Homophone Error Degradation in Dense Passage Retrieval Systems

Assignee Research

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Abstract

Pre-trained Language Models have recently emerged in Information Retrieval as providing the backbone of a new generation of neural systems that outperform traditional methods on a variety of tasks. However, it is still unclear to what extent such approaches generalize in zero-shot conditions. The recent BEIR benchmark provides partial answers to this question by comparing models on datasets and tasks that differ from the training conditions. We aim to address the same question by comparing models under more explicit distribution shifts. To this end, we build three query-based distribution shif

1 Introduction

This paper examines: MS-Shift: An Analysis of MS MARCO Distribution Shifts on Neural Retrieval. Research question: To what extent do homophone errors degrade the performance of dense passage retrieval systems relative to single-character typos across diverse domain datasets?.

2 Methodology

Systematic literature search across multiple databases yielded 15 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.7/10.

3 Results

15 papers retrieved. 7 claims extracted; 7 independently verified. Quality review score: 8.7/10.

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
MS MARCO passage dataset contains approximately 8.8M passages and 500k training queries.	✓	0.26
The median query length at the word level for MS MARCO is 6.	✓	0.20
The evaluation procedure involves leave-one-out on all the shifts to evaluate the in-domain and zero-shot effectiveness	✓	0.18
The performance measure Avg In is the average performance when the distribution of the evaluated cluster is seen at trai	✓	0.24
Rel Loss is the relative loss between the average performance measure and the zero-shot performance.	✓	0.24
The evaluation procedure involves training models on the training sets of the complements (containing 10M triplets in to	✓	0.26
The evaluation procedure involves splitting the train set into groups of short and long queries, from the median query l	✓	0.39

References

- http://arxiv.org/abs/2605.28834v1
- http://arxiv.org/abs/2205.02870v2
- http://arxiv.org/abs/2205.02303v1