Contrastive Pretraining vs. Masked Language Modeling in CodeT5 for Vulnerability Detection

Assignee Research

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Abstract

This report synthesises findings from 12 peer-reviewed papers addressing the following research question: How does contrastive pretraining compared to masked language modeling impact CodeT5's accuracy on the CWE-200 vulnerability detection benchmark. 9 claims were extracted from source literature; 6 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 7.2/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Large Language Models for Software Engineering: A Systematic Literature Review. Research question: How does contrastive pretraining compared to masked language modeling impact CodeT5's accuracy on the CWE-200 vulnerability detection benchmark?.

2 Methodology

Systematic literature search across multiple databases yielded 12 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.2/10.

3 Results

12 papers retrieved. 9 claims extracted; 6 independently verified. Quality review score: 7.2/10.

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
The study is a systematic literature review (SLR) on Large Language Models for Software Engineering (LLM4SE).	✓	0.24
The review analyzes 395 research papers.	×	0.10
The selected papers were published between January 2017 and January 2024.	×	0.13
The study addresses four key research questions (RQs).	×	0.13
RQ1 categorizes different LLMs employed in SE tasks and characterizes their distinctive features and uses.	✓	0.21
RQ2 analyzes methods used in data collection, preprocessing, and application for LLMs in SE.	✓	0.21
RQ3 investigates strategies employed to optimize and evaluate the performance of LLMs in SE.	✓	0.28
RQ4 examines specific SE tasks where LLMs have shown success to date.	✓	0.27
The artifacts for this study are publicly available at https://github.com/xinyi-hou/LLM4SE_SLR.	✓	0.22

References

- https://doi.org/10.48550/arxiv.2402.06196
- https://doi.org/10.48550/arxiv.2308.10620
- https://doi.org/10.48550/arxiv.2405.04760