ABSTRACT

In this work, the Bidirectional Long Short-Term Memory (BiLSTM) technique and Internet of Things (IoT)-based integrated weather stations are used to anticipate air pollution. The weather station is outfitted with multiple sensors, including the MQ-135, BMP280, and DHT11, to gauge temperature, humidity, air pressure, and quality of the air. Air pollution levels are predicted using data from these devices. An improvement on the Long Short-Term Memory (LSTM) concept, Bidirectional Long Short-Term Memory (BiLSTM) has two layers with opposing processes. The selection of the BiLSTM model was based on how well it can identify patterns of air pollution. Based on measures such as Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE), and Coefficient of Determination (R2), evaluation results demonstrate that the BiLSTM model may generate highly accurate predictions. The predictions are almost identical to the original data, indicating low prediction errors and good accuracy. This study suggests further development in expanding the locations of weather stations, using more data, and developing applications to display real-time air pollution forecasts to the public.

Keyword: Bidirectional Long Short-Term Memory (BiLSTM), Air Pollution, Weather Station, Prediction Accuracy