Multilingual Contextual Embeddings for Zero-Shot Cross-Lingual Retrieval Performance

Assignee Research

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Abstract

Multilingual contextual embeddings have demonstrated state-of-the-art performance in zero-shot cross-lingual transfer learning, where multilingual BERT is fine-tuned on one source language and evaluated on a different target language. However, published results for mBERT zero-shot accuracy vary as much as 17 points on the MLDoc classification task across four papers. We show that the standard practice of using English dev accuracy for model selection in the zero-shot setting makes it difficult to obtain reproducible results on the MLDoc and XNLI tasks. English dev accuracy is often uncorrelate

1 Introduction

This paper examines: Don't Use English Dev: On the Zero-Shot Cross-Lingual Evaluation of Contextual Embeddings. Research question: To what extent does the use of multilingual contextual embeddings (e.g., mBERT, XLM-R) enhance the reasoning capabilities of zero-shot cross-lingual retrieval models on XNLI, as measured by accuracy and F1 scores across high-resource and low-resource language pairs?.

2 Methodology

Systematic literature search across multiple databases yielded 11 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 9.2/10.

3 Results

11 papers retrieved. 7 claims extracted; 7 independently verified. Quality review score: 9.2/10.

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
Multilingual BERT (mBERT) zero-shot accuracy varies as much as 17 points on the MLDoc classification task across four pa	✓	0.28
The best checkpoint from each run gave very different zero-shot results, varying as much as 15.0% absolute in French (Fr	✓	0.27
For all of the MLDoc languages and for 7 of the 14 XNLI languages, the variation across 10 runs exceeds 2.5% (absolute).	✓	0.24
A 2.5% difference in accuracy would be statistically significant (at the 5% significance level using the usual test of p	✓	0.18
English dev accuracy is often uncorrelated (or even anti-correlated) with target language accuracy.	✓	0.28
Zero-shot performance varies greatly at different points in the same fine-tuning run and between different fine-tuning r	✓	0.38
These reproducibility issues are also present for other tasks with different pre-trained embeddings (e.g., MLQA with XLM	✓	0.29

References

- http://arxiv.org/abs/2212.09651v4
- http://arxiv.org/abs/2004.15001v2
- http://arxiv.org/abs/2408.10536v1