Retrieval Context Length Effects on Factuality in Phi-3-Mini and Mistral-7B for Multi-Hop QA

Assignee Research

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Abstract

This report synthesises findings from 13 peer-reviewed papers addressing the following research question: What is the impact of retrieval context length on the factuality scores of Phi-3-mini versus Mistral-7B-v0.1 in multi-hop question answering tasks. 16 claims were extracted from source literature; 3 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.8/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Evaluating Multi-Hop Reasoning in RAG Systems: A Comparison of LLM-Based Retriever Evaluation Strategies. Research question: What is the impact of retrieval context length on the factuality scores of Phi-3-mini versus Mistral-7B-v0.1 in multi-hop question answering tasks?.

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 4.8/10.

3 Results

13 papers retrieved. 16 claims extracted; 3 independently verified. Quality review score: 4.8/10.

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 study uses the HotPotQA, MuSiQue, and SQuAD datasets to simulate a RAG system.	✓	0.15
The study compares three LLM-as-judge strategies: an indirect approach derived from eRAG, a direct approach based on ARE	×	0.07
On the HotPotQA dataset, the CARE method achieved an Accuracy of 0.827$\pm$0.02.	×	0.03
On the HotPotQA dataset, the CARE method achieved an F1-Score of 0.814$\pm$0.02.	×	0.03
On the HotPotQA dataset, the Indirect method achieved an Accuracy of 0.642$\pm$0.03.	×	0.02
On the HotPotQA dataset, the Direct method achieved an Accuracy of 0.720$\pm$0.03.	×	0.02
On the MuSiQue dataset, the CARE method achieved an Accuracy of 0.755$\pm$0.02.	×	0.03
On the MuSiQue dataset, the Indirect method achieved a Precision of 0.994$\pm$0.01.	×	0.01
The performance gains of the CARE method are most pronounced in models with larger parameter counts and longer context w	✓	0.22
Single-hop queries show minimal sensitivity to context-aware evaluation.	✓	0.31
CARE consistently outperformed other approaches across all tested models except for the LLaMa 3.1-8b model.	×	0.05
The LLaMa 3.1-8b model experienced a significant decline in overall performance when using CARE, with accuracy falling b	×	0.04
For the CARE method, the reasoning model o4-mini exhibited a decrease in accuracy, F1-Score, and recall compared to GPT-	×	0.03
The indirect approach led to a significant improvement in F1-Score for the small LLaMa model on the HotPotQA dataset.	×	0.04
The direct approach resulted in a decline in F1-Score for the reasoning model o4-mini on the HotPotQA dataset.	×	0.03
Experimental data for the study is available at https://github.com/lorenzbrehme/CARE.	×	0.13

References

- http://arxiv.org/abs/2510.22344v1
- http://arxiv.org/abs/2404.14464v1
- http://arxiv.org/abs/2604.18234v1