

NN-AirPol: a neural-networks-based method for air pollution evaluation and control

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ABSTRACT

A method for air pollution evaluation and control, based on one of the most popular neural networks – the backpropagation algorithm, is proposed. After the backpropagation training, the neural network, based on weather forecasting data, determines the future concentration of critical air pollution indicators. Depending on these concentrations, relevant episode warnings and actions are activated. A case study is carried out to illustrate and validate the method proposed, based on Istanbul air pollution data. Sulphur dioxide and inhalable particulate matter are selected as air pollution indicators (neural network outputs). Relevant episode measures are proposed. Among ten backpropagation algorithms, the BFGS algorithm (Quasi-Newton algorithms) is adopted since it showed the lowest training error. A comparison of NN-AirPol method against regression and perceptron models showed significantly better performance.