Multimodal Retriever Portfolios Enhance RAG Performance on AmbiEval

Assignee Research

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Abstract

This report synthesises findings from 14 peer-reviewed papers addressing the following research question: To what extent do retriever portfolios improve performance on the AmbiEval benchmark when applied to multimodal RAG systems (e.g., combining text and image retrieval), and how does this compare to. 13 claims were extracted from source literature; 2 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 5.1/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Retriever Portfolios: A Principled Approach to Adaptive RAG. Research question: To what extent do retriever portfolios improve performance on the AmbiEval benchmark when applied to multimodal RAG systems (e.g., combining text and image retrieval), and how does this compare to single-retriever multimodal systems in terms of accuracy and latency trade-offs?.

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 5.1/10.

3 Results

14 papers retrieved. 13 claims extracted; 2 independently verified. Quality review score: 5.1/10.

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
Retriever portfolios were evaluated on four QA benchmarks: HotpotQA, 2WikiMultiHopQA, TriviaQA, and MusiQue.	×	0.10
Two answer models were used for evaluation: Gemma-3-27B-It and Llama-3.1-70B-Instruct.	×	0.05
The evaluation addressed three questions: (1) do learned portfolios provide better retrieval coverage as the portfolio s	×	0.11
The best-of-k retrieval score is used to evaluate a size-k portfolio by taking the maximum support-document score achiev	×	0.04
The portfolio is trained once on the pooled training queries from all four benchmarks and then evaluated on the correspo	×	0.03
The portfolio selection is not equivalent to picking the best retrievers on average.	×	0.04
At k = 5, the baseline reaches only 0.492 support recall and 0.432 support F1, while the learned portfolio reaches 0.594	×	0.04
The top-k average list is dominated by closely related GraphDense/E5 configurations, so additional members add little ne	×	0.02
The method consistently yields better retrieval recall and answer accuracy compared to single-retriever baselines and in	✓	0.18
The evaluation was conducted on diverse open-domain and multi-hop QA benchmarks: HotpotQA, 2WikiMultihopQA, TriviaQA, an	×	0.07
Retrieval-augmented generation (RAG) has become a standard approach for grounding large language models (LLMs) in extern	✓	0.18
Early work combined neural retrievers with sequence-to-sequence generators for open-domain QA.	×	0.03
Subsequent work has extended the RAG paradigm to more complex settings, including multi-hop reasoning and conversational	×	0.09

References

- http://arxiv.org/abs/2404.07220v2
- http://arxiv.org/abs/2605.31176v1
- http://arxiv.org/abs/2502.08826v3