

Budget-Xfer Framework for Cross-Lingual NER Accuracy in Low-Resource African Languages

Assignee Research

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Abstract

Cross-lingual transfer learning enables NLP for low-resource languages by leveraging labeled data from higher-resource sources, yet existing comparisons of source language selection strategies do not control for total training data, confounding language selection effects with data quantity effects. We introduce Budget-Xfer, a framework that formulates multi-source cross-lingual transfer as a budget-constrained resource allocation problem. Given a fixed annotation budget B , our framework jointly optimizes which source languages to include and how much data to allocate from each. We evaluate fou

1 Introduction

This paper examines: Budget-Xfer: Budget-Constrained Source Language Selection for Cross-Lingual Transfer to African Languages. Research question: Does the Budget-Xfer framework improve cross-lingual NER accuracy on low-resource African languages compared to single-source transfer when using a fixed annotation budget of 100k tokens?.

2 Methodology

Systematic literature search across multiple databases yielded 9 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.1/10.

3 Results

9 papers retrieved. 14 claims extracted; 9 independently verified. Quality review score: 7.1/10.

4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

5 Extracted Claims

Claim	Verified	Confidence
cosine_gap predicts cross-lingual transfer with a correlation coefficient (ρ) of 0.4–0.6.	×	0.10
The evaluation metric for NER is entity-level F1 (micro-averaged) computed with seqeval, requiring exact span and type m	✓	0.24
The evaluation metric for sentiment analysis is weighted F1 to account for class imbalance.	✓	0.18
Multi-source transfer significantly outperforms single-source transfer with Cohen’s d effect sizes ranging from 0.80 to	✓	0.24
The study evaluates four allocation strategies across named entity recognition and sentiment analysis for three African	✓	0.36
The All-from-Best strategy allocates the entire budget to the single most similar source.	×	0.14
The Top-K-Proportional strategy selects the K most similar sources and allocates proportionally to their similarity scor	✓	0.19
The Random-K strategy selects K sources uniformly at random with equal allocation.	×	0.14
The Diversity-Aware strategy modifies source selection to penalize redundancy among chosen sources.	✓	0.16
The Diversity-Aware strategy uses a diversity penalty parameter $\alpha = 0.5$.	×	0.09
The study uses 1,012 parallel sentences per language from FLORES-200 to compute pairwise similarities.	✓	0.17
The study evaluates on two standard NLP tasks for African languages: named entity recognition (NER) and sentiment analys	×	0.13
For NER, the study uses MasakhaNER 2.0, which provides entity-annotated data in 20 African languages with standard categ	✓	0.19
For sentiment analysis, the study uses AfriSenti, covering 14 African languages with three classes (positive, negative,	✓	0.20

References

- <http://arxiv.org/abs/2603.27651v1>
- <http://arxiv.org/abs/2501.18750v1>
- <http://arxiv.org/abs/2004.12440v2>