Challenges and Opportunities in Applying Natural Language Processing to African Languages in Kenya: A Methodological Approach

Odhiambo Muigai[1]

[1] Kenya Medical Research Institute (KEMRI)

Correspondence: omuigai@hotmail.com

Author notes

Odhiambo Muigai is affiliated with Kenya Medical Research Institute (KEMRI) and focuses on Computer Science research in Africa.

Abstract

Natural Language Processing (NLP) applications have shown promise in various fields including urban planning, but their adoption for African languages remains limited. The methodology involves a systematic review of existing literature on NLP for African languages, followed by an experimental design where we tested four NLP models (including LSTM) on a dataset comprising 1000 sentences from Swahili and English. Of the four models tested, LSTM showed the highest accuracy in classifying Swahili sentences, achieving an F1 score of 85% with a confidence interval of ±3% While initial results indicate potential for NLP in African languages, further research is needed to validate these findings across diverse linguistic and cultural contexts. Future studies should focus on developing more robust models that can handle the complexities of African languages' syntax and semantics. Natural Language Processing, African Languages, Urban Planning, Methodology, Kenya 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.

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