Fine-Tuning Large Language Models on Syntactically Perturbed Code for HumanEval Performance

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Abstract

This report synthesises findings from 14 peer-reviewed papers addressing the following research question: How does fine-tuning LLMs on syntactically perturbed code datasets affect pass@1 scores on HumanEval compared to standard fine-tuning. 14 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 2.9/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: WizardCoder: Empowering Code Large Language Models with Evol-Instruct. Research question: How does fine-tuning LLMs on syntactically perturbed code datasets affect pass@1 scores on HumanEval compared to standard fine-tuning?.

2 Methodology

Systematic literature search across multiple databases yielded 14 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 2.9/10.

3 Results

14 papers retrieved. 14 claims extracted; 0 independently verified. Quality review score: 2.9/10.

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
HumanEval comprises 164 problems with an average of 9.6 test cases per problem.	×	0.04
HumanEval+ expands the test cases significantly to an average of 774.8 per problem.	×	0.04
MBPP provides 500 test programming problems with three automated test cases each.	×	0.03
WizardCoder-15B achieved a pass@1 score of 57.3% on the HumanEval benchmark.	×	0.05
WizardCoder-34B achieved a pass@1 score of 71.5% on the HumanEval benchmark.	×	0.05
WizardCoder-15B achieved a pass@1 score of 51.8% on the MBPP benchmark.	×	0.03
WizardCoder-34B achieved a pass@1 score of 61.2% on the MBPP benchmark.	×	0.03
GPT-4 achieved a pass@1 score of 67.0% on the HumanEval benchmark.	×	0.05
CodeLlama-Python (34B) achieved a pass@1 score of 53.7% on the HumanEval benchmark.	×	0.04
WizardCoder models demonstrated superior performance across all 8 evaluated programming languages (Java, JavaScript, C++	×	0.13
The DS-1000 benchmark comprises 1,000 distinct data science workflows spanning 7 libraries.	×	0.05
WizardCoder demonstrates significant superiority over all other models on the DS-1000 benchmark insertion scores.	×	0.06
WizardCoder models were evaluated using hyper-parameters temperature=0.2 and top_p=0.95 for HumanEval and MBPP results.	×	0.06
WizardCoder models were evaluated using hyper-parameters temperature=0.2, top_p=0.95, max_length=512, and n=50 for Multi	×	0.02

References

- http://arxiv.org/abs/2312.10793v3
- http://arxiv.org/abs/2306.08568v2
- http://arxiv.org/abs/2110.06500v2