African Coastal Engineering

Time-Series Forecasting Model for Measuring Adoption Rates of Process-Control Systems in Senegal: A Methodological Evaluation

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Abstract

This report evaluates a time-series forecasting model to measure the adoption rates of process-control systems in Senegal. A time-series forecasting model was developed using data from Senegalese coastal engineering projects. The model incorporates ARIMA (AutoRegressive Integrated Moving Average) methodology, with uncertainty quantified by 95% confidence intervals. The forecasted adoption rates show a significant upward trend over the next five years, indicating increased deployment of process-control systems in Senegal's coastal areas. The developed model accurately predicts future adoption patterns based on historical data, providing valuable insights for policy and resource allocation in coastal engineering projects. Policy makers should consider implementing the forecasted results to guide investments and planning efforts in coastal infrastructure development. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, Africa, Networks, Stochastic, ARIMA, Empirical, Time-Periodicity*

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