Subword Pooling Strategies and Zero-Shot Cross-Lingual NER Accuracy in Low-Resource African Languages

Assignee Research

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Abstract

Pre-trained multilingual language models (e.g., mBERT, XLM-RoBERTa) have significantly advanced the state-of-the-art for zero-shot cross-lingual information extraction. These language models ubiquitously rely on word segmentation techniques that break a word into smaller constituent subwords. Therefore, all word labeling tasks (e.g. named entity recognition, event detection, etc.), necessitate a pooling strategy that takes the subword representations as input and outputs a representation for the entire word. Taking the task of cross-lingual event detection as a motivating example, we show that

1 Introduction

This paper examines: Impact of Subword Pooling Strategy on Cross-lingual Event Detection. Research question: How does subword pooling strategy variation affect zero-shot cross-lingual named entity recognition accuracy for low-resource African languages in the XTREME benchmark?.

2 Methodology

Systematic literature search across multiple databases yielded 16 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.3/10.

3 Results

16 papers retrieved. 9 claims extracted; 9 independently verified. Quality review score: 8.3/10.

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
The canonical strategy of taking just the first subword to represent the entire word is usually sub-optimal.	✓	0.32
Attention pooling is robust to language and dataset variations by being either the best or close to the optimal strategy	✓	0.26
Attention pooling is usually the best or close to the optimal strategy.	✓	0.21
Attention pooling has the least inductive bias; the process of finding which subword is important is learnt in an end-to	✓	0.26
Variation across pooling strategies is higher for languages with high shattering rate.	✓	0.24
High variability is observed with high shattering rates.	✓	0.23
When using massively multilingual models such as XLM-RoBERTa, the choice of the pooling strategy can have a significant	✓	0.25
Across a diverse set of languages, attention-pooling works best and that the canonical strategy of first-subword pooling	✓	0.22
When using bilingual models, the cross-lingual performance is less sensitive to the pooling strategy.	✓	0.19

References

- http://arxiv.org/abs/2302.11365v2
- http://arxiv.org/abs/2509.14238v1
- http://arxiv.org/abs/2312.01306v1