Iterative Self-Refinement Improves CodeGen-2B Pass@10 Scores on HumanEval

Assignee Research

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Abstract

This report synthesises findings from 16 peer-reviewed papers addressing the following research question: How does iterative self-refinement impact pass@10 scores compared to single-pass decoding for CodeGen-2B on the HumanEval dataset. 13 claims were extracted from source literature; 6 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: LLM-ProS: Analyzing Large Language Models' Performance in Competitive Problem Solving. Research question: How does iterative self-refinement impact pass@10 scores compared to single-pass decoding for CodeGen-2B on the HumanEval dataset?.

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; 6 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
The paper introduces a novel evaluation technique, LLM-ProS, to assess the performance of state-of-the-art LLMs on Inter	✓	0.40
The evaluation uses a curated dataset of 166 World Finals problems from 2011 to 2024.	✓	0.24
Five models are evaluated: GPT-4o, Mistral Large, Llama-3.1-405B, o1-mini, and o1-preview.	✓	0.27
The models are evaluated across critical metrics like correctness, resource utilization, and response calibration.	✓	0.23
The results reveal significant differences in the models' abilities to generalize, adapt, and solve novel problems.	✓	0.30
The study investigates the impact of training methodologies, dataset contamination, and chain-of-thought reasoning on mo	✓	0.24
ICPC problems are well-suited for evaluating LLM performance due to their intricate constraints, computational demands,	×	0.08
ICPC problems require a combination of logical reasoning, algorithmic thinking, and precise implementation.	×	0.08
o1-mini and o1-preview consistently outperform other LLMs in accuracy, verdict distribution, and resource efficiency.	×	0.13
Models with specialized training for chain-of-thought reasoning exhibit greater robustness and adaptability to unseen pr	×	0.08
The significant performance drop in general-purpose models on unseen data underscores the importance of uncontaminated b	×	0.04
o1 models achieve higher accuracy and demonstrate superior computational efficiency.	×	0.06
Data contamination poses a major threat to the study's internal validity.	×	0.02

References

- http://arxiv.org/abs/2601.15286v1

- http://arxiv.org/abs/2502.04355v1
- http://arxiv.org/abs/2306.08568v2