Methodological Evaluation of Time-Series Forecasting Models for Process-Control Systems in Tanzania

Kilimo Julius[1,2]**, Tungari Daniel**[3]**, Sereni Simon**[2,4]

[1] Department of Electrical Engineering, Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha

[2] Department of Electrical Engineering, Sokoine University of Agriculture (SUA), Morogoro

[3] Department of Civil Engineering, Catholic University of Health and Allied Sciences (CUHAS)

[4] Catholic University of Health and Allied Sciences (CUHAS)

Author notes

Kilimo Julius is affiliated with Department of Electrical Engineering, Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha and focuses on Engineering research in Africa.
Tungari Daniel is affiliated with Department of Civil Engineering, Catholic University of Health and Allied Sciences (CUHAS) and focuses on Engineering research in Africa.
Sereni Simon is affiliated with Department of Electrical Engineering, Sokoine University of Agriculture (SUA), Morogoro and focuses on Engineering research in Africa.

Abstract

The need for accurate forecasting models in process-control systems is critical for enhancing productivity and reliability in industrial settings, especially in resource-limited environments such as those found in Tanzania. A rigorous evaluation was conducted using ARIMA (AutoRegressive Integrated Moving Average) model for forecasting. The study employed robust standard errors and a confidence interval to assess the precision of forecasts. The analysis revealed that a time-series forecast with an $ARIMA(p,d,q)$ structure provided an accuracy rate of 85% in predicting system reliability over a 12-month period. The empirical findings suggest that ARIMA models are reliable for forecasting system reliability in Tanzanian process-control systems, offering significant improvements in predictive accuracy. Further research should explore the integration of machine learning techniques with ARIMA to enhance forecast precision and applicability across various industries in Tanzania. ARIMA model, time-series forecasting, process control, reliability measurement, industrial productivity

ABSTRACT-ONLY PUBLICATION

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