African Management Information Systems (Business/ICT crossover)

Machine Learning Models in Climate Prediction and Adaptation Planning in Mozambique: A Comparative Analysis

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Abstract

Mozambique is a country heavily impacted by climate variability, necessitating robust prediction models for effective adaptation planning. A comparative analysis of different machine learning algorithms was conducted using historical climate data from Mozambique's meteorological station. The study identified that ensemble neural networks outperformed other models, achieving a mean absolute error (MAE) reduction by 15% compared to individual models. Machine learning models significantly improved climate prediction accuracy in Mozambique, with ensemble methods yielding the most reliable results. Adopting ensemble neural networks for climate predictions can facilitate more effective adaptation planning and resource allocation in Mozambique. Machine Learning, Climate Prediction, Adaptation Planning, Ensemble Neural Networks, Mozambique Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, Africa, Geospatial, Artificial Neural Networks, Spatial Statistics, Climate Indices, Machine Learning*

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