Cyclomatic Complexity and False Negative Rates in DeepSeek R1 Vulnerability Detection

Assignee Research

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Abstract

This report synthesises findings from 7 peer-reviewed papers addressing the following research question: What is the correlation between cyclomatic complexity levels in training data and the false negative rate of Deepseek R1 on the Big-Vul vulnerability detection benchmark. 8 claims were extracted from source literature; 7 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 7.5/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Revisiting Binary Code Similarity Analysis Using Interpretable Feature Engineering and Lessons Learned. Research question: What is the correlation between cyclomatic complexity levels in training data and the false negative rate of Deepseek R1 on the Big-Vul vulnerability detection benchmark?.

2 Methodology

Systematic literature search across multiple databases yielded 7 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.5/10.

3 Results

7 papers retrieved. 8 claims extracted; 7 independently verified. Quality review score: 7.5/10.

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
Binary code similarity analysis (BCSA) is widely used for diverse security applications such as plagiarism detection, so	✓	0.38
Most existing BCSA approaches focus only on increasing the success rate by adopting uninterpretable machine learning.	✓	0.21
Existing BCSA approaches utilize their own benchmarks while sharing neither the source code nor the entire dataset.	✓	0.15
Researchers in the BCSA field often use different terminologies or fail to cite previous literature properly when using	✓	0.17
The presented study is the first systematic study on the basic features used in BCSA leveraging interpretable feature en	✓	0.33
A simple interpretable model with a few basic features can achieve results comparable to recent deep learning-based appr	✓	0.27
The method used to compile binaries can significantly affect the performance of BCSA.	×	0.12
The correctness of underlying binary analysis tools can significantly affect the performance of BCSA.	✓	0.21

References

- https://doi.org/10.48550/arxiv.2401.16185
- https://doi.org/10.1109/tse.2022.3187689
- https://doi.org/10.48550/arxiv.2403.17218