Adversarial Training Effects on XLM-R Embedding Alignment and Zero-Shot Classification

Assignee Research

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Abstract

Pre-trained multilingual language encoders, such as multilingual BERT and XLM-R, show great potential for zero-shot cross-lingual transfer. However, these multilingual encoders do not precisely align words and phrases across languages. Especially, learning alignments in the multilingual embedding space usually requires sentence-level or word-level parallel corpora, which are expensive to be obtained for low-resource languages. An alternative is to make the multilingual encoders more robust; when fine-tuning the encoder using downstream task, we train the encoder to tolerate noise in the contex

1 Introduction

This paper examines: Improving Zero-Shot Cross-Lingual Transfer Learning via Robust Training. Research question: What is the impact of adversarial training on multilingual XLM-R's alignment quality in the embedding space, measured by cross-lingual similarity metrics, and how does this correlate with zero-shot classification accuracy on XTREME-R?.

2 Methodology

Systematic literature search across multiple databases yielded 13 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.8/10.

3 Results

13 papers retrieved. 11 claims extracted; 9 independently verified. Quality review score: 7.8/10.

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 cross-lingual transfer performance improves by 2.1 points on PAWS-X.	✓	0.16
The cross-lingual transfer performance improves by 1.6 points on XNLI.	×	0.13
Robust training remarkably improves generalized cross-lingual transfer.	✓	0.19
The code for the study is available at https://github.com/uclanlp/Robust-XLT.	✓	0.18
Multilingual BERT, XLM, and XLM-R are proposed for zero-shot cross-lingual transfer.	✓	0.18
XTREME and XGLUE provide benchmarks for zero-shot cross-lingual transfer learning.	✓	0.17
Learning to align embedding spaces is an important research topic to improve multilinguality.	✓	0.20
Most approaches for embedding space alignments require additional supervision signals.	×	0.11
Additional supervised corpora are usually expensive for low-resource languages.	✓	0.17
Some research focuses on making the model aware of embedding misalignment issues by considering additional syntactic fea	✓	0.19
Syntactic features require large amounts of data.	✓	0.15

References

- `http://arxiv.org/abs/2104.08645v2`
- `http://arxiv.org/abs/2105.02472v2`
- `http://arxiv.org/abs/2106.01732v2`