AI Diagnostics in Resource-Constrained Healthcare: A Comparative Exploration in Malawi's Urban Settings

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Abstract

AI diagnostics have shown promise in resource-constrained healthcare settings, particularly in rural areas where access to trained professionals is limited. In Malawi, urban healthcare systems face similar challenges with a high prevalence of infectious diseases and limited medical resources. The study employed a mixed-methods approach involving data collection from electronic medical records at three urban health clinics in Malawi: one public and two private. Data were analysed using machine learning algorithms to predict disease diagnoses with an accuracy rate of up to 85% (95% CI). AI models demonstrated a higher diagnostic accuracy in the public clinic, particularly for respiratory infections, suggesting that public clinics may benefit more from AI diagnostics due to their larger patient volume and varied case mix. The findings indicate that AI can complement traditional healthcare practices but require further refinement and validation before widespread adoption. The study highlights the need for tailored AI solutions addressing local healthcare needs and resource constraints. Public health authorities should prioritise training of AI diagnostic models on local data to enhance accuracy and relevance. Additionally, ongoing research into AI ethics and privacy is essential for ethical deployment in urban settings. AI diagnostics, Malawi, urban healthcare, machine learning, clinic performance 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: *Sub-Saharan, African, Machine, Learning, Data, Mining*

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