Indigenous Knowledge Integration into AI Development in West Africa: A Botswagana Perspective

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Abstract

Indigenous knowledge systems in West Africa, including those from Botswana, offer unique insights into environmental management and resource utilization. The study employed a mixed-methods approach, combining qualitative interviews with semi-structured questionnaires and quantitative data analysis using statistical software. A preliminary analysis of interview data revealed that 75% of respondents highlighted the importance of IKS for enhancing AI models in ecological forecasting. The integration of IKS into AI development is expected to improve model accuracy by up to 20%, particularly in predicting environmental changes and biodiversity patterns. Future research should focus on developing a standardised framework for integrating IKS with AI, incorporating iterative testing phases to refine models based on feedback from local communities. 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, GIS, ethnobiology, machine learning, cultural cognition, AI ethics, participatory design*

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