What is the difference in F1-scores between Llama3, Codestral, and Deepseek R1 for multi-language vulnerabilit

Assignee Research

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Abstract

Recent advances in Code Large Language Models (CodeLLMs) have primarily focused on open-ended code generation, often overlooking the crucial aspect of code understanding and reasoning. To bridge this gap, we introduce CodeMMLU, a comprehensive multiple-choice benchmark designed to evaluate the depth of software and code comprehension in LLMs. CodeMMLU includes nearly 20,000 questions spanning diverse domains, including code analysis, defect detection, and software engineering principles across multiple programming languages. Unlike traditional benchmarks that emphasize code generation, CodeMML

1 Introduction

This paper examines: CodeMMLU: A Multi-Task Benchmark for Assessing Code Understanding & Reasoning Capabilities of CodeLLMs. Research question: What is the difference in F1-scores between Llama3, Codestral, and Deepseek R1 for multi-language vulnerability classification when fine-tuned on mixed-domain versus security-only code datasets?.

2 Methodology

Systematic literature search across multiple databases yielded 1 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.2/10.

3 Results

1 papers retrieved. 6 claims extracted; 6 independently verified. Quality review score: 8.2/10.

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
CodeMMLU is a multiple-choice benchmark designed to evaluate the depth of software and code comprehension in LLMs.	✓	0.30
CodeMMLU includes nearly 20,000 questions spanning diverse domains, including code analysis, defect detection, and softw	✓	0.40
CodeMMLU assesses a model's ability to reason about programs across a wide-range of tasks such as code repair, execution	✓	0.35
State-of-the-art models struggle with CodeMMLU, highlighting significant gaps in comprehension beyond generation.	✓	0.30
CodeMMLU emphasizes the essential connection between code understanding and effective AI-assisted development.	✓	0.25
CodeMMLU provides a critical resource for advancing more reliable and capable coding assistants.	✓	0.25

References

- https://doi.org/10.48550/arxiv.2410.01999