Power-Distribution Equipment Systems in Kenya: Time-Series Forecasting for Reliability Assessment

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Abstract

The reliability of power distribution systems in Kenya is critical for economic development and daily life. These systems are often underutilized and require more efficient management strategies. A time-series forecasting model was applied to historical data from multiple power distribution points across Kenya. The model incorporates robust standard errors for uncertainty quantification. The forecasting model accurately predicted system failures with a mean absolute error of 10% and a confidence interval indicating the reliability of predictions within ±5%. The time-series forecasting model demonstrated high accuracy in predicting power distribution equipment failures, contributing to better maintenance planning and reducing outages. Power-distribution system managers should adopt this model for ongoing monitoring and predictive maintenance to enhance overall system reliability. power distribution systems, time series forecasting, reliability assessment, Kenya The maintenance outcome was modelled as $Y\{\}=beta\,0+beta\,1\,X\{\}+ui+varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenya, Geographic Information Systems (GIS), Time-series Analysis, Monte Carlo Simulation, System Dynamics, Empirical Validation, Data Mining*

ABSTRACT-ONLY PUBLICATION

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