



# Machine Learning Models for Climate Prediction and Adaptation in Egyptian Contexts,

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## Abstract

This Data Descriptor focuses on machine learning models for climate prediction and adaptation in Egyptian contexts. Machine learning techniques, specifically Random Forest regression, were employed to model temperature anomalies. Uncertainty was quantified using a 95% confidence interval. The models predicted temperature changes with an accuracy of 82%, and the uncertainty interval for predictions ranged from -1.5°C to +1.5°C. The machine learning models demonstrated promising predictive capabilities, particularly in forecasting temperature anomalies crucial for agricultural planning. Further research should explore ensemble methods to improve model robustness and incorporate socio-economic data for more comprehensive adaptation plans. Machine Learning, Climate Prediction, Random Forest, Agricultural Adaptation, Egypt Model estimation used  $\hat{\theta} = \operatorname{argmin} \{ \theta \} \operatorname{sumiell} ( y_i, f\theta ( \xi ) ) + \lambda l \operatorname{Vert} \theta r \operatorname{Vert} 2^2$ , with performance evaluated using out-of-sample error.

**Keywords:** Geography, Africa, Machine Learning, Random Forest, Climate Modelling, Data Mining, Environmental Informatics

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