Indigenous Knowledge Systems Integration into AI Development in Nigeria: A West African Perspective

Oluwatobiloba Oyewumi[1,2]**, Sunday Adetimirin**[3,4]**, Adekunle Abiodun**[5]**, Funmilayo Fajara**[6,7]

[1] Department of Cybersecurity, Nnamdi Azikiwe University, Awka

[2] Department of Data Science, Babcock University

[3] National Institute for Medical Research (NIMR)

[4] Nnamdi Azikiwe University, Awka

[5] Department of Cybersecurity, National Institute for Medical Research (NIMR)

[6] Department of Software Engineering, Nnamdi Azikiwe University, Awka

[7] Department of Data Science, National Institute for Medical Research (NIMR)

Author notes

Oluwatobiloba Oyewumi is affiliated with Department of Cybersecurity, Nnamdi Azikiwe University, Awka and focuses on Computer Science research in Africa.

Sunday Adetimirin is affiliated with National Institute for Medical Research (NIMR) and focuses on Computer Science research in Africa.

Adekunle Abiodun is affiliated with Department of Cybersecurity, National Institute for Medical Research (NIMR) and focuses on Computer Science research in Africa.

Funmilayo Fajara is affiliated with Department of Software Engineering, Nnamdi Azikiwe University, Awka and focuses on Computer Science research in Africa.

Abstract

This study addresses a current research gap in Computer Science concerning Integrating Indigenous Knowledge Systems into AI Development in West Africa in Nigeria. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Integrating Indigenous Knowledge Systems into AI Development in West Africa, Nigeria, Africa, Computer Science, short report This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. 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: *Nigerian, GIS, ethnography, machine learning, ontology, cultural analytics, participatory design*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ REQUEST FULL PAPER

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa

Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge