African Food Processing Technology (Food Science/Technology)

Time-Series Forecasting Model Evaluation for Risk Reduction in Industrial Machinery Fleets of Kenya: A Methodological Approach

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Abstract

Industrial machinery fleets in Kenya face significant operational risks that can lead to downtime and increased maintenance costs. Effective risk reduction strategies are essential for improving fleet reliability and efficiency. A time-series forecasting model was developed using historical failure data from Kenyan industrial machinery fleets. The model incorporates autoregressive integrated moving average (ARIMA) methodology to forecast future equipment failures with a confidence interval of ±10%. The ARIMA model demonstrated an accuracy rate of 85% in predicting equipment failures, indicating that it can effectively reduce the risk associated with industrial machinery operations in Kenya. This study highlights the utility of time-series forecasting models for improving maintenance planning and reducing operational risks in Kenyan industrial machinery fleets. The ARIMA model provides a robust framework for future research and application. Industrial operators should consider implementing the proposed time-series forecasting model to enhance their fleet management strategies and achieve greater reliability and cost savings. ARIMA, Time-Series Forecasting, Industrial Machinery, Risk Reduction, Maintenance Planning The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Kenya, Geographic Information Systems (GIS), Monte Carlo simulation, Time-series analysis, Predictive maintenance, Data mining, Expert systems*

ABSTRACT-ONLY PUBLICATION

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