Robustness and False Positives in Federated Intrusion Detection Under Heterogeneous Edge Compute

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Abstract

This report synthesises findings from 9 peer-reviewed papers addressing the following research question: How does heterogeneity in edge device compute capabilities affect the robustness and false positive rates of federated deep learning intrusion detection systems using non-IID data distributions. Federated Learning (FL) provides decentralised model training, which effectively tackles problems such as distributed data and privacy preservation. However, the generalisation of global models frequently faces challenges from data heterogeneity among clients. 0 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 6.5/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: FedQuad: Federated Stochastic Quadruplet Learning to Mitigate Data Heterogeneity. Research question: How does heterogeneity in edge device compute capabilities affect the robustness and false positive rates of federated deep learning intrusion detection systems using non-IID data distributions?.

2 Methodology

Systematic literature search across multiple databases yielded 9 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 6.5/10.

3 Results

9 papers retrieved. 0 claims extracted; 0 independently verified. Quality review score: 6.5/10.

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.

References

- http://arxiv.org/abs/2602.14301v1
- http://arxiv.org/abs/2204.12443v2
- http://arxiv.org/abs/2509.04107v1