Cross-lingual dense retrieval training effects on zero-shot performance in low-resource languages

Assignee Research

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Abstract

In this paper, we analyze the capabilities of the multi-lingual Dense Passage Retriever (mDPR) for extremely low-resource languages. In the Cross-lingual Open-Retrieval Answer Generation (CORA) pipeline, mDPR achieves success on multilingual open QA benchmarks across 26 languages, of which 9 were unseen during training. These results are promising for Question Answering (QA) for low-resource languages. We focus on two extremely low-resource languages for which mDPR performs poorly: Amharic and Khmer. We collect and curate datasets to train mDPR models using Translation Language Modeling (TLM)

1 Introduction

This paper examines: What are the limits of cross-lingual dense passage retrieval for low-resource languages?. Research question: What is the impact of cross-lingual dense retrieval training on zero-shot performance for extremely low-resource languages in the CORA pipeline?.

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 7.3/10.

3 Results

13 papers retrieved. 10 claims extracted; 8 independently verified. Quality review score: 7.3/10.

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 multi-lingual Dense Passage Retriever (mDPR) achieves success on multilingual open QA benchmarks across 26 languages	✓	0.39
Of the 26 languages tested, 9 were unseen during the training of the mDPR model.	×	0.12
mDPR performs poorly on the extremely low-resource languages Amharic and Khmer.	✓	0.29
The authors collected and curated datasets to train mDPR models using Translation Language Modeling (TLM) and question–	✓	0.27
Experiments were conducted on the MKQA and AmQA datasets.	×	0.10
Language alignment brings improvements to mDPR for low-resource languages.	✓	0.30
The improvements gained from language alignment for low-resource languages are modest.	✓	0.17
Despite improvements from language alignment, retrieval results for low-resource languages remain low.	✓	0.22
Fulfilling CORA's promise to enable multilingual open QA in extremely low-resource settings is challenging because the m	✓	0.41
The code for the study is released at https://anonymous.4open.science/r/Question-Answering-for-Low-Resource-Languages-B1	✓	0.27

References

- https://doi.org/10.48550/arxiv.2408.11942
- https://doi.org/10.18653/v1/2024.findings-acl.137
- https://doi.org/10.48550/arxiv.2107.11976