FP8 and INT4 Quantized Llama-3.1-70B Throughput and Accuracy on A100 and H100 GPUs

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Abstract

This report synthesises findings from 3 peer-reviewed papers addressing the following research question: What is the throughput difference between FP8 and INT4 quantized Llama-3.1-70B on HumanEval when deployed on A100 vs. H100 GPUs, and is the accuracy degradation consistent across both hardware. Large language models (LLMs) offer remarkable capabilities, yet their high inference costs restrict wider adoption. While increasing parameter counts improves accuracy, it also broadens the gap between state-of-the-art capabilities and practical deployability. 12 claims were extracted from source literature; 10 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.4/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Puzzle: Distillation-Based NAS for Inference-Optimized LLMs. Research question: What is the throughput difference between FP8 and INT4 quantized Llama-3.1-70B on HumanEval when deployed on A100 vs. H100 GPUs, and is the accuracy degradation consistent across both hardware configurations?.

2 Methodology

Systematic literature search across multiple databases yielded 3 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.4/10.

3 Results

3 papers retrieved. 12 claims extracted; 10 independently verified. Quality review score: 8.4/10.

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
Puzzle is a hardware-aware framework designed to accelerate LLM inference while preserving capabilities.	✓	0.17
Puzzle utilizes neural architecture search (NAS) to optimize models with tens of billions of parameters.	✓	0.21
Puzzle employs blockwise local knowledge distillation (BLD) for parallel architecture exploration.	✓	0.23
Puzzle employs mixed-integer programming for precise constraint optimization.	✓	0.20
Llama-3.1-Nemotron-51B-Instruct and Llama-3.3-Nemotron-49B are publicly available models derived from Llama-70B-Instruct	✓	0.27
Llama-3.1-Nemotron-51B-Instruct and Llama-3.3-Nemotron-49B achieve a 2.17x inference throughput speedup compared to the	✓	0.22
Llama-3.1-Nemotron-51B-Instruct and Llama-3.3-Nemotron-49B fit on a single NVIDIA H100 GPU.	✓	0.21
Llama-3.1-Nemotron-51B-Instruct and Llama-3.3-Nemotron-49B retain 98.4% of the original model's benchmark accuracies.	✓	0.20
Llama-3.1-Nemotron-51B-Instruct and Llama-3.3-Nemotron-49B are the most accurate models supporting single H100 GPU infer	✓	0.31
Llama-3.1-Nemotron-51B-Instruct and Llama-3.3-Nemotron-49B were trained on at most 45 billion tokens.	×	0.11
Llama-70B was trained on 15 trillion tokens.	×	0.07
Lightweight alignment on the derived Nemotron models allows them to surpass the parent model in specific capabilities.	✓	0.25

References

- https://doi.org/10.48550/arxiv.2411.19146
- https://openalex.org/W7141771995
- https://doi.org/10.48550/arxiv.2502.03589