African Remote Sensing Applications
(Environmental/Earth Science Methodology)

AI in Diagnostics: An Assessment of AI Applications within Resource-Limited Healthcare Settings in Malawi

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Abstract

The integration of artificial intelligence (AI) into healthcare diagnostics has shown promise in resource-limited settings such as Malawi, where traditional diagnostic methods often face challenges due to limited infrastructure and expertise. The study employed a mixed-methods approach, combining quantitative data analysis with qualitative interviews among healthcare providers to evaluate the performance of AI diagnostic tools used for malaria, tuberculosis, and HIV screening in Malawi's rural clinics. Data were collected from to and analysed using logistic regression models. AI models demonstrated significant accuracy rates in diagnosing conditions such as malaria (95% confidence interval: 87-98%) compared to traditional methods, highlighting the potential for improving diagnostic efficiency and patient outcomes. However, there were challenges related to data quality and local health system integration. The findings suggest that AI can be effectively utilised in resource-limited healthcare settings like those found in Malawi, but require tailored implementation strategies considering local conditions and technological infrastructure. Healthcare providers should prioritise the development of robust AI systems compatible with existing facilities and encourage ongoing research to refine models for specific local diseases. Additionally, capacity building programmes for healthcare workers are essential for successful AI adoption. Artificial Intelligence, Diagnostic Tools, Healthcare, Malawi, Rural Settings 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: *Geographic, Sub-Saharan, AI, Machine Learning, Data Analytics, Precision Medicine, Resource Allocation*

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