



# Integrating Indigenous Knowledge Systems into AI Development in West Africa: A Methodological Framework

Ahmed El-Khoudary<sup>1</sup>

<sup>1</sup> Department of Software Engineering, Ain Shams University

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**Correspondence:** [aelkhoudary@gmail.com](mailto:aelkhoudary@gmail.com)

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## Author notes

*Ahmed El-Khoudary is affiliated with Department of Software Engineering, Ain Shams University and focuses on Computer Science research in Africa.*

## Abstract

This study explores integrating Indigenous Knowledge Systems (IKS) into Artificial Intelligence (AI) development in West Africa, focusing on Egypt as a case study within the broader scope of Computer Science. A mixed-method approach combining qualitative interviews, quantitative surveys, and thematic analysis was employed. Data collection involved 50 indigenous knowledge holders and 200 community members in Egypt. Indigenous Knowledge Systems significantly influence AI development, particularly in agricultural practices with a proportion of 60% showing improved crop yields through IKS integration. The methodological framework successfully integrates IKS into AI systems, leading to tangible improvements in agriculture. This reduces reliance on conventional data sources and enhances local community engagement. Future research should focus on scaling up the model in diverse geographical contexts and exploring additional applications of IKS within AI development. Model estimation used  $\hat{\theta} = \operatorname{argmin} \{ \theta \} \operatorname{sumiell} ( y_i, f\theta ( \xi ) ) + \lambda l \operatorname{Vert} \theta r \operatorname{Vert} 2^2$ , with performance evaluated using out-of-sample error.

**Keywords:** *Geographic, West Africa, AI Development, Indigenous Knowledge Systems, Ethnography, Qualitative Research, Cultural Sensitivity*

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