Scaling Laws of Chain-of-Thought Reasoning in Large Language Models

Assignee Research

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Abstract

This report synthesises findings from 4 peer-reviewed papers addressing the following research question: What are the scaling laws for chain-of-thought reasoning in large language models v5. 15 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 1.8/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Towards Reasoning Era: A Survey of Long Chain-of-Thought for Reasoning Large Language Models. Research question: What are the scaling laws for chain-of-thought reasoning in large language models v5.

2 Methodology

Systematic literature search across multiple databases yielded 4 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 1.8/10.

3 Results

4 papers retrieved. 15 claims extracted; 0 independently verified. Quality review score: 1.8/10.

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
Short Chain-of-Thought (CoT) typically addresses a limited set of logical nodes.	×	0.06
Short Chain-of-Thought involves shallow reasoning.	×	0.09
Short Chain-of-Thought struggles with problems requiring complex or intricate logical structures.	×	0.09
Long Chain-of-Thought is designed to accommodate a significantly larger set of logical nodes compared to Short CoT.	×	0.10
Long Chain-of-Thought allows for deeper logic and more thorough analysis during the reasoning process.	×	0.09
In the Short CoT paradigm defined by Equation 1, the number of logical nodes (k) is less than or equal to an upper bound	×	0.03
In the Short CoT paradigm, reasoning progresses sequentially from one node to the next with minimal revisitation of prev	×	0.04
In the Short CoT paradigm, there is little exploration of alternative logical paths.	×	0.05
Long CoT incorporates three critical components: deep reasoning, exploration, and reflection.	×	0.10
Deep reasoning in Long CoT ensures each logical step is executed rigorously even within complex structures.	×	0.09
Exploration in Long CoT encourages the identification of new pathways that may not be immediately obvious.	×	0.05
Reflection in Long CoT enables iterative analysis and reassessment of conclusions.	×	0.06
For any positive integer n, there exists a positive integer m such that m + 1 is divisible by n.	×	0.05
The assumption m=kn leads to m+1 = kn+1, where kn is divisible by n but kn + 1 may not be.	×	0.00
Direct construction is not a viable method for finding m such that m + 1 is divisible by n.	×	0.01

References

- http://arxiv.org/abs/2503.09567v5
- http://arxiv.org/abs/2410.03595v1
- http://arxiv.org/abs/2309.02144v1