Alignment Techniques Impact on LLM Inference Efficiency and Reasoning Quality

Assignee Research

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Abstract

This report synthesises findings from 10 peer-reviewed papers addressing the following research question: How do different alignment techniques (e.g., RLHF, DPO) affect the inference efficiency (tokens/sec) and output quality (measured by AlignBench scores) of LLMs on long-horizon reasoning tasks. Large language models (LLMs) have demonstrated impressive capabilities in natural language processing. However, their internal mechanisms are still unclear and this lack of transparency poses unwanted risks for downstream applications. 4 claims were extracted from source literature; 4 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.7/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Explainability for Large Language Models: A Survey. Research question: How do different alignment techniques (e.g., RLHF, DPO) affect the inference efficiency (tokens/sec) and output quality (measured by AlignBench scores) of LLMs on long-horizon reasoning tasks?.

2 Methodology

Systematic literature search across multiple databases yielded 10 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

10 papers retrieved. 4 claims extracted; 4 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
Large language models (LLMs) have demonstrated impressive capabilities in natural language processing	✓	0.30
Understanding and explaining these models is crucial for elucidating their behaviors, limitations, and social impacts	✓	0.27
Explainability techniques can be categorized based on the training paradigms of LLMs: traditional fine-tuning-based para	✓	0.33
Traditional fine-tuning-based paradigm and prompting-based paradigm are two approaches for explaining Transformer-based	✓	0.33

References

- https://doi.org/10.1145/3639372
- https://doi.org/10.3390/bioengineering11040337
- https://doi.org/10.4230/oasics.icpec.2025.4