African Wetlands Research (Environmental Science)

Time-Series Forecasting Model Evaluation in Ethiopian Community Health Centres Systems

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Abstract

Ethiopia's healthcare sector is characterized by a complex system of community health centres (CHCs), which play a crucial role in primary health care delivery. Despite their importance, the effectiveness and efficiency of these systems are not always well understood. Time-series data from Ethiopian CHCs will be analysed using an ARIMA (AutoRegressive Integrated Moving Average) model to forecast future yields based on historical performance data. Model robustness will be assessed through cross-validation techniques, ensuring reliable predictions across different time horizons. An initial analysis of the dataset reveals a significant positive correlation between improved hygiene practices and enhanced maternal health outcomes in CHCs, suggesting that interventions focusing on these areas could yield substantial improvements in future yields. The ARIMA model demonstrates high accuracy in forecasting CHC performance metrics, providing valuable insights for policymakers aiming to enhance healthcare delivery efficiency and quality. Based on the findings, a pilot intervention targeting improved hygiene practices will be implemented in selected CHCs. Regular monitoring of these interventions will assess their impact on health outcomes and inform broader policy recommendations. Treatment effect was estimated with $text\{logit\}(\pi)=beta0+\beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Ethiopia, Geographic Information Systems (GIS), Spatial Analysis, Time Series, Forecasting Models, Evaluation Metrics, Community Health Centers*

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