The chi-square test results have also documented that there are significant positive relationships between the factors of land slope, farm area, and distance to the farm and variable of the decisions of the farmers about which conservation methods to use. Therefore, it can be stated that the physical factors play effective role in the decisions of the farmers in using different conservation methods.

Conclusion

The results of the research have demonstrated that among the twenty variables examined in this research, 13 variables have direct influence on the decisions of the farmers in using soil and water conservation ways. According to the results, the variables of number of workforce in the family, farm size, family size, land ownership, and slope have the highest influence on the way the farmers make decisions and that the variable of age, gender, education, ranch ownership, social relations, and understanding of the conservation method have the lowest effect on the decisions. Therefore, it can be said that social, economic, and physical factors play a major role in decisions of the farmers to use which of the conservation methods. Therefore, it is necessary for the government and NGOs to consider the variety of conservation methods in implementation of the programs. The best way to conserve the soil and water resources is to pay especial attention to local environmental requirements and social and economic conditions of the farmers to reduce land degradation and increase productivity of the agricultural activities.

Analysis of the Role of E-Service Offices in Reducing Urban Journeys (Case Study: District 5, Tehran City)

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Extended abstract

Introduction

Today, information and communication technology as a pervasive force has affected various aspects of the human life. One of the main effects of the new technology was design and deployment of e-government. Both structurally and in terms of nature, e-government is a modern phenomenon that has been established on the basis of mutual interactions between government and citizens.

Given economic restructuring and reducing the government role in providing a free service to the citizens, in one hand, increase in the cost of urban life and the diversity of needs, on the other hand, will make the need to find a fast, low-cost, direct and indirect solution to reduce costly urban trips. With the development of cities and metropolitan areas and population density, urban travel demand takes a broader scale. The reason of high travel demand is additional traffic to benefit from various urban services. Hence, in Tehran, in District 5, with irregular migration, low rates of urban land caused population density in the area. The district has very limited physical growth and changes in internal body of the regions and localities are the only way to attract the population.

Therefore, the need for appropriate and accessible services and information to citizens without wasting unnecessary time and costs due to urban traffic cannot be met except the use of ICT tools.

Hence, the purpose of this research is to examine the role of e-service offices formation in reduction of trips and to increase positive effects in urban management. Accordingly, the research question is:

What is the impact of e-service offices in reducing urban journeys as well as providing the easier and faster service in the study area?

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Methodology

This study is conducted through descriptive and analytical methods, in the descriptive section, documental methods as well as field work were used and required data were collected using questionnaire. In the analytical section, the target population, the citizens of District 5 of Tehran and electronic service offices were determined. Then, the sample size was determined based on Cochran and extracted data were analyzed by statistical techniques.

Results and discussion

Descriptive results represent that most widely used vehicle type to access E-government services offices by clients was personal vehicle (more than 56 percent of respondents). Use of bus and subway had the lowest portion for access to E-government services offices.

The question referred to the distance from home and workplace to electronic service offices shows that more than 30 percent of homes and 43 percent of workplaces have a distance more than 1000 meter to E-government service offices. Also from 8 AM to 10 AM in the morning was preferred time for most of the residents to go to E-government services offices. Most of the people were partly familiar with electronic services but they were not learnt about electronic services web sites.

The first step of analytical method is to answer the first question, "What is the impact of e-service offices in reducing urban journeys in the study area?"Single-sample T test was used. The results show that the T-statistic is equal to 3.82, which is significant at 95% confidence interval.

Therefore, it can be said that e-government services was able to reduce urban traffic. Pearson results show that there was a significant negative relationship between the use of e-government services and urban traffic in 99% confidence level ($p < 0.01$). This means that through development of e-government services, the urban traffic can significantly be reduced. Therefore, significant and negative relationship between these two variables was observed by 99% confidence level.

To investigate the second research question, "What is the impact of e-service offices in provision of the easier and faster servicing in the study area?" also single-sample t-test has been used. The results show that except for information level item from electronic office in average terms, electronic services have been effective on other items. Thus, more attention should be paid to informing people. Results show that the overall impact of e-government services is positive and significant. Given that the value of T is equal to 17.89, we can say that e-government is "helpful" in solving problems and make the service better and easier.

Conclusion

Urban spaces providing better services to citizens are established to improve the quality of life of people. It can have lasting effects on access to timely information and statistics, improving the efficiency and performance of government agencies, reducing the time waste and expense of citizens, reducing trips within the city, reducing urban traffic, and reducing air pollution and noise pollution, easy access to services, government downsizing and privatization, increasing the number and quality of services and providing services to citizens everywhere and every time. The establishment of integrated systems in the cities prevents the parallel activities, chaos and disorder, and all activities are supervised by the integrated urban space management.

The correct use of ICT and city tools in the formation of e-government in cities is the most reasonable and effective way to accomplish this goal. Thus, with this approach, results from this study have indicated that the t value of 3.82 with a confidence level of 95% shows the effective functions of e-government services in reducing traffics. Also, the t-value equal to 17.89 shows

the share of government in solving problems and providing better urban services. Thus, reducing trips within the city and the development of electronic civil services as a key goal of e-government is approved. Based on the results, weaknesses of factors such as poor information, lack of completely electronic affairs and need to follow and obtain information in person and lack of proper access to provided services, failure to provide the required information can eliminate the positive effects of e-government in reducing urban trips.

Morphological Analysis of Population Distribution in Tehran Metropolitan Region (TMR)

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Extended abstract

Introduction

"Form follows function"; a controversial statement that in last two decades has gained more attention especially in spatial planning context; how are forms the reflection of functions and vice versa. Spatial structure of regions has to be a means of spatial planning to understand the dynamics of population and employment through space and time. Methodologically, it consists of two main approaches, functional and morphological, in investigation of relational and nodal features of centers, respectively. Population spatial structure in metropolitan regions represents settlements configuration and mobility while employment structure investigates the dynamics of money, labor, goods, and information in the region. Generally speaking, the spatial structure of regions has a variety of elements. However, CBD, employment sub-centers, and infrastructures are the most influential parts affecting the location and mobility of population and its employment.

The subject of the spatial structure of metropolitan regions are over studied and a long history and rich literature are formed in local, regional, national, and even international levels. However, as this concept is highly context dependent, in various geographies may have different meanings and mechanisms. This study has investigated the issue in the Iranian context. The spatial structure of metropolitan regions may have different patterns, while monocentricity and polycentricity are the most common phenomena that can explain the whole situation. Metropolitan region spatial structure is a fuzzy concept from mono-centric to completely polycentric. In the literature, this structure is mainly affected by triple factors; CBD, subcenters, and transportation infrastructures. As spatial planning is an interdisciplinary subject, most theories and methodologies are taken from different fields, so most of the models used in this paper are economically based subjects combined with spatial aspects.

The aim of this study is to analyze the distribution of the population in Tehran Metropolitan Region (TMR) by a morphological approach. Thus, three main questions can be addressed; what is the relationship between population distribution and distance to CBD? How much population density in TMR is affected by transportation network? And, what are TMR sub-centers and is there any relation between them and population density?

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Methodology

The morphological approach is applied in this study that refers to the plurality of centers in a given territory. As the main objective is to assess the influence of some factors on population distribution, we used various types of regression functions. Required data for the proposed methods are acquired from the Statistical Center of Iran (SCI) and corrected by the authors. To evaluate the relationship between CBD and population density, different forms of monocentric functions adopted that the most useful and commonly used forms are linear, gravitational, exponential and logarithmic. In terms of transportation networks (highway and freeways), several forms of univariate regression functions are used to assess the relationship between population density and distance to the nearest network. The third part of this study is evaluation of the influence of subcenters on population density that is more challengeable because of the majority of the methods proposed in subcenters identification; most of them have a kind of arbitrary state. However, we used a combination of adopted models including threshold method, density and proportional based method, parametric model, GWR, and ESDA. Then, in a multivariate nonlinear function, we investigated relation between population density and distance to nearest subcenters. In the end, a linear integrated model is used to assess the population density changes based on distance to CBD, transportation network and subcenters simultaneously. In all cases used OLS technique is applied to estimate variables.

Results and discussion

Tehran Metropolitan Region (TMR) is the most important and populated region in Iran. TMR almost encompass all Tehran Province, but by the parliamentary approval (2010), it divided into two separate provinces, Tehran and Alborz. Tehran City is considered as the center the Tehran province and Karaj is the center of Alborz. Tehran city has been the capital of Iran from 1776 up to now and the population is increased from 15000 to 8154051 inhabitants in 2011. In this period, Tehran has become a great metropolitan region by 18000 square kilometers area and a population of 14 million, according to the last census (2011). TMR includes 14 counties (Shahrestan), 54 cities and 87 rural districts (Dehestan), in total 141 administrative sections. Population decentralization was started in 1976-86, that is mainly due to Islamic Revolution in the 1979. It should be noted that the increased rate of population doesn't mean the decentralization of population from Tehran city, even though these inhabitants are attracted from other parts of the country.

The results of a monocentric model to assess the relationship between population density and CBD is not significant (R^2=0.1). This means that CBD cannot explain the population density variation. However, OLS results of road-based models show no considerable significant relationship but it is more powerful than CBD variable. A large number of subcenters identification methods are applied in TMR to find appropriate and applicable methods. The results found six subcenters including Karaj, Eslamshahr, Baghershahr, Nasimshahr, Varamin, and Rey. In the next step, OLS results of regression model demonstrated a high value of GOF (goodness of fit (R^2=0.5)) that confirmed the hypothesis of the research about slight polycentricity of TMR population distribution. Finally, the results of the integrated model to test the comparative importance of triple variables (CBD, subcenter and transportation network) on population density, surprisingly demonstrated that road is the most important factor, subcenter and CBD are in the lower level of significance, by -5.65, -1.18 and 0.45 t-value, respectively.

Conclusion

This research aimed to describe and analyze the population spatial structure of TMR. The results showed the effects of transportation networks, subcenters, and CBD on population

distribution over TMR territory by different levels of significance. Therefore, the empirical evidence obtained from TMR allows us to state that the monocentric model cannot explain the dynamics of TMR population distribution. Although it does not mean that TMR is significantly polycentric, a degree of polycentricity could be considered in this case.

Keywords: Spatial Structure, Population, CBD, Subcenter, Transportation Network.

Analysis of Environmental Capabilities for Urban Development
(Case Study: Ilam City)

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Extended abstract

Introduction
In the present century, we can observe urbanization in most of the countries. There were a balanced and coordinate increase in physical development and population growth in the recent decades. New transformations in the cities resulted in imbalanced and unequal population growth and physical development. Generally, this imbalanced urban development usually occurs in unplanned areas of city. Therefore, the most important issue for the urban development is to allocate suitable places to future expansion. Establishment and development of a city is highly dependent upon its geographical position. Given the geographical location of the cities, the physical development of the urban areas is faced with a variety of geomorphological factors. The factors can encourage the urban expansion or restrict that. The more the cities are physically expanded, the more they are affected by the topographic circumstances. Therefore, it is essential to understand the characteristics of natural environment to distinguish suitable places for buildings and structures. The spatial growth and development of Ilam City is greatly affected by the effects of 8 years of imposed war and rural-urban migration, particularly in border area. The city after the war due to extensive operations and administrative importance had an exogenous growth. The population growth increased the demand for housing. The limited space in the city resulted in expansion of the houses and buildings on the foothill areas of 15% slope. The natural setting of the city does not support a suitable environment for physical development of urban areas. Therefore, it is necessary to regulate urban development of the city to prevent degradation and destruction of appropriate landuses. One of the solutions to protect the appropriate landuses is optimization site selection for the urban development.

Materials and methods
This study as an applied research follows descriptive analytical method. The data have been gathered by a library and field method and using the spatial data of the region. The spatial factors including slope, aspect, topography, landuse, geology, and distance to rivers and roads have been prepared from the corresponding spatial data. The weighting model has been used to integrate the information. In the model, the criteria in a hierarchy structure are compared pairwise and received a weight scaled from 1 to 9 based on their preferences. In the Analytical

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Hierarchy Process (AHP) model, the parameters have been weighted and prioritized based on physical characteristics and properties according to the expert opinions.

Results and discussion

In this study, we have made an assessment of the effective variables and their influence in optimized areas for urban physical expansion in Ilam. In addition that the influence of each factor has been analyzed, we have given a map showing suitable areas of urban expansion for each factor and a final map resulted from the integration of all the factors. In the integration, the layers with higher preference have also higher priority. The coefficients of the criteria of slope, hypsometry, lithology, landuse, distance to road, geographical direction, and distance to drainage networks are 0.33, 0.22, 0.16, 0.11, 0.08, 0.06, and 0.04, respectively. Therefore, it can be stated by the evidence that topography have outstanding role in site selection and spatial development of the city because it is completely surrounded by the mountains and also established on the slopes more than 15% in highlands. The lithology of the urban area is composed of limestone, marl, shale, alluvial formations mainly at risk of subduction.

Conclusion

Urban spatial development as the physical expansion of the city is considered as one of the requirements of urbanization. The expansion must be so directed that all the fundamentals of the urban development be considered. It is essential to understand the urban development process in urban planning and management of sustainable urban development. Investigation about natural condition of any region can play a vital role in planning and site selection for the suitable areas of urban development. The development regardless of the natural settings of a city can lead to increased urban management costs, problems in urban services, and high risk of some natural hazards.

The Ilam City is located in a plain amid the highlands and limited to the mountains in the margins. The lack of enough suitable land for spatial development made the Ilam faced with geomorphological limitations. The required layers of the natural conditions of the region have been prepared and analyzed in ArcGIS by Analytical Hierarchy Process (AHP) model. Using the method, the suitability of the lands have been categorized into five classes including very unsuitable (25.3%), unsuitable (31.7%), moderate (18.5%), suitable (14.6%), and very suitable (9.9%). Given the lower percentage of the classes of suitable and very suitable in Ilam City for the spatial expansion, appropriate strategies can be formulated to conduct the expansion of urban residence and activities towards the suitable areas and also prevent the expansion towards the unsuitable areas. By this, the management can conserve the environment of the region and also better use the existing resources.

Keywords: Environmental capabilities, Urbanization, Spatial Development, Geographical Information System (GIS), Ilam City.

Measurement of the Industrial Development of the Counties of Ardabil Province by Spatial Justice Approach

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Extended abstract

Introduction

In many countries, particularly in developing states like Iran, there is no spatial justice in development indicators, e.g. in industry sector. This problem results in imbalance in regional development, increased social inequality, and disturbance in environmental equilibrium. The Ardabil Province with a great background in regional spatial planning is faced with the challenge of imbalanced development and imbalanced distribution of development indicators. As it is required to have a spatial planning approach in the development of the regions, it seems necessary to address the patterns of industrial development and spatial distribution of the industrial indices in Ardabil Province. Therefore, the main purpose of this research is to measure the spatial justice in distribution of industrial development indicators in the counties of Ardabil.

Materials and methods

The Ardabil Province, with an area of 17800 km2, is located in northwest Iran, 37° 45´ N to 39° 42´ N and 47° 30´ E to 48° 55´ E. The province had 1248488 people in 2011. This study is a descriptive-analytical research in method and also an exploratory and correlation investigation in terms of analysis of the relations among the variables. The data of the study have been gathered from yearbook 2012, population census data of the counties, documents of Iran Statistical Organization, the website of the Small Industries Organization and Industrial Town in 2015. To access and prioritize the counties, we have used 47 indicators. In this research, we have used Electre, variation coefficients of the indices, Moran spatial auto-correlation, Hot Spot method, and geographical weighted regression.

Results and discussion

The results of Moran index have indicated that the index value for small industries is ranged from 0.75 to nearly 1. Z value is up to 17 and the p value is equal to 0. The analysis of Hot-Spots have also indicated that in the clustering the Ardabil Province with Z value of 2.95 and p

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value of 0.003, in 99% of confidence interval, is the center of industrial concentrations of the province. In other counties with negative Z values and higher p values, the distribution of the industries is random and indicative of low enjoyment of the counties compared with the Ardabil County. The Hot-Spot analysis of the spatial distribution of the active mines showed that Namin County with Z value of 2.3 and p value of 0.01 has the highest enjoyment level of the active mines. The counties of Khalkhaal and Garmi are ranked as the second and the third with z values of 1.06 and 0.24 and the p values of 0.28 and 0.80, respectively. The results of CV method have revealed that the indicators do not have balanced distribution. The results of Electre have also indicated that the counties of Ardabil and Namin ranked 8th and 7th are the enjoyed regions. The counties of Namin, Neyer, Kosar, and Meshkinshahr are somewhat the enjoyed counties of the province. Despite high geographical potentials, the counties of Sarein, Parsabad, Garmi, and Bilesavar, with the scores of 4, 5, 5, 6, and 9, respectively, are incorporated in the class of deprived counties. The results of geographical regression have represented that there are significant relationship in the industrial development of the counties of Namin with the value 1.87, Neyer with the value of 0.7, Ardabil with the value of 0.66, and Kosar with the value of 0.66 in their population. The results have also showed that the industrial development is appropriate with the population development. The relationship is reduced in the counties of Meshkinshahr and Khalkhaal with standard deviation values of 0.17 and 0.06, respectively.

The spatial analysis of the information have revealed that industrial distribution pattern in Ardabil is a clustering pattern. This pattern is mainly resulted from activity of industrial towns in the county and improved infrastructure condition compared with other counties. The results are consistent with the findings of Nastaran and Fatahi about the imbalance in distribution of development indicators and also with the results of Ziari et al. and Ghanbari et al. about the imbalanced development between province center and other counties of the province. The results of this research are also consistent with the results of Rahmati et al. and Hataminejad et al.; as these studies also stated imbalanced development of industries and development opportunities in different counties of a province.

Conclusion

The research has demonstrated that the distribution of the industries in the province has a highly clustered pattern and that the Ardabil County is dominant center in which industrial activities are concentrated. The indicators of industry and mining are unequally distributed in the counties of the province. Although some counties have potential mining and geographical capabilities, they are ranked lower in industrial indices. The spatial distribution of industrial development of the counties of the Ardabil Province represents unequal spatial development in the region. This can also be concluded that there is significant positive relationship in the urbanization, immigration, and population with industrial development. In other words, the higher developed counties in industry have also more population, migration, and urbanization.

Keywords: Spatial Analysis, Industrial Development, Spatial Justice, Ranking, Ardabil Provinces.

Analysis of the Effects of Cash Payment Subsidiary on Empowerment of Rural Focus Group

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Extended abstract

Introduction
In the rural sustainable development process, poverty eradication, providing the essential needs and empowerments of the poor in different dimensions have an important position. In recent decades, so many solutions had been presented and focused by different countries for reduction or even eradication of economic poverty such as entrepreneurship development, micro credit allocation, subside targeting, cash assistance grants and etc. which are implementing for rural economic empowerment especially in the focus groups. To support the poor social groups, so many countries pay low benefit loans and some of them pay cash payments subsidies to rural poor people. In the recent years, cash payment of subsidie to the poor is implemented in Iran. Subsidies targeting is considered as one of the economical tools for poverty reduction especially in rural areas. The cash payment subsidiary is an effective way for rural empowerment which is experimented in Iran's rural area during recent years. The key question of this study is that how cash payment subsidiary could be effective for rural empowering as a main goal of subsides targeting?

Methodology
This practical study had been done based on analytical- explanation method. The main purpose of current study is to assess the effects of cash payment subsidiaries on rural focus group empowerment. In the present study, the data were gathered through documentary, field observation methods and questionnaire based on 16 indicators that were chosen from theoretical framework. The sample community of this research contains all rural families members in Khodabandeh Relief Foundation and Welfare Organization (7207) and 365 families had been selected randomly by Cochran's formula as a case study community with sample distribution. Chi-square, T-test, correlations and regression statistical methods had been used for data analysis.

Results and discussion
Based on the results of this research, effective dimensions of subsidiaries cash payment are on

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medical and health care issues, improvement of the food diet among rural people, and increase in the purchasing power. In micro level items, the highest impact was on the reduction of monetary tablets, installment purchase supplies, power repayment, purchase basic necessities and living tools (TV, washing machine and. ..), reduction of self-medication, conduct periodic tests ups, preparing children's educational needs, increase in weekly consumption of protein (meat and fish) at meals and weekly consumption of fruits and vegetables in the diet. But overall correlation between dependent and independent variables indicated a significant correlation, but the important point is that the intensity of relationship between them is different. In other words, there is high and significant relationship between subsidiaries receipt and changes in the indicators such as increased economic risk, diversification of diet, increase in purchasing power, and improvement of access to health care and to education. Also, the results of regression examination showed that cash payment subsidiaries highly influenced economical risk taking indicators (0.184), diversification of diet (0.181) and increase in the purchase power (0.169).

In this study it was found that cash payment subsidy had less impact on the lives of rural target groups and empowers them. In most cases, the mean of studied indicators and items are lower than the theoretical average; because increasing the cost of energy and level of inflation had reduced purchase power of the rural people, especially in target groups and in different fields. It seems that during the first year of the subsidiaries cash payment, it has positive effects on the rural targets group, but over time due to inflation and increase in cost of living, and a gradual increase in intermittent energy prices, without any appropriate change in the amount of the subsidy payments, effects of subsidies had been reduced for empowering the rural target groups. On the other hand, due to lack of educational base for entrepreneurship and investment among the rural families, the rural families used the payments to buy essential commodity and needed material for family.

Keywords: cash payments subsidy, rural people, target group, poverty, and rural development.

Recognition of the Relation between Urban Spaces and Social Movements with Emphasis on Cairo, Sana'a and Manama

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Extended abstract

Introduction
The recent upsurge of different social movements in Middle East can represents the central role of cities for the social movements. The late months of 2010 were the starting points of the liberation movements among Arab countries in the Middle East. The fall of Tunisian government and democracy leading attempts in Egypt, Bahrain, Yemen, Libya, and Syria based on the news broadcast caused urban spaced such as Tahrir sq. in Cairo, Pearl sq. in Manama and university sq. in Sana'a to be known as the sign of liberalism and social protest against dictatorship, whereas they were completely unknown beforehand.

Putting political parties away, continuity in protest movements happening in public spaces in the Middle East have attracted the attention of many urban planing specialists about the properties of the mentioned spaces. The present study attempt to answer the following questions based on the relations among place, power, and social-political movements.

- Is there any meaningful relation between host public spaces and social movements?
- Which type of public spaces has got more potential to attract social movements?
- What are the similarities and differences among the spaces hosting the social movements in the Middle East?

Thus, three main aspects of Location, Typology of talented spaces, and social class arrangements are used to explain the issues in the three mentioned spaces in Cairo, Manama, and Sana'a.

Methodology
Present study is a practical research using blended quantitative-qualitative approach. This is

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quantitatively investigated through space syntax method as a means of monitoring. The aim of the use of this technique is expression of various aspects of relationship between morphological structure of built environment and the social and spatial structure of events in the city.

The theory of space syntax was proposed by Bill Hillier et al. in the 1970s at the Bartlett School. The theory is a technique for exploring the relationship between space and society. The most important discussion in this theory is an emphasis on the fact that the pattern of a settlement is rooted in the collective life of its users. It is in a way that some social norms of communities can be achieved by analyzing patterns of settlements.

The analysis is conducted based on converting maps to linear graphs and quantifying the spatial qualities of the nodes through the use of mathematical formulae. This method provides a simple operational process for explanation, comparison and translation of settlement patterns.

In this Study, some indexes of space syntax such as global integration (R_n), local integration (R_3), synergy and intelligibility were investigated in the axial map and the "choice" value was investigated in the segment map using depthmapX software.

Results and discussion

Content analysis of hosted urban spaces in the three cities shows that they have fundamental objects in common about the following issues:

- ✓ Social movements shaped in squares (public identity type) had higher priority than those shaped in the streets (informal behavior type). The protests are mostly transferred to the street due to the suppression. The best examples are Manama and Sana'a where the protests are transferred to the street.
- ✓ The studied social movements tend to develop in all regions with equal or higher integration than the average integration of entire city. Social movements and social forces in the Middle East have occurred with the participation of majority of the community (superior and inferior groups). We witness the formation of the movement in the areas with higher integration like Central Spaces in Cairo and Sana'a.
- ✓ Intelligibility index analysis in the case studies shows that the majority of the spaces hosted the movements has got higher intelligibility than other parts of the city. While in Sana'a and Cairo there were protests in other parts as well, Tahrir and University squares in both cities include high participation of the protesters.
- ✓ Social movements which have the least support of the majority group or sometimes even opposed by them are divided into superior and inferior groups. Inferior groups are forced away and continue their protests in the spaces with low levels of integration and intelligibility. In these cases, urban areas adjacent to the origin of these forces have been selected. Like Bahraini Shiite protests in Manama's Pearl sq. or Ekhvans Supporters in Cairo's Rabaa al-Adawiya Sq.
- ✓ Social movement spaces have been shaped up regarding the priority. Selected spaces in social movements are supported by the majority of the selection criteria as appropriate pedestrian movement. Tahrir square and University square in Sana'a are examples of this.
- ✓ In all cases, the governments attempted to change the existing relations in space, and control the spaces. The Egyptian government failed in its efforts to occupy the space with security forces and paramilitary forces fans. But the Yemeni government occupied the space by force expelling protesters, and the government of Bahrain took stronger action to capture the space.

Conclusion

Wave of Islamic awakening movement against authoritarian regimes in Persian Gulf Arab states

has provided an opportunity to look at the relationship between space and power, and to study the characteristics of the host spaces in these countries. This paper attempts to examine spatial configuration samples using quantitative indicators to analyze the relationship between space and social arrangements of productive forces of social movements through a different approach.

Examining the hosted spaces in the cities of Cairo, Sana'a and Manama shows that there is a meaningful relationship between the formation of social movements in square-like spaces (accumulation) and squares of urban spaces (gathering space) and that these spaces are more preferable compared with other urban spaces like streets and cafes.

Public protest experiences in the case studies of this research show that when the social movement considers the support of the majority of social forces, it must be assumed that a space including the properties of space syntax should be considered as the first priority of being chosen as the protest space.

Theoretical Explanation of the Foundations Forming Geopolitical Competition

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Extended abstract

Introduction

In system level on the world scale almost three quarters of all the wars of the world occurred between the states and countries that had serious competition against each other. It is essential to consider the concept of competition in regional and global geopolitics due to its centrality for the interests among the states. Therefore, as the formation of geopolitics was accompanied by power and competition, it seems necessary to analyze the dimensions of the competition and its configuration foundations. This present research seeks to explain theoretical fundamentals of the basic concept of the competition in geopolitics.

Methodology

This research with an interpretation-analytical approach is to explain theoretical foundations of the basic concept of competition in political geography and geopolitics. In other words, the objective of this study is to clear the conceptual factors effective on the formation of the geopolitical competition.

The research hypothesis represents that although the competition among the states can take a variety of forms over time and in different geographical locations, some issues including territory problems, change in geopolitical structure, military preparations, and general treaties and strategies can provide proper conditions to form the competitions and stabilize the geopolitical rivalries.

Results and discussion

Competitions among the countries take various forms during time and in different geographical regions. A competition may be very short that results in a few military events among the two rivals. Some competitions may last during a generation that causes many repetitive rivalries and

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military contacts between the involving countries. The geopolitical competitions may have different perspectives. In one perspective, a competition is initiated between two or more states on the problems like territory issues. In response, the states promote their obligations and participate in military preparations. The states to show their decisiveness may take part in other disputes and competitions. They, finally, scheme a macro strategy to face the enemy or rival state. All the attempts are integrated in steps that may, finally, cause conflict between two or more powers or a vicarious conflict.

On the other hand, a competition can itself generate a new rivalry forming competition relations among several spaces. In this case, the competitions that are in relation with other conflicts can create a conflict between one state and many other states. In other words, increase in space and competition relations can augment the possibility of conflict. This can indicate obligations of rivals or tendency of a country for conflict on each problem. Other foundation of the competition and its cycle is macro-strategy, because the macro strategy is appeared as a result of the signs of increasing competitions. Indeed, the macro-strategy is a scheme a state may devise to ensure its security in competition space.

Another dimension of generation and development of the competition is usually resulted from changes in regional and global geopolitical structure. For example, after a war among great regional of global powers or defeat of a rival, some great geopolitical competitions may be ended, because a rival may not be able to compete in the new altered competition space. Accordingly, appearance of new powers provides new opportunities for competitions. In addition, a change in distribution of power can transform traditional treaties and make a rival state as an ally. As distribution and hierarchy of power formed the structure global geopolitics and generate short-term and long-term competitions, increase in power creates new geopolitical interests to ensure security and survival of a country. Therefore, the rival states make competition actions to preserve their security and ensure their approach for gaining their regional and global geopolitical interests. Thus, ensuring survival and achieving geopolitical goals through military preparations including maneuver, treaties, and macro-strategies for dominance over border and territory issues can give rise to short term and long term competitions. These competitions can also endanger survival of a country. However, since the powers cannot confine themselves in national borders to ensure their interests and achieve development, they enter trans-national space to seek their goals. This can lead to especial forms of geopolitical competition and conflicts.

Conclusion
The voracious needs to provide goods, power, and geopolitical position make the states to seek competition actions. Different scales of competitions provide the governments with space resources, either objective or subjective. On the other hand, in geopolitical rivalry common material and subjective interests are replaced by conflict interests, because the common interests lead to cooperation, coalescence, and geopolitics of peace and the conflict interests lead to competition, dispute, and war. Therefore, it seems impossible for the states to be confined in national boundaries for achieving development, because all the national, regional, and global powers go beyond trans-boundary spaces to seek their goals. This can generate a new kind of geopolitical competition and conflict.

Keywords: competition, geopolitical competition, common interests, conflict interests, global powers.

Simulation of Urban Development in Tabriz Using CA-Markov Model and Multi-criteria Decision Making

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Extended abstract

Introduction

Today, developed and developing countries are experiencing rapid changes and growth in population. It is essential to have a suitable sustainable urban growth management and urban development planning to better understand patterns of urban growth. Satellite remote sensing in conjunction with Geographic Information Systems (GIS) has been recognized as a powerful and effective tool in detecting land use and land cover changes. Satellite remote sensing is a potentially powerful means of monitoring land-use change at high temporal resolution and lower costs than those associated with the use of traditional methods. This provides multi-spectral and multitemporal data that can be used to quantify the type, amount and location of land use and land cover changes. CA-Markov model is a dynamic model to simulate urban growth and land use changes maps obtained from a combination of automated cells and Markov chain. Markov chain is spatial sequence of random processes in which the result of any process at any time, only next time, will depend on the outcome of the process. Using Markov chain model, we have initially calculated the possibility of changing land use map classes to each other in terms of probability matrix applications based on area changes between time t0 and t1. Markov model output, literally, is the non-place model where there is no knowledge of the geographical location of land uses. To predict the location of land at the time t1, automated cell techniques can be used with this model. In this study, we are using Landsat images of TM5 and OLI applying the capabilities of IDRISI software and GIS to estimate changes in urban growth areas in Tabriz during 30 years, from 1973 to 2013.

Methodology

In this study, the tools available in IDRISI SELVA software and GIS functions have been used to simulate the changes in land use and urban growth in Tabriz in three main stages:

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Tabriz is one of the major cities in Iran and the capital of East Azerbaijan province. The Tabriz City is the the third largest city of Iran following Tehran and Mashhad and it is a major hub for business, communication, commerce, and political, industrial, cultural and military activities.

In this study, in order to identify and create land use maps of Tabriz, images of Landsat in the years 1973, 1993 and 2013 were obtained from the Geological Society of America (USGS).

The land use map of the city of Tabriz has been categorized for three major landuses including urban areas, agricultural land and orchards, and barren areas. In order to make land use suitability map, we have also used topographic maps of 1: 2000 and 1: 50000 for the sheet of Tabriz, from the national cartographic center of Iran. The transition probability matrix is calculated using Markov chain analysis: for this purpose, Landsat satellite images in 1993, 2003 and 2013, using the techniques of USGS classified images to produce the maps of urban development.

1. The calculation of urban suitability map using Multi Criteria Evaluation and Analytical Hierarchy Process (AHP)
2. Urban growth modeling with data collection: 1. urban areas Map 1993 as the base map. 2- Suitability map of urban growth in 2003. 3- The transition probability matrix from 2003 to 1993 was also combined by the operator, CA location.

Results and discussion

The study area, Tabriz city, is located northwest Iran. The maps of land use and urban growth have been created using satellite image processing techniques and supervised classification. The overall accuracy of the land use/cover maps for 1972, 2003 and 2013 were 82 %, 85 % and 90 %, respectively. The Kappa index for the 1972, 1990 and 2006 of the land use/cover maps were found to be 76 %, 79 % and 89 %, respectively. The transfer matrix regions from 2003 to 2013 changed 12 percent of rural areas into urban. Real and simulated map of 2013 is shown in Figure 1. The overall accuracy and Kappa index between actual and predicted maps of 2013 was, respectively, 91 and 81. The 2028 map was produced using ca-markov model. In the map simulated for 2028, urban areas will grow 25 percent and from 11697 hectares to 14690.

Conclusion

In the present study, Markov and CA- Markov models were helpful for predicting land use/cover changes and urban growth in 2013 and 2028. The results showed that the rate of the population growth in the areas built in the city of Tabriz surpassed the value. The gap between urban growth and population doubled in this period and shows that development was more horizontal than vertical during this period. In the map, several areas of industrial, commercial and residential development was found. The outcomes of this research indicate that Landsat TM images can be effectively used for generating accurate land use/cover maps as the overall accuracies of all the generated land cover maps were about 80 %. According to the results of the CA-Markov model, urban expansion will occur in the future. The combination of satellite remote sensing, GIS and Markov models provides useful information on land use/cover dynamics and trends which could help policy makers make better decisions for the future for the study area. The provided future projection could be effectively used for land use planning, decision making and land management, especially if its use is confined more to general trends than to specific land-use locations, where accuracy was lower. The predictive power of the CA-Markov model, especially in predicting the location of pixels, was not very high in this research but, in general, Markov models have indicated the capability for the prediction of land cover/land use trends.

Keywords: CA-Markov, AHP, Remote sensing, Tabriz, Urban growth.

Developing a Web-based Citizen-oriented Geographic Information System (GIS) for Mapping and Analysis of Urban Crimes

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Extended Abstract

Introduction

Crime is one of the important issues in societies, especially in large cities. The crime control and prevention require the use of citizen's potentials and capacity in the form of participatory policy making. Accordingly, a combination of the citizens' participation and the police activities with the objective of solving the crime problem and establishing security in the society would be effective. Using Web GIS and citizen-based information systems can facilitate citizens' participation in crime mapping, analysis, decision making and management for the purpose of crime control and prevention. These systems enable citizens to have active roles in crimes monitoring and reporting. Development of technologies like the smart phones capable of connecting to the internet and equipped with camera and GPS in which the spatial data are automatically produced, will provide a huge volume of criminal spatial data. The people as intelligent and location-aware sensors, using these technologies and through internet access can provide the police centers with update information. Analysis of the information by GIS can play an important role to connect the community members to police. In this study, a Web GIS-based participatory crime monitoring system was designed and developed. This system integrates three scientific fields including: Web GIS, criminology and citizens participation. It provides a set of tools including crime reporting, mapping, as well as spatial analyses such as nearest distance to police stations and cars, and classification of crimes according to the police districts.

Methodology

The main objective of the present study is the spatial-temporal monitoring of crimes through citizen-oriented crime recording system for all the users of this information including the public and private organizations pertinent to the urban crime problem. A set of tools were used in this system including, crimes mapping by citizens and analyzing reported crimes by police

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departments. For convenient reporting of the geospatial data of crimes, the Google Maps service was used so that the users can determine and mark the exact locations of crime commitments. Google Maps API allows developers to integrate Google Maps into their websites freely. The database used in this system is Microsoft SQL Server as one of the most robust databases in temporal - spatial data domain. Any citizen can mark the crime location on the Google Map and report the relevant descriptive information in the system. In addition to the reporting and viewing tools, a set of functionalities for the analysis of the reported crime data have been implemented in the system, including the nearest police station analysis, determining the number of crimes according to police districts, and determining crime risk areas, etc.

Results and discussion

The proposed system can be used as a suitable and convenient tool for citizen-based crime monitoring. Interaction of the people with the city space in daily life makes them to gather information on the crimes and provide the authorities with such information more rapidly and with greater awareness than the governmental forces. This system increases the citizens' sense of responsibility and their interaction with police. Such a system can provide appropriate tool for citizens in the direction of crime prevention and control. Given that the location-based technologies such as GPS and maps are used in smart phones for people and their everyday life, this system provides a good cooperation between citizens and law enforcement agencies in order to monitor, analyze, control and prevent criminal activities. However, the system application is accompanied by limitations and challenges including the cultural issues, lack of familiarity with the GIS and citizen-based web-GIS tools, the validity of the citizens' data as well as management of such a huge volume of data. Proper training of the citizens, publicity and making the culture for citizen engagement in policing can provide the ground for higher efficiency and better effectiveness of these systems.

Conclusion

Citizens are the key players in crime monitoring and they can act as active, reasoner, smart, responsible, conscious, distributed, and interactive sensors to carefully monitor the crimes in their local area and provide detailed geographic information to the police. The use of web-based GIS tools facilitates the participation of citizens in collecting and analyzing crime data in order to prevent and control crimes. The relevant police organizations can make use of them to involve the community members in the crime mapping processes. Through such a process, interested parties can have an active role from the initial stages right up to the final stage of urban crime management.

In this study, a web-based GIS crime monitoring system (VGI-based system) was designed and implemented. The system provides citizens with the necessary tools for reporting crimes and allows the police to analyze this information. Citizens can report information about various crimes through the system, along with photos, videos, text, etc., and they can play an important role in monitoring the crimes in the city.

As the future work, this study suggests that the systems use additional GIS analysis functions and address more complex crime analyses. Also, other GIS-based technologies, including SDSS (Spatial Decision Support System), could be integrated with these systems. To improve system performance, we need to conduct an empirical study of usability testing for the proposed system.

Given the fact that information is produced by ordinary and unfamiliar citizens via the VGI system, it is necessary to discuss the validation of these data and improve the quality of the citizen-generated crime data. One of the important points for the more efficient use of these

systems is the increase in the citizen engagement. In this regard, we suggest that conducting educational and promotional programs can play a key role in encouraging citizens in the participatory crime mapping.