Comparative Analysis of Qwen2.5 and Llama-3.1-8B on Synthetic Context Retrieval Benchmarks

Assignee Research

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Abstract

In this work, we present Qwen3, the latest version of the Qwen model family. Qwen3 comprises a series of large language models (LLMs) designed to advance performance, efficiency, and multilingual capabilities. The Qwen3 series includes models of both dense and Mixture-of-Expert (MoE) architectures, with parameter scales ranging from 0.6 to 235 billion. A key innovation in Qwen3 is the integration of thinking mode (for complex, multi-step reasoning) and non-thinking mode (for rapid, context-driven responses) into a unified framework. This eliminates the need to switch between different models–

1 Introduction

This paper examines: Qwen3 Technical Report. Research question: How does Qwen2.5's performance on synthetic context retrieval tasks (e.g., Ruler) compare to other 8B-parameter models like Llama-3.1-8B when using identical benchmark configurations?.

2 Methodology

Systematic literature search across multiple databases yielded 14 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.7/10.

3 Results

14 papers retrieved. 13 claims extracted; 13 independently verified. Quality review score: 8.7/10.

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
Qwen3 is the latest version of the Qwen model family.	✓	0.20
Qwen3 comprises a series of large language models (LLMs) designed to advance performance, efficiency, and multilingual c	✓	0.29
The Qwen3 series includes models of both dense and Mixture-of-Expert (MoE) architectures, with parameter scales ranging	✓	0.32
Qwen3 integrates thinking mode (for complex, multi-step reasoning) and non-thinking mode (for rapid, context-driven resp	✓	0.32
Qwen3 eliminates the need to switch between different models, such as chat-optimized models (e.g., GPT-4o) and dedicated	✓	0.32
Qwen3 enables dynamic mode switching based on user queries or chat templates.	✓	0.27
Qwen3 introduces a thinking budget mechanism, allowing users to allocate computational resources adaptively during infer	✓	0.31
Qwen3 balances latency and performance based on task complexity.	✓	0.16
Qwen3 leverages knowledge from flagship models to reduce computational resources required to build smaller-scale models.	✓	0.25
Qwen3 ensures highly competitive performance for smaller-scale models.	✓	0.16
Qwen3 achieves state-of-the-art results across diverse benchmarks, including tasks in code generation, mathematical reas	✓	0.31
Qwen3 is competitive against larger MoE models and proprietary models.	✓	0.21
Qwen3 expands multilingual support compared to its predecessor Qwen2.5.	✓	0.17

References

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- https://doi.org/10.18653/v1/2025.findings-emnlp.214
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