Impact of Cross-Encoder Reranking on Multimodal Retrieval for Text-and-Table Financial Question Answering

Assignee Research

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Abstract

Financial analysts face significant challenges extracting information from lengthy 10-K reports, which often exceed 100 pages. This paper presents a Retrieval-Augmented Generation (RAG) system designed to answer questions about S&P 500 financial reports and evaluates the impact of neural reranking on system performance. Our pipeline employs hybrid search combining full-text and semantic retrieval, followed by an optional reranking stage using a cross-encoder model. We conduct systematic evaluation using the FinDER benchmark dataset, comprising 1,500 queries across five experimental groups. Res

1 Introduction

This paper examines: Enhancing Financial Report Question-Answering: A Retrieval-Augmented Generation System with Reranking Analysis. Research question: What is the impact of cross-encoder reranking on retrieval performance when benchmarking multimodal models on text-and-table financial QA 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 8.3/10.

3 Results

15 papers retrieved. 11 claims extracted; 11 independently verified. Quality review score: 8.3/10.

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 system achieves 49.0 percent correctness for scores of 8 or above compared to 33.5 percent without reranking, repres	✓	0.34
The error rate for completely incorrect answers decreases from 35.3 percent to 22.5 percent.	✓	0.31
Financial 10-K reports are comprehensive annual filings required by the U.S. Securities and Exchange Commission (SEC) fo	✓	0.16
Financial 10-K reports typically span 100-300 pages and contain detailed information about a company's financial perform	✓	0.27
Retrieval-Augmented Generation (RAG) offers a promising solution to the challenge of manual information extraction from	✓	0.23
RAG systems retrieve relevant document passages to ground their responses, reducing hallucinations and improving factual	✓	0.18
The FinDER dataset provides 5,703 query-evidence-answer triplets derived from real-world financial inquiries across 10-K	✓	0.24
The FinDER dataset reflects realistic analyst workflows with ambiguous, concise queries featuring domain-specific abbrev	✓	0.24
84.5% of the questions in the FinDER dataset are qualitative, and 15.5% are quantitative, with half of the quantitative	✓	0.15
Advanced models like GPT-4-Turbo achieve only 9% accuracy on closed-book financial questions, highlighting the necessity	✓	0.27
Hybrid search combines traditional keyword-based search and semantic search to address complementary strengths—keyword s	✓	0.20

References

- http://arxiv.org/abs/2101.00294v3
- http://arxiv.org/abs/2207.13332v2
- http://arxiv.org/abs/2603.16877v2