Natural Language Processing Challenges and Opportunities in African Languages within Somalia's Educational Context

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Abstract

Natural Language Processing (NLP) is a field in Computer Science that aims to enable machines to understand and process human language as it appears in natural form. In Africa, languages are diverse, which poses significant challenges for NLP research and development. The methodology involves a comprehensive review of existing NLP studies on African languages with a focus on Somali. A qualitative analysis was conducted to identify common issues faced by researchers and educators alike. A significant challenge identified is the lack of standardised corpora in Somali, which impacts both training datasets for machine learning models and the development of natural language understanding systems. The findings highlight the critical need for more comprehensive linguistic resources to support NLP research in Somalia. This study contributes by identifying these gaps and proposing a framework for developing localized resources. Recommendations include the establishment of collaborative research projects between academic institutions and local educational authorities to develop robust Somali language corpora, thereby advancing NLP technology within the region. 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: *African Geographic Information Systems, Computational Linguistics, Diachronic Analysis, Grammatical Alignment, Morphology, Phonetics, Syntax*

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