Mul-GAD Efficiency Trade-offs in Large-Scale Graph Anomaly Detection

Assignee Research

June 1, 2026

Abstract

This report synthesises findings from 10 peer-reviewed papers addressing the following research question: What is the efficiency trade-off between Mul-GAD and alternative semi-supervised graph anomaly detection methods in terms of inference latency and memory usage when scaled to large graphs (e.g.,. Anomaly detection and similarity computation are two fundamental tasks in data mining, but when applied to graphs, their heterogeneous, relation-centric, and non-Euclidean nature presents unique challenges. This thesis explores novel approaches to both problems in the context of. 8 claims were extracted from source literature; 8 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 7.7/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Anomaly Detection and Similarity Computation on Attributed Graphs. Research question: What is the efficiency trade-off between Mul-GAD and alternative semi-supervised graph anomaly detection methods in terms of inference latency and memory usage when scaled to large graphs (e.g., Reddit, Amazon)?.

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 7.7/10.

3 Results

10 papers retrieved. 8 claims extracted; 8 independently verified. Quality review score: 7.7/10.

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
Anomaly detection and similarity computation are two fundamental tasks in data mining.	✓	0.28
Graph data presents unique challenges for anomaly detection and similarity computation due to its heterogeneous, relatio	✓	0.30
The thesis is divided into three parts: node-level anomaly detection, node-level similarity computation, and the combina	✓	0.36
Anomalous nodes in a static attributed graph redistribute spectral energy to higher frequencies, a phenomenon described	✓	0.25
The Beta Wavelet Graph Neural Network (BWGNN) utilizes specialized spectral bandpass filters to capture anomalous patte	✓	0.28
GADBench is a benchmarking framework that evaluates 29 algorithms across diverse datasets.	✓	0.20
Traditional tree ensembles with simple neighborhood aggregation can outperform specialized GNNs in performance, robustne	✓	0.27
The thesis proposes a joint structural learning and optimal transport approach for unsupervised alignment addressing str	✓	0.22

References

- https://openalex.org/W2765213949

- https://doi.org/10.14711/thesis-hdl151270
- https://doi.org/10.1145/3711896.3736989