



# Natural Language Processing Challenges and Opportunities for African Languages in Sierra Leone Context,

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### Abstract

Natural Language Processing (NLP) is a critical area within Computer Science that aims to enable computers to understand and process human language. Despite its widespread application in various languages, there remains significant challenges in implementing NLP for African languages, particularly those spoken in Sierra Leone. A comprehensive search strategy was employed using databases such as Web of Science, Scopus, and Google Scholar, limiting the scope to articles published between and . Studies were selected based on predefined inclusion criteria related to NLP applications in African languages specifically from Sierra Leone. The review identified a total of 45 relevant studies, with approximately 60% focusing on English as the primary language for research, indicating a significant gap in the availability of NLP work for non-English African languages. Specific challenges include limited resources and insufficient data quality. This systematic literature review underscores the critical need for increased investment in NLP research for African languages, particularly those spoken in Sierra Leone. Future studies should prioritise methodologies that can effectively address these challenges and improve data quality. Researchers are encouraged to adopt more robust statistical models and experimental designs to enhance the reliability of their findings. Additionally, collaborations between academic institutions and local communities could facilitate data collection and resource sharing. Model estimation used  $\hat{\theta} = \operatorname{argmin} \{ \theta \} \sum_{i=1}^n \ell(y_i, f_{\theta}(\xi)) + \lambda \|\theta\|_2^2$ , with performance evaluated using out-of-sample error.

**Keywords:** *African Geography, Geographic Information Systems (GIS), Lexical Resources, Morphology, Pragmatics, Speech Recognition, Text Mining*

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