

Forecasting PM2.5 Concentrations Using CNN-BiLSTM

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ABSTRACT

Air quality is an increasingly pressing issue in big cities like Jakarta, with air pollution, especially PM2.5. These particles are so small that they can only be detected using an electron microscope [1]. This research was driven by the trend of worsening air quality in Jakarta which exceeds the World Health Organization (WHO) guideline standards and its potential adverse impacts on human health and the environment.

The research aims to develop accurate predictions for PM2.5 concentrations, enabling proactive action from governments. With a threatening increase in air pollution, early steps are needed to protect society and the environment. Furthermore, this research focuses on Kemayoran District, Jakarta, with the aim of producing an accurate PM2.5 forecasting model based on historical data. This research limits itself to secondary data on daily PM2.5 concentrations in Kemayoran District from January 2022 to August 2023, which is univariate time series data. The research will compare prediction models with machine learning methods using CNN-BiLSTM. The results of this forecast will show the importance of looking at trends over the next month so that the government can take action to prevent increasing PM2.5 concentrations.

Keywords: Forecasting, PM2.5, CNN-BiLSTM, Air Quality.

References:

[1] US EPA. (2023). United States Environmental Protection Agency: Particulate matter (PM) basics.