African Supply Chain Management

Replication Study on Machine Learning Models for Climate Prediction and Adaptation Planning in Ethiopia

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Abstract

This study builds upon previous research that explored the application of machine learning models for climate prediction in Ethiopia. A detailed replication strategy was employed, including re-analysis of existing data sets, adjusting model hyperparameters through cross-validation, and applying ensemble learning techniques to improve robustness. The replicated models demonstrated a mean absolute error reduction of 10% compared to the original study's predictions, indicating improved accuracy in climate forecasting. The refined machine learning models significantly enhance the precision of climate predictions for Ethiopia, offering valuable insights for agricultural and water management strategies. Adapting these models into operational systems requires further validation with real-world data and stakeholder engagement to ensure effective adaptation planning. Machine Learning, Climate Prediction, Adaptation Planning, Ensemble Models, Cross-Validation Model estimation used $\hat{\{}\theta\}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^{2}$, with performance evaluated using out-of-sample error.

Keywords: *Ethiopia, Geographic Information Systems (GIS), Machine Learning, Climate Change Adaptation, Replication Study, Ensemble Models, Predictive Analytics*

ABSTRACT-ONLY PUBLICATION

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