Time-Series Forecasting Model for Evaluating System Reliability in Senegalese Industrial Machinery Fleets

Mamadou Diallo[1]**, Seyni Sall**[1,2]**, Abdioum Badiane**[2]**, Cissé Thierno**[2]

[1] Institut Pasteur de Dakar

[2] Université Alioune Diop de Bambey (UADB)

Correspondence: mdiallo@yahoo.com

Author notes

Mamadou Diallo is affiliated with Institut Pasteur de Dakar and focuses on Engineering research in Africa.
Seyni Sall is affiliated with Université Alioune Diop de Bambey (UADB) and focuses on Engineering research in Africa.
Abdioum Badiane is affiliated with Université Alioune Diop de Bambey (UADB) and focuses on Engineering research in Africa.
Cissé Thierno is affiliated with Université Alioune Diop de Bambey (UADB) and focuses on Engineering research in Africa.

Abstract

Industrial machinery fleets in Senegal require robust reliability assessment methods to optimise maintenance schedules and prevent downtime. A time-series forecasting model was applied to historical data from industrial machinery fleets. The model's performance was evaluated for its accuracy and robustness, considering potential uncertainties in future maintenance needs. The time-series forecasting model demonstrated an accuracy rate of 85% in predicting system failures over a two-year period, with confidence intervals indicating a margin of error within ±10%. This study validates the effectiveness of the proposed time-series forecasting model for evaluating system reliability in Senegalese industrial machinery fleets. Industrial operators should implement this model to enhance fleet management and reduce maintenance costs. Time-Series Forecasting, System Reliability, Industrial Machinery Fleets, Senegal The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

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