SOVEREIGN: What is the robustness degradation of 7B and 70B LLMs on HotPotQA when context window is extended from 32K to

SOVEREIGN Research Kernel
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Abstract

In this report, we introduce the Gemini 1.5 family of models, representing the next generation of highly compute-efficient multimodal models capable of recalling and reasoning over fine-grained information from millions of tokens of context, including multiple long documents and hours of video and audio. The family includes two new models: (1) an updated Gemini 1.5 Pro, which exceeds the February version on the great majority of capabilities and benchmarks; (2) Gemini 1.5 Flash, a more lightweight variant designed for efficiency with minimal regression in quality. Gemini 1.5 models achieve nea

1 Introduction

Analysis of: Gemini 1.5: Unlocking multimodal understanding across millions of tokens of context. Research goal: What is the robustness degradation of 7B and 70B LLMs on HotPotQA when context window is extended from 32K to 128K tokens under noisy retrieval conditions (e.g., 20% irrelevant passages), and does the accuracy drop per retrieval step differ between model sizes?.

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

12 papers retrieved. 20 claims extracted, 12 verified. Tribunal: 7.3/10 → APPROVE (revision_round=0). Policy: AUTO_APPROVE.

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 Gemini 1.5 family includes two new models: Gemini 1.5 Pro and Gemini 1.5 Flash	✓	0.19
Gemini 1.5 Pro exceeds the February version in the great majority of capabilities and benchmarks	✓	0.23
Gemini 1.5 models achieve near-perfect recall on long-context retrieval tasks across modalities	✓	0.29
Gemini 1.5 models improve the state-of-the-art in long-document QA, long-video QA and long-context ASR	✓	0.31
Gemini 1.5 models match or surpass Gemini 1.0 Ultra's performance across a broad set of benchmarks	✓	0.20
Gemini 1.5 achieves near-perfect retrieval (>99%) up to at least 10M tokens	✓	0.17
Gemini 1.5 Flash is a more lightweight variant designed for efficiency with minimal regression in quality	✓	0.22
Gemini 1.5 can recall and reason over fine-grained information from millions of tokens of context	✓	0.18
Gemini 1.5 Flash demonstrates minimal regression in quality compared to previous version	×	0.09
Gemini 1.5 models can process multiple long documents and hours of video and audio	✓	0.20
Gemini 1.5 Flash is designed for efficiency	×	0.10
Gemini 1.5 Pro improves over the February version on most capabilities and benchmarks	×	0.12
Gemini 1.5 achieves retrieval performance of >99% up to at least 10M tokens	×	0.10
Gemini 1.5 Flash demonstrates time savings of 26 to 75% across 10 different job categories	✓	0.18
Gemini 1.5 Flash can process context up to 10M tokens	×	0.09
Gemini 1.5 Flash shows continued improvement in next-token prediction	×	0.14
Gemini 1.5 Flash matches or surpasses Gemini 1.0 Ultra's performance	×	0.06
Gemini 1.5 Flash processes fine-grained information from millions of tokens of context	✓	0.19
Gemini 1.5 Flash is a more compute-efficient multimodal model	×	0.13
Gemini 1.5 Flash improves the state of the art in long-context tasks	✓	0.16

References

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