African Pharmaceutical Regulatory Affairs

# Machine Learning Models for Climate Prediction and Adaptive Planning in Kenya

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## Abstract

Climate change has significant impacts on agriculture in Kenya, necessitating advanced predictive models for effective adaptation planning. The study employed a Random Forest model with historical weather data from the Meteorological Department of Kenya. Model validation was conducted using cross-validation techniques. The Random Forest model achieved an accuracy rate above 80% in predicting temperature and precipitation patterns, providing insights into climate variability. Machine learning models can effectively predict climate conditions in Kenya, aiding farmers in making informed decisions to enhance crop yields and reduce vulnerability to extreme weather events. Adopt the developed machine learning models for climate prediction within agricultural advisories and support services to promote sustainable farming practices. 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:** *African climates, Geographic Information Systems (GIS), Machine Learning, Predictive Models, Random Forest, Spatial Data Analysis, Weather Patterns*

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