

ABSTRACT

Rainfall is one of the most crucial parameters in hydrometeorological analysis, especially in tropical regions such as Indonesia. In Surabaya City, seasonal rainfall patterns have a significant impact on various sectors, including urban planning and infrastructure. A major issue is the risk of flooding due to high rainfall intensity during wet season periods. This study aims to forecast monthly rainfall in Surabaya using the Seasonal Autoregressive Integrated Moving Average (SARIMA) model. Monthly historical rainfall data from January 2020 to December 2024, obtained from the Perak I Meteorological Station in Surabaya, was used as the basis for analysis. The modeling process involved stationarity testing using the Augmented Dickey-Fuller (ADF) test, parameter identification through ACF and PACF plots, and model evaluation using MAE, RMSE, MSE, AIC, and BIC metrics. The analysis results show that the SARIMA(2,0,0)(2,1,0)[12] model provides the best performance under a 90% training and 10% testing data split scenario, with an MAE of 1.16, RMSE of 1.63, MSE of 2.66, AIC of 95.48, and BIC of 99.34. Based on the forecasting results, the highest rainfall is expected to occur in January, February, November, and December 2025, while the lowest rainfall is predicted during the dry season, from June to August 2025. This pattern reflects a consistent seasonal cycle, with peak rainfall in the early and late parts of the year and a dry season in the middle. The forecasting results are visualized through an interactive dashboard developed using Streamlit, which also facilitates exploration of the modeling workflow from training to evaluation, thereby supporting a more intuitive understanding of the data and model performance.

Keywords: *Monthly rainfall, Forecasting, SARIMA, Seasonal time series, Dashboard, Streamlit.*