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AI Diagnostic Algorithms in Resource-Constrained Healthcare: An Approach to Enhancing Disease Identification in Malawi Settings,

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Abstract

AI diagnostic algorithms have shown promise in enhancing disease identification in resource-constrained healthcare settings. In Malawi, where infrastructure and resources are limited, AI can play a crucial role in improving healthcare delivery. A machine learning approach was employed, specifically a Random Forest classifier, trained on a dataset of clinical records from six major hospitals in Malawi. The algorithm was fine-tuned to maximise sensitivity while maintaining acceptable specificity levels. The model achieved an accuracy rate of 78% with a precision of 90%, indicating high performance under limited resource conditions. This study demonstrates the feasibility and effectiveness of AI in disease diagnosis within Malawi's healthcare system, providing a robust tool for enhancing diagnostic capabilities. Further validation is required to ensure the algorithm's generalizability across different geographical regions and patient populations. Implementation strategies should also consider ethical considerations and local healthcare resource availability. 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: *African geography, machine learning, data analytics, predictive modelling, resource scarcity, healthcare informatics, algorithm validation*

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