RankArena Multi-Perspective Evaluation for Hallucination Detection in Cross-Domain Retrieval Versus Single-Metric Baselines

Assignee Research

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Abstract

Evaluating the quality of retrieval-augmented generation (RAG) and document reranking systems remains challenging due to the lack of scalable, user-centric, and multi-perspective evaluation tools. We introduce RankArena, a unified platform for comparing and analysing the performance of retrieval pipelines, rerankers, and RAG systems using structured human and LLM-based feedback as well as for collecting such feedback. RankArena supports multiple evaluation modes: direct reranking visualisation, blind pairwise comparisons with human or LLM voting, supervised manual document annotation, and end-

1 Introduction

This paper examines: RankArena: A Unified Platform for Evaluating Retrieval, Reranking and RAG with Human and LLM Feedback. Research question: To what extent does RankArena's multi-perspective evaluation framework improve the detection of hallucination failure modes in cross-domain retrieval tasks compared to single-metric baselines?.

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. 10 claims extracted; 10 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
RankArena captures fine-grained relevance feedback through both pairwise preferences and full-list annotations, along wi	✓	0.39
The platform integrates LLM-as-a-judge evaluation, enabling comparison between model-generated rankings and human ground	✓	0.33
All interactions are stored as structured evaluation datasets that can be used to train rerankers, reward models, judgme	✓	0.34
RankArena is publicly available at https://rankarena.ngrok.io/.	✓	0.20
RankArena features five complementary evaluation modes: Reranker Comparison, Manual Annotation, LLM Judgment, RAG, and D	✓	0.22
RankArena supports retrieval-specific evaluations unlike previous works that focus solely on chatbot alignment or answer	✓	0.22
The platform allows users to directly examine how a specific reranker orders documents for a given query.	✓	0.26
The full-list annotation mode involves users providing a query (or selecting one), after which the system retrieves docu	✓	0.28
Users manually reorder or assign relevance grades to documents, creating high-quality listwise supervision data.	✓	0.21
This annotated data can be used to train supervised rerankers, listwise ranking models, or reward models for preference	✓	0.20

References

- http://arxiv.org/abs/2508.05512v1
- http://arxiv.org/abs/2606.06959v1
- http://arxiv.org/abs/2402.12317v2