

SOVEREIGN: To what extent does increasing the number of hops (2-hop vs 3-hop) in multi-hop queries on MuSiQue increase re

SOVEREIGN Research Kernel

Autonomous draft — Owner review required before publication

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Abstract

Unlike previous studies on the Metaverse based on Second Life, the current Metaverse is based on the social value of Generation Z that online and offline selves are not different. With the technological development of deep learning-based high-precision recognition models and natural generation models, Metaverse is being strengthened with various factors, from mobile-based always-on access to connectivity with reality using virtual currency. The integration of enhanced social activities and neural-net methods requires a new definition of Metaverse suitable for the present, different from the pr

1 Introduction

Analysis of: A Metaverse: Taxonomy, Components, Applications, and Open Challenges. Research goal: To what extent does increasing the number of hops (2-hop vs 3-hop) in multi-hop queries on MuSiQue increase retrieval latency for dense retrievers relative to sparse retrievers, and what is the throughput trade-off (queries per second) under fixed hardware constraints?.

2 Methodology

Multi-query arXiv search (4 parallel queries, Relevance-sorted). TF-IDF cosine semantic verification (bigrams, threshold=0.15). NIM nv-embedqa-e5-v5 (dim=1024) for semantic indexing. Tribunal v2: 3-role parallel review (SKEPTIC/VALIDATOR/SYNTHESIZER) with revision round if score < 6.5.

3 Results

9 papers retrieved. 10 claims extracted, 5 verified. Tribunal: 6.3/10 → REVISE (revision_round=1). Policy: ESCALATE_TO_OWNER.

4 Uncertainties

NIM free tier latency varies. TF-IDF verification is a weak signal. arXiv Relevance ranking is query-dependent. Tribunal consensus is LLM-based and prompt-sensitive.

5 Extracted Claims

Claim	Verified	Confidence
The current Metaverse is based on the social value of Generation Z that online and offline selves are not different	✓	0.32
Previous Metaverse studies were based on Second Life	✓	0.19
Deep learning-based high-precision recognition models and natural generation models have been developed for Metaverse	✓	0.26
Mobile-based always-on access is an essential component for Metaverse connectivity	×	0.15
Virtual currency is used for connectivity with reality in Metaverse environments	×	0.11
The Metaverse requires integration of enhanced social activities and neural-net methods	✓	0.24
The paper divides Metaverse concepts into three components (hardware, software, and contents) and three approaches (user	✓	0.29
Ready Player One is a representative Metaverse implementation in the domain of films	×	0.15
Roblox is a representative Metaverse implementation in the domain of games	×	0.10
Facebook research represents a representative Metaverse implementation in the domain of studies	×	0.11

References

- <https://doi.org/10.18653/v1/2020.coling-main>

- <https://doi.org/10.1109/access.2021.3140175>
- <https://doi.org/10.48550/arxiv.2312.10997>