Mul-GAD and Spatial GNN Performance on GADBench Heterophilic Graph Datasets

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Abstract

This report synthesises findings from 6 peer-reviewed papers addressing the following research question: How does the performance of Mul-GAD compare to spatial GNN baselines on heterophilic graph benchmark datasets in terms of AUC-ROC and F1-score metrics. With a long history of traditional Graph Anomaly Detection (GAD) algorithms and recently popular Graph Neural Networks (GNNs), it is still not clear (1) how they perform under a standard comprehensive setting, (2) whether GNNs can outperform traditional algorithms such as tree. 6 claims were extracted from source literature; 5 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 7.0/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: GADBench: Revisiting and Benchmarking Supervised Graph Anomaly Detection. Research question: How does the performance of Mul-GAD compare to spatial GNN baselines on heterophilic graph benchmark datasets in terms of AUC-ROC and F1-score metrics?.

2 Methodology

Systematic literature search across multiple databases yielded 6 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.0/10.

3 Results

6 papers retrieved. 6 claims extracted; 5 independently verified. Quality review score: 7.0/10.

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
GADBench is a benchmark tool dedicated to supervised anomalous node detection in static graphs.	✓	0.31
GADBench facilitates a comparison across 29 distinct models.	✓	0.20
GADBench utilizes ten real-world GAD datasets.	✓	0.15
The datasets used in GADBench encompass from thousands to approximately 6 million nodes.	×	0.05
Tree ensembles with simple neighborhood aggregation can outperform the latest GNNs tailored for the GAD task.	✓	0.34
GADBench is open-sourced at https://github.com/squareRoot3/GADBench.	✓	0.26

References

- https://doi.org/10.48550/arxiv.2306.12251
- https://doi.org/10.48550/arxiv.2410.18487
- https://doi.org/10.14711/thesis-hdl151270