Time-Series Forecasting for Process-Control Systems in Nigerian Context: A Replication Study

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Abstract

This study focuses on evaluating process-control systems in Nigeria, specifically examining their reliability through time-series forecasting methods. A time-series forecasting model was employed using ARIMA (Autoregressive Integrated Moving Average) methodology. Robust standard errors were used to account for model uncertainty. The analysis revealed a correlation coefficient of 0.85 between the actual and forecasted values, indicating strong predictive power with moderate confidence intervals around these forecasts. The replication study confirms the effectiveness of ARIMA in time-series forecasting within Nigerian industrial processes but highlights the need for localized data adjustments to improve accuracy. Localized datasets should be used to fine-tune model parameters, and further research is recommended to understand the specific dynamics affecting reliability in Nigerian settings. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geographic, Sub-Saharan, Time-series, Forecasting, Reliability, Control Systems, Methodology*

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