



Time-Series Forecasting Model Evaluation for Yield Improvement in Senegalese Manufacturing Plants Systems

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Abstract

Manufacturing plants in Senegal are crucial for economic growth but often face challenges related to yield variability. A comprehensive evaluation of the manufacturing systems was conducted, employing advanced statistical techniques including ARIMA (AutoRegressive Integrated Moving Average) models for predictive analysis. The study aimed at identifying patterns and trends in yield data over multiple periods to inform future operational improvements. An empirical application of the ARIMA model demonstrated significant improvement in forecasting accuracy by around 20% compared to traditional methods, particularly evident in seasonal fluctuations of output yields from Senegalese plants. The study validated the effectiveness of ARIMA models for enhancing yield stability and efficiency in manufacturing systems within Senegal, offering a robust framework for future research and policy development. Further exploration into integrating machine learning algorithms could enhance predictive precision, while continuous monitoring and adaptation are essential to maintain optimal performance under varying conditions. Manufacturing Systems, Yield Forecasting, ARIMA Model, Time-Series Analysis, Senegal The empirical specification follows $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Sub-Saharan, African, Yield, Variability, Forecasting, Model, Evaluation

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