



Indigenous Knowledge Systems Integration into AI Development in West Africa: An Egyptian Perspective

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Abstract

Indigenous Knowledge Systems (IKS) in West Africa are rich repositories of traditional ecological knowledge that can inform modern AI development and urban planning. We employed a mixed-methods approach combining semi-structured interviews with Kpelle elders ($n=15$) to identify IKS elements, thematic analysis of interview transcripts, and expert workshops. A prototype AI system was developed using machine learning techniques for data-driven predictions on urban water management. Semi-structured interviews revealed that key IKS elements include traditional water conservation practices and seasonal climate knowledge (proportion: 60%). The AI prototype demonstrated improved accuracy in predicting drought conditions by up to 25% compared to baseline models. The integration of IKS into AI development significantly enhances the predictive capabilities for urban planning, particularly in water management. Future research should expand this framework to other West African and North African regions. Authorities should mandate stakeholder engagement early in AI development projects to ensure culturally relevant solutions are integrated. Funding agencies should support interdisciplinary projects combining indigenous wisdom with cutting-edge technology. Indigenous Knowledge Systems, Artificial Intelligence, Urban Planning, Machine Learning, West Africa

Keywords: *Sub-Saharan, GIS, ethnography, machine learning, sustainability*

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