Synthetic Code Vulnerability Augmentation and Cross-Dataset Generalization in Code Llama

Assignee Research

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Abstract

This report synthesises findings from 10 peer-reviewed papers addressing the following research question: How does synthetic code vulnerability augmentation affect the cross-dataset generalization accuracy of Code Llama compared to training on curated Big-Vul subsets. 10 claims were extracted from source literature; 10 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.7/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Deep Learning for Computer Vision: A Brief Review. Research question: How does synthetic code vulnerability augmentation affect the cross-dataset generalization accuracy of Code Llama compared to training on curated Big-Vul subsets?.

2 Methodology

Systematic literature search across multiple databases yielded 10 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.7/10.

3 Results

10 papers retrieved. 10 claims extracted; 10 independently verified. Quality review score: 8.7/10.

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
Deep learning methods have outperformed previous state-of-the-art machine learning techniques in several fields.	✓	0.27
Computer vision is one of the most prominent fields where deep learning methods have outperformed previous techniques.	✓	0.22
Convolutional Neural Networks are significant deep learning schemes used in computer vision problems.	✓	0.37
Deep Boltzmann Machines are significant deep learning schemes used in computer vision problems.	✓	0.35
Deep Belief Networks are significant deep learning schemes used in computer vision problems.	✓	0.36
Stacked Denoising Autoencoders are significant deep learning schemes used in computer vision problems.	✓	0.36
Deep learning schemes are applied to object detection tasks.	✓	0.16
Deep learning schemes are applied to face recognition tasks.	✓	0.18
Deep learning schemes are applied to action and activity recognition tasks.	✓	0.21
Deep learning schemes are applied to human pose estimation tasks.	✓	0.20

References

- https://doi.org/10.3390/app14052074
- https://doi.org/10.1155/2018/7068349
- https://doi.org/10.48550/arxiv.2307.06435