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Dissertation Submitted in Partial
Fulfillment of the Requirements for the
Degree of Master of Science in

Spatial relationships between elements of climate and air pollution in Mashhad using artificial neural network

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2013

Abstract

One of the dangers of environmental hazards that can lead to human health risks, including the risks of air pollution. Air pollution is a major environmental risk to human health in many cities in the developed or developing world as well. Levels of air pollution are usually concentrations of air pollutants such as nitrogen oxides, sulfur dioxide, carbon monoxide, ozone and particulate. Handing is determine. This study uses a model to establish the relationship between the elements of climate and air pollution. Thus, to investigate the relationship between climatic factors and air pollutants emissions data 11 stations in the city of Mashhad, which was hourly, daily, as well as data from Mashhad synoptic stations have been used for a period of one year. Climate data included parameters, barometric pressure, wind direction, wind speed, precipitation, relative humidity (6.30, 12.30 and 18.30 h) and temperature (mean, maximum and minimum) is. Firstly, data from 11 stations in the city of Mashhad and then averaged using the optimizer software ARC GIS, the interpolation methods IDW, a single single pollutants regular seasonal data were interpolated to the Shadow. then the data using software Neuroslutions, with three potential neural network, a multilayer perceptron and linear regression were processed. the three categories of software, data, training, evaluation and testing have divided the data into 70 Percent training data and 15 Percent of the data, evaluate the data and test data, 15 percent was allocated. The correlation coefficient between air pollutants on climate elements obtained Vnshan temperature and relative humidity data that most correlated with air pollutants during the seasons of spring and fall Tabsan, wind speed and air pressure in the winter has shown the highest correlation. The results showed that the neural network model with the lowest possible error and the highest correlation coefficient of linear regression models and multi-layer perceptron. The best model that is able to establish a significant relationship between air pollution and climatic factors and the forecasting accuracy is better.

keywords: Air Pollutants, Mashhad, Probabilistic Neural Networks, Multi-Layer Perceptron, Linear Regression ,Software Neuroslution.