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**K.N.Toosi University of Technology**

**Faculty of Geodesy and Geomatic**

**Master Thesis in Civil-Surveying Engineering**

**In Geospatial Information Systems**

**Spatio-Temporal Modeling of Pollutants Concentration using LUR Methods and Meteorological Data (Case Study: Tehran)**

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**Abstract**

The models of association between land use and air pollution have wide application in urban studies, but the land-use role and its different parameters effective on variability of air pollution concentration in various hours can be used for more accurate spatio-temporal prediction of pollution. Integration of the dynamic parameters such as meteorology, which have the fundamental role in changing air pollution concentration during the time, and the environmental parameters can lead to more accurate results. In this study, in order to make spatio-temporal prediction of CO pollutant using hourly land-use regression (LUR), the effective environmental parameters on spatio-temporal variation of this pollutant are investigated during the day and night and then, the hourly prediction of CO pollutant concentration is carried out by using the values obtained for the prediction of the mentioned concentration with hourly LUR models and the dynamic parameters in Multiple Linear Regression (MLR) simultaneously. By analyzing hourly LUR models, due to the differences in the parameters used in these models, it is shown that these parameters play important roles in temporal and spatial variability of CO pollutant. The coefficient of determination (R2) of the MLR models for the summer season and the fall season is 0.6611 and 0.4755 respectively which indicates good performance and efficiency of this method in comparison with the similar studies in the literature. The most effective land use parameters are local access roads and official/commercial centers for the summer and highways and local access roads for the fall which illustrate the high impact of road network on increasing CO pollutant concentration. Also, the diurnal difference of temperature data and wind speed data at each hour and the traffic affected by the last hour are the most effective dynamic parameters on CO pollutant concentration.

**Keywords: Land-use Regression model, spatio-temporal prediction, CO Pollutant, Multiple linear regression model**