Subword Tokenization Strategies in Cross-Lingual Retrieval for Kinyarwanda: mBERT Versus Monolingual RoBERTa on XTREME

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: What is the impact of subword tokenization strategies on the cross-lingual retrieval accuracy of mBERT versus monolingual RoBERTa variants for Kinyarwanda passages in the XTREME dataset?.

2 Methodology

Systematic literature search across multiple databases yielded 14 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

14 papers retrieved. 11 claims extracted; 10 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
The code for the study is available at https://github.com/isi-boston/ed-pooling.	✓	0.21
Attention pooling is usually the best or close to the optimal strategy across all the pooling strategies.	✓	0.22
Attention pooling has the least inductive bias among all the pooling strategies.	✓	0.17
Variation across pooling strategies is higher for languages with high shattering rate.	✓	0.24
High variability in performance is observed with high shattering rates.	✓	0.19
The choice of the pooling strategy can have a significant impact on the performance of cross-lingual event detection whe	✓	0.23
Attention-pooling works best across a diverse set of languages.	✓	0.16
The canonical strategy of first-subword pooling can be sub-optimal.	×	0.14
When using bilingual models, the cross-lingual performance is less sensitive to the pooling strategy.	✓	0.19

References

- `http://arxiv.org/abs/2408.10536v1`

- http://arxiv.org/abs/2010.12174v1
- http://arxiv.org/abs/2302.11365v2