Quantized LLaVA-UHD and LLaVA-1.5 Inference Latency on Ultra-High-Resolution Multimodal Benchmarks

Assignee Research

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Abstract

This report synthesises findings from 16 peer-reviewed papers addressing the following research question: How does the inference latency of quantized LLaVA-UHD compare to LLaVA-1.5 when processing ultra-high-resolution images (e.g., 4K) across multimodal benchmarks like MMBench or SEED-Bench. The advent of real-time large multimodal models (LMMs) like GPT-4o has sparked considerable interest in efficient LMMs. LMM frameworks typically encode visual inputs into vision tokens (continuous representations) and integrate them and textual instructions into the context of. 13 claims were extracted from source literature; 2 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 6.0/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: LLaVA-Mini: Efficient Image and Video Large Multimodal Models with One Vision Token. Research question: How does the inference latency of quantized LLaVA-UHD compare to LLaVA-1.5 when processing ultra-high-resolution images (e.g., 4K) across multimodal benchmarks like MMBench or SEED-Bench?.

2 Methodology

Systematic literature search across multiple databases yielded 16 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 6.0/10.

3 Results

16 papers retrieved. 13 claims extracted; 2 independently verified. Quality review score: 6.0/10.

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
LLaVA-Mini uses 1 vision token per image, whereas LLaVA-v1.5 uses 576 vision tokens.	✓	0.16
LLaVA-Mini achieves a vision token compression rate of 0.17% compared to LLaVA-v1.5.	×	0.12
LLaVA-Mini reduces FLOPs by 77% compared to LLaVA-v1.5.	×	0.06
LLaVA-Mini reduces GPU memory usage per image from 360 MB to 0.6 MB.	×	0.03
LLaVA-Mini decreases image understanding inference latency from 100 ms to 40 ms.	×	0.05
LLaVA-Mini enables processing of long videos exceeding 10,000 frames (over 3 hours) on an NVIDIA RTX 3090 with 24GB of m	×	0.03
LLaVA-Mini was evaluated on 11 image-based and 7 video-based understanding benchmarks.	×	0.15
LLaVA-Mini achieves performance comparable to LLaVA-v1.5 across the evaluated benchmarks.	×	0.06
In LLaVA architectures, attention devoted to vision tokens decreases sharply as layers deepen, shifting towards input in	×	0.08
LLaVA-Mini retains certain visual understanding capabilities even when vision tokens are entirely removed in later layer	×	0.13
LLaVA-Mini introduces a modality pre-fusion module before the LLM to fuse visual information into instruction text.	✓	0.23
LLaVA-v1.5 uses a Vicuna-7B backbone with an input resolution of 336.	×	0.06
LLaVA-Mini is 2.92 times faster than LLaVA-v1.5.	×	0.06

References

- https://arxiv.org/abs/2501.03895
- https://arxiv.org/abs/2512.01949
- http://arxiv.org/abs/2403.11703v1