ABSTRACT

The $PM_{2.5}$ in the open air AMBIEN continues to increase. The $PM_{2.5}$ in the air can be affected by meteorological parameters such as temperature, humidity, pressure, precipitation, and wind speed/direction. In previous research, Web-Based Air Quality Monitoring System in Bandung Raya Air Basin Area, prediction application has been made using several methods, such as multiple linear regression, neural network regression, lasso regression, elasticNet regression, decision forest, extra trees, and boosted decision tree. The meteorological parameters used in previous studies did not all show significant results against predictions $PM_{2.5}$, with an average gain of RMSE 26.63μg/m3. In this study, optimization of $PM_{2.5}$ concentration prediction system was built with Artificial Neural Network Backpropagation method and validated meteorological parameters namely humidity, rainfall, wind speed, and $PM_{2.5}$ concentration. The best network model GKU obtained has an architecture of 4 input layers, 3 hidden layers with nodes namely 9, 12, 9 nodes, one output layer, and a learning rate of 0.2. While deli best network model architecture is 4 input layers, 3 hidden layers with nodes namely 50, 9, and 9 nodes, one output layer, and a learning rate of 0.3. RMSE and MAPE performance produced by the best network models of GKU and DELI is 8.32 μg/m3 and 37%, as well as 12.49 μg/m3 and 15%.

Keywords: artificial neural network, backpropagation, concentration of pollutants, machine learning, $PM_{2.5}$.