Instruction-Tuned Models and CodeT5 Performance Gaps on MBPP Pro Variants

Assignee Research

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Abstract

This report synthesises findings from 9 peer-reviewed papers addressing the following research question: How does the performance gap between CodeT5 and instruction-tuned models on MBPP Pro variants correlate with the models' reasoning capabilities as measured by benchmarks like HumanEval or GSMEval. 16 claims were extracted from source literature; 3 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 5.1/10. 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 does the performance gap between CodeT5 and instruction-tuned models on MBPP Pro variants correlate with the models' reasoning capabilities as measured by benchmarks like HumanEval or GSMEval?.

2 Methodology

Systematic literature search across multiple databases yielded 9 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 5.1/10.

3 Results

9 papers retrieved. 16 claims extracted; 3 independently verified. Quality review score: 5.1/10.

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 the HumanEval benchmark.	✓	0.17
o1-mini achieves 76.2% pass@1 on the HumanEval Pro benchmark.	✓	0.19
Instruction-tuned models are less efficient on self-invoking code generation tasks compared to traditional code generati	✓	0.28
HumanEval Pro and MBPP Pro were constructed using Deepseek-V2.5 to generate self-invoking problems, candidate solutions,	×	0.14
The benchmark construction process involves executing generated solutions with test inputs in a controlled Python enviro	×	0.02
OpenCoder-8B-base achieved a score of 56.1 on the Base Problem and 10.5 on the Self-invoking Problem.	×	0.07
OpenCoder-8B-instruct achieved a score of 75.4 on the Base Problem and 22.8 on the Self-invoking Problem.	×	0.06
DeepseekCoder-6.7B-base achieved a score of 59.6 on the Base Problem and 35.1 on the Self-invoking Problem.	×	0.08
DeepseekCoder-6.7B-instruct achieved a score of 56.1 on the Base Problem and 35.1 on the Self-invoking Problem.	×	0.07
WaveCoder-Ultra-6.7B achieved a score of 61.4 on the Base Problem and 26.3 on the Self-invoking Problem.	×	0.06
Magicoder-S-DS-6.7B achieved a score of 50.9 on the Base Problem and 33.3 on the Self-invoking Problem.	×	0.06
Yi-Coder-9B-Chat achieved a score of 66.7 on the Base Problem and 31.6 on the Self-invoking Problem.	×	0.06
Qwen2.5Coder-7B-base achieved a score of 59.6 on the Base Problem and 38.6 on the Self-invoking Problem.	×	0.07
Qwen2.5Coder-7B-instruct achieved a score of 64.9 on the Base Problem and 35.1 on the Self-invoking Problem.	×	0.06
DeepseekCoder-33B-instruct achieved a score of 80.7 on the Base Problem and 43.9 on the Self-invoking Problem.	×	0.06
HumanEval and MBPP are fundamental benchmarks focusing on Python function completion tasks with test-driven evaluation.	×	0.09

References

- http://arxiv.org/abs/2309.02144v1
- http://arxiv.org/abs/2410.12381v3
- http://arxiv.org/abs/2412.21199v2