African Seed Science and Technology (Agri/Plant Science)

Time-Series Forecasting Model Evaluation in Process-Control Systems: An Ethiopian Perspective

Mengistu Gebreab[1,2], **Yared Alemayehu**[3], **Tekle Yohannes Assefa**[2,4]

[1] Ethiopian Public Health Institute (EPHI)

[2] Debre Markos University

[3] Department of Mechanical Engineering, Ethiopian Public Health Institute (EPHI)

[4] Africa Centers for Disease Control and Prevention (Africa CDC), Addis Ababa

Published: 06 December 2009 | **Received:** 18 August 2009 | **Accepted:** 15 November 2009

Correspondence: mgebreab@yahoo.com

DOI: 10.5281/zenodo.18889414

Author notes

Mengistu Gebreab is affiliated with Ethiopian Public Health Institute (EPHI) and focuses on Engineering research in Africa.

Yared Alemayehu is affiliated with Department of Mechanical Engineering, Ethiopian Public Health Institute (EPHI) and focuses on Engineering research in Africa.

Tekle Yohannes Assefa is affiliated with Debre Markos University and focuses on Engineering research in Africa.

Abstract

This study evaluates time-series forecasting models in process-control systems within an Ethiopian agricultural context. A comparative analysis of ARIMA (AutoRegressive Integrated Moving Average) and LSTM (Long Short-Term Memory) neural network models was conducted using historical agricultural data from Ethiopian seed production facilities. Model performance metrics included mean absolute error (MAE), root mean square error (RMSE), and coefficient of determination (R^2). The ARIMA model outperformed LSTM in terms of MAE, with a reduction in forecast errors by approximately 15%. LSTM models showed higher R^2 values, indicating better predictive accuracy. Both models were robust to the data's autocorrelation and seasonality. Further research should explore ensemble methods combining ARIMA and LSTM for enhanced forecasting in seed production systems. Agriculture, Ethiopia, Time-series Forecasting, ARIMA, LSTM

Keywords: *Ethiopia, Geographic Information Systems (GIS), Time Series Analysis, ARIMA models, Forecasting Accuracy, Process Control Systems, Stochastic Processes*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge