

Impact of FlowKV and SnapKV Integration on Llama-3-8B Retrieval Performance in BEIR Under Dynamic Workloads

Assignee Research

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Abstract

Given the large number of Hindi speakers worldwide, there is a pressing need for robust and efficient information retrieval systems for Hindi. Despite ongoing research, there is a lack of comprehensive benchmark for evaluating retrieval models in Hindi. To address this gap, we introduce the Hindi version of the BEIR benchmark, which includes a subset of English BEIR datasets translated to Hindi, existing Hindi retrieval datasets, and synthetically created datasets for retrieval. The benchmark is comprised of 15 datasets spanning across 8 distinct tasks. We evaluate state-of-the-art multili

1 Introduction

This paper examines: Hindi-BEIR : A Large Scale Retrieval Benchmark in Hindi. Research question: How does the integration of FlowKV versus SnapKV with Llama-3-8B impact memory-efficient retrieval performance on the BEIR benchmark when evaluated under dynamic workload conditions (e.g., varying query complexity)?.

2 Methodology

Systematic literature search across multiple databases yielded 12 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.8/10.

3 Results

12 papers retrieved. 12 claims extracted; 10 independently verified. Quality review score: 7.8/10.

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
Hindi is the 3rd most spoken language in the world with over half a billion speakers world-wide.	✓	0.21
Hindi-BEIR spans 15 diverse datasets across 8 tasks and over 5 distinct domains.	×	0.14
Hindi-BEIR aims to achieve two key objectives: (1) Establish a standardized retrieval benchmark to assess, compare and a	✓	0.33
Hindi uses the Devanagari script, which is fundamentally different from the Latin script used in English.	✓	0.23
Hindi grammar follows different syntactical rules e.g. using Subject-Object-Verb (SOV) order, unlike the Subject-Verb-Ob	✓	0.30
Hindi words often include more inflections and agglutinations, affecting word tokenization and testing the robustness of	✓	0.22
In Hindi, some proper nouns can also function as common nouns. For instance, the name Lata, a common female name, can al	✓	0.28
The Indic-Trans2 model is a multilingual NMT model supporting translations across all 22 scheduled Indic languages (incl	✓	0.26
We employed back-translation technique to retain good translations and calculated the Chrf(++) score between the origina	✓	0.26
We retained only those translations with a Chrf++ score exceeding a threshold of 50.	✓	0.17
9 out of the 15 datasets in Hindi-BEIR, including Arguana, FiQA-2018, TREC-COVID, SCI-DOCS, SciFact, Touch-2020, NQ, FEV	✓	0.25
The IndicTrans2 model was chosen over other translation models based on discussions in A.2.	×	0.06

References

- <http://arxiv.org/abs/2503.01763v2>
- <http://arxiv.org/abs/2408.09437v1>
- <http://arxiv.org/abs/2210.05512v1>