A neural network-based approach for the prediction of urban SO$_2$ concentrations in the Istanbul metropolitan area

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Abstract: A three-layer Artificial Neural Network (ANN) model was developed to forecast air pollution levels. The subsequent SO$_2$ concentration (24-hour averaged) being the output parameter of this study was estimated by seven input parameters such as preceding SO$_2$ concentrations (24-hour averaged), average daily temperature, sea-level pressure, relative humidity, cloudiness, average daily wind speed and daily dominant wind direction. After Backpropagation training combined with Principal Component Analysis (PCA), the proposed model predicted subsequent SO$_2$ values based on measured data. ANN testing outputs were proven to be satisfactory with correlation coefficients of about 0.770, 0.744 and 0.751 for the winter, summer and overall data, respectively.

Keywords: ANN; artificial neural network; BP; backpropagation algorithm; modelling; meteorological data; SO$_2$. 