ABSTRAK

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Judul : Perbandingan Algoritma *Long Short Term Memory* (LSTM) dan *Seasonal Autoregressive Integrated Moving Average* (SARIMA) Dalam Memprediksi Kualitas Udara DKI Jakarta.

Polusi udara merupakan masalah serius di kota-kota besar, termasuk DKI Jakarta, yang berdampak negatif pada kesehatan masyarakat dan lingkungan. Penelitian ini bertujuan untuk membandingkan efektivitas dua model prediktif, yaitu Long Short Term Memory (LSTM) dan Seasonal Autoregressive Integrated Moving Average (SARIMA), dalam memprediksi Indeks Kualitas Udara (IKU) harian di DKI Jakarta. Metode yang digunakan melibatkan implementasi dan evaluasi kedua model menggunakan metrik RMSE, MSE, MAPE, dan MAE. Hasil penelitian menunjukkan bahwa model SARIMA memiliki kinerja yang lebih baik dibandingkan LSTM, dengan nilai kesalahan yang lebih rendah dan prediksi yang lebih akurat. Model SARIMA menunjukkan nilai RMSE sebesar 19.8732, MSE sebesar 394.9456, MAPE sebesar 15.8195%, dan MAE sebesar 13.4830, sementara model LSTM menunjukkan nilai RMSE sebesar 10484.8390, MSE sebesar 550.1901, MAPE sebesar 11706.6848%, dan MAE sebesar 18.1898. Kesimpulannya, SARIMA lebih efektif dalam memprediksi kualitas udara di DKI Jakarta, menawarkan prediksi yang lebih andal untuk perencanaan dan pengambilan keputusan terkait kualitas udara.

Kata Kunci: Prediksi Kualitas Udara, *Long Short-Term Memory* (LSTM), *Seasonal Autoregressive Integrated Moving Average* (SARIMA), Jakarta, Indeks Standar Pencemar Udara (ISPU), Pemodelan Prediktif.

ABSTRACT

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Title : *Comparison of Long Short-Term Memory (LSTM) and Seasonal Autoregressive Integrated Moving Average (SARIMA) Algorithms in Predicting Air Quality in Jakarta.*

Air pollution is a serious issue in major cities, including DKI Jakarta, which negatively impacts public health and the environment. This study aims to compare the effectiveness of two predictive models, Long Short Term Memory (LSTM) and Seasonal Autoregressive Integrated Moving Average (SARIMA), in forecasting the daily Air Quality Index (AQI) in DKI Jakarta. The methodology involves the implementation and evaluation of both models using RMSE, MSE, MAPE, and MAE metrics. The results show that the SARIMA model performs better than the LSTM model, with lower error values and more accurate predictions. The SARIMA model exhibits an RMSE of 19.8732, an MSE of 394.9456, a MAPE of 15.8195%, and an MAE of 13.4830, while the LSTM model shows an RMSE of 10484.8390, an MSE of 550.1901, a MAPE of 11706.6848%, and an MAE of 18.1898. In conclusion, SARIMA is more effective in predicting air quality in DKI Jakarta, providing more reliable predictions for air quality planning and decision-making.

Keywords: Air Quality Forecasting, Long Short-Term Memory (LSTM), Seasonal Autoregressive Integrated Moving Average (SARIMA), Jakarta, Air Pollution Standard Index, Predictive Modeling.