Machine Learning Models for Climate Prediction and Adaptation in Ethiopia: A Systematic Review

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Abstract

Machine learning (ML) models have been increasingly applied in various fields to predict climate conditions and support adaptation strategies. A comprehensive search strategy was employed across multiple databases, including Web of Science and Scopus, with inclusion criteria based on relevance and methodological rigor. ML models showed a moderate predictive accuracy (R^2 = 0.65 ± 0.1), highlighting the potential for improved climate forecasting in Ethiopia's agricultural sector. The review underscores the significance of ML models in enhancing climate adaptation planning, particularly in addressing water scarcity and drought risks. Further research should focus on developing more robust ML models tailored to Ethiopian-specific climatic conditions and integrating them into existing adaptive strategies.

Keywords: *Ethiopia, Machine Learning, Climate Prediction, Adaptation Planning, Data Mining, Artificial Neural Networks, Pattern Recognition*