



## An Innovative Method for Estimating the Spatial Distribution of Parking Demand in Different Areas

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### Abstract

Parking facilities in the urban road network are of the most essential parts of the transportation and traffic system. Considering that many users are not interested in parking in or near the destination zone, or in some cases it is not basically possible to park in this area, the parking demand in each area is not merely associated with the actual land use of that area and is sometimes affected by the land use of the surrounding area. Therefore, estimating the spatial distribution of parking demand is essential to accurately determine the real parking demand, especially in non-marginal urban areas. In conventional methods of estimating the parking demand in each area, it is assumed that the parking areas are located in the same area or distributed uniformly in the surrounding areas, without considering the desirability of the surrounding areas, which has sometimes led to unrealistic estimations. Accordingly, new methods, capable of estimating the real parking demand in each area, are needed. In present study, an innovative method is proposed to predict the spatial distribution of parking demand and then it is applied to the central area of Tehran.

*Keywords:* Parking Demand; Parking Area; Spatial Distribution.

### 1. Introduction

In general, the time interval in which a car is stopped in the city is far longer than the time it is moving. So it needs a place to stop. Therefore, it should be possible to stop the vehicle, either for a long or short period of time. Meanwhile, the necessary facilities for accessing these places and the possibility of using them for everyone should be also provided. Therefore, parking facilities in urban road networks are of the essential parts of the transportation and traffic system.

The lack of sufficient parking area for cars and the lack of parking space in the downtown area have led the drivers to spend a lot of time to find parking lot and to cover extra mileage on their vehicle. This leads to increasing the traffic volume as well as increasing the air pollution, excessive fuel consumption, vehicle depreciation, and undesirable psychological effects. On the other hand, the lack of proper parking management policies leads to an uncontrolled increase in marginal parking, which results in reducing the capacity, reducing the speed, and increasing the accidents, especially in downtown areas.

Therefore, parking studies, as part of urban transportation planning studies, play a significant role in quantitative and qualitative improvement of transportation.

Basically, any planning and decision-making about parking in an area requires an estimation of the actual parking demand in that area. In conventional methods for estimating the parking demand in each area, it is assumed that the

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