# The nonlinear autoregressive exogenous neural network performance in predicting Malaysia air pollutant index

## ABSTRACT

Predicting the air quality is important particularly in the areas where air pollution is becoming a major health problem. This paper presents and evaluates the Nonlinear Autoregressive Exogenous (NARX) Neural Network performance in predicting the Air Pollutant Index (API) at three industrial areas in Malaysia: Pasir Gudang, Larkin and TTDI Jaya. The NARX was implemented in an open loop feed-forward architecture and was trained to produce an hour ahead API prediction based on the past values of air quality and meteorological parameters. Six air quality parameters: $CO$, $NO_2$, $O_3$, $PM_{2.5}$, $PM_{10}$, $SO_2$, and three meteorological parameters: wind direction, wind speed and ambient temperature were used as input while the API was set as the output. The prediction performance was measured by using the Coefficient of Determination ($R^2$) and Root Mean Square Error (RMSE) tests. Results show that the performance of NARX model was encouraging with $R^2$ value above 0.97 and RMSE value around 1.21 based on the data collected in 2018 at the three monitoring stations.