Multimodal vs. Text-Only Llama-2 Models in Self-Invoking Code Generation Performance

Assignee Research

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Abstract

This report synthesises findings from 10 peer-reviewed papers addressing the following research question: How do multimodal extensions of Llama-2 models compare to text-only versions in self-invoking code generation tasks on HumanEval Pro, measured by pass@1 and pass@k metrics. We introduce self-invoking code generation, a new task designed to evaluate the progressive reasoning and problem-solving capabilities of LLMs. In this task, models are presented with a base problem and a related, more complex problem. 11 claims were extracted from source literature; 4 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 5.8/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: HumanEval Pro and MBPP Pro: Evaluating Large Language Models on Self-invoking Code Generation. Research question: How do multimodal extensions of Llama-2 models compare to text-only versions in self-invoking code generation tasks on HumanEval Pro, measured by pass@1 and pass@k metrics?.

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 5.8/10.

3 Results

10 papers retrieved. 11 claims extracted; 4 independently verified. Quality review score: 5.8/10.

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
o1-mini achieves 96.2% pass@1 on HumanEval but only 76.2% on HumanEval Pro.	✓	0.27
Instruction-tuned models are less efficient on self-invoking code generation than traditional code generation tasks.	✓	0.29
HumanEval and MBPP serve as fundamental benchmarks, focusing on Python function completion tasks with test-driven evalua	×	0.08
Several benchmarks have expanded code evaluation benchmarks to encompass multiple programming languages, complex tasks l	×	0.10
The benchmark construction process involves three steps: Self-invoking problem Generation, Solutions Generation, and Tes	×	0.11
Deepseek-V2.5 is used to generate self-invoking problems, candidate solutions, and test inputs.	×	0.06
An iterative method involving Python execution check and manual review is employed to ensure that all test cases pass su	×	0.03
The final execution results are used to construct complete test cases with assert command.	×	0.02
The confusion matrix of different models is shown in Figure 5.	×	0.02
The performance of various models on HumanEval Pro and MBPP Pro is detailed in Table (p9).	✓	0.17
The performance of different models on self-invoking code generation tasks is detailed in Table (p15).	✓	0.21

References

- http://arxiv.org/abs/2510.08325v2
- http://arxiv.org/abs/2410.12381v3
- http://arxiv.org/abs/2412.21199v2