

Vol. 13 (1): 215-218 (2023)

## A REVIEW INVESTIGATION OF THE USAGE ARTIFICIAL NEURAL NETWORKS ON AIR POLLUTION MODELING

Fatma Kunt<sup>1\*</sup>, Buse Nur Kopuklu<sup>1</sup>, Zeynep Cansu Ayturan<sup>2</sup>, Sukru Dursun<sup>2</sup>

<sup>1\*</sup>Environmental Engineering Department, Engineering Faculty,  
Necmettin Erbakan University, Konya, Turkey;

<sup>2</sup>Environmental Engineering Department, Engineering and Natural Science Faculty,  
Konya Technical University, Konya, Turkey;

\*Corresponding Author Fatma Kunt, e-mail: [drfatmakunt@gmail.com](mailto:drfatmakunt@gmail.com);

Received November 2022; Accepted December 2022; Published January 2023;

DOI: <https://doi.org/10.31407/ijeess13.127>

### ABSTRACT

Air pollution is one of the most important problems that negatively impacts human health and disrupts the ecological balance by changing the atmosphere because of the pollutants formed as a result of natural events and human activities. This problem is growing because of the increase in population, the development of industrialization and urbanization. Pollutants that cause air pollution reaching the atmosphere directly without changing their form are sulfur dioxide (SO<sub>2</sub>), hydrogen sulfide (H<sub>2</sub>S), nitrogen monoxide (NO), nitrogen dioxide (NO<sub>2</sub>), and carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>) and particulate matter. Secondary pollutants are formed by reacting with other substances in the atmosphere after leaving the source are sulfur trioxide (SO<sub>3</sub>), sulfuric acid (H<sub>2</sub>SO<sub>4</sub>), ozone (O<sub>3</sub>), aldehydes, peroxyacetyl nitrate (PAN), and heavy metals. Besides, air pollution causes acid rain, increases acidity in lakes, destroys forests, damages agricultural and animal products, and significantly disrupts the ecological balance, especially in industrial countries. Therefore, this issue should be evaluated in many ways such as modeling to predict future episode, monitoring to assess present air pollution levels efficiently and taking preventive precautions with respect to these evaluations. Artificial neural networks are one of the mostly used artificial intelligence prediction techniques for prediction of air pollutant future concentrations. It uses multilayer perceptron technique which consists of at least three layers of nodes: an input layer, a hidden layer, and an output layer for estimating recent atmospheric events and air quality. This study aims to examine the studies on the use of artificial neural network models to predict air pollution concentrations accurately and swiftly. It has been proven that the application of this method for air pollution prediction allows the improving of prediction accuracy.

**Keywords:** Artificial neural networks, air pollution, modeling, artificial intelligence.