Evaluating the Geographical Distribution of Traffic Anomalies in Various Districts of Mashhad

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Extended Abstract

1. Introduction

Every year, a considerable amount of Iranian national resources are squandered due to traffic jam disorganization. In Iran, car accidents take the second place after heart attack in the ranking of major causes of death. Engineering, education, and enforcement are the three pillars of traffic management. Needless to say, two of the previously mentioned factors (i.e., education & enforcement) directly point to human behavior and the way it is controlled. In fact, users of routes who are people including drivers, cyclists, and pedestrians are the paramount factors in traffic equation which needs to be guided and controlled with a full understanding. Abnormal traffic behavior of some users of transportation systems is one of the reasons of an increase in the rate of traffic problems in various routes. Such a condition is contrary to the urban principles of smart growth and sustainability. Studying traffic anomalies, as a symbol of traffic etiquette in the society, can guide urban planners toward making correct decisions. The present study aims to determine the geographical distribution of traffic anomalies in Mashhad and find a logical link between geographical features of various districts and their rate of traffic anomalies.

2. Theoretical Framework

Smart growth theory constitutes the theoretical framework for the present study. In fact, the strategy of smart growth tries to reshape cities and guide them toward an empowered community, providing access to a desirable environment. Smart growth emphasizes a kind of urban planning and transportation theory which is in pursuit of urban development through increased density, walkability, and at the same time refraining from urban sprawl.

In transportation engineering, traffic anomalies happen when two or more vehicles in order to avoid a crash, are put in a situation where at least one of them should react (swerve). Anomalies can be defined through investigating the time of the crash after its occurrence or through other factors related to the vehicle's condition in a specific time or place. Traffic anomalies should be defined specifically, considering the conditions of the country in question. Following the studies conducted in 2008 and published in 2009 in Mashhad, 11 traffic anomalies in crossings with traffic light were identified and defined.

3. Methodology

Geographical span of the study is limited to the city of Mashhad. The areas under study were considered to be the 13 municipality districts of Mashhad. The current study, in terms of data collection and analysis, is an evaluation study, and in terms of findings can be categorized as an applied study. The methodology used in the study is of a descriptive-analytical type. Traffic anomalies were captured using a camera throughout March 2013 and the data regarding traffic volume was obtained from the data base of Traffic lights' Integrated Intelligent Control System in Mashhad. Research samples include 26 crossings, chosen from 189 crossings equipped with traffic lights throughout Mashhad, where the rate of occurrence for two of major traffic anomalies has been identified. In order to

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investigate the relationship between districts' features and traffic anomalies, SPSS was used. The minimum time required for recording was calculated using standard methods published through the Institute of Transportation Engineers. Two types of indicators were used in the study: 1) indicators of districts' features including three factors of population, surface area, and population density of each district; 2) indicators of traffic anomalies in these districts entailing two factors, namely number of anomalies per hour and number of anomalies compared to the traffic volume. In addition, according to the findings of the previous studies, districts of Mashhad were categorized in terms of wealth. The link among independent and dependent variables were calculated through Pearson Correlation. Moreover, linear regression was used in order to investigate the link between the number of traffic anomalies per hour and the population density in the district.

4. Findings and Discussion

It can be inferred from the findings that law through the police as well as the educational and cultural undertakings should be enforced more rigorously in districts with a high population density and also in deprived and central districts of the city.

It is also necessary that executives in charge of urban traffic identify and analyze traffic anomalies through continuous studies, and utilize the findings in assessing the efficacy of traffic plans, correcting routes in terms of geometry, and increasing the traffic etiquette.

Keywords: Traffic anomalies, Smart growth, Traffic etiquette, Geographical distribution, Mashhad

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