Supervised GNNs vs Traditional Methods in Scalable Graph Anomaly Detection

Assignee Research

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Abstract

This report synthesises findings from 15 peer-reviewed papers addressing the following research question: What is the impact of graph size scaling on the detection accuracy of supervised GNN models versus traditional methods in standardized GAD benchmarks. As industries become automated and connectivity technologies advance, a wide range of systems continues to generate massive amounts of data. Many approaches have been proposed to extract principal indicators from the vast sea of data to represent the entire system state. 7 claims were extracted from source literature; 7 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 6.6/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Deep Learning for Anomaly Detection in Time-Series Data: Review, Analysis, and Guidelines. Research question: What is the impact of graph size scaling on the detection accuracy of supervised GNN models versus traditional methods in standardized GAD benchmarks?.

2 Methodology

Systematic literature search across multiple databases yielded 15 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 6.6/10.

3 Results

15 papers retrieved. 7 claims extracted; 7 independently verified. Quality review score: 6.6/10.

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 in multivariate time series data requires simultaneous consideration of temporal dependencies and rela	✓	0.35
Recent deep learning-based works have made impressive progress in the field of anomaly detection in time-series data.	✓	0.35
Deep learning-based approaches are capable of learning representations of large-scaled sequences in an unsupervised mann	✓	0.24
Deep learning-based approaches are capable of identifying anomalies from time-series data.	✓	0.24
Most deep learning-based anomaly detection models are highly specific to the individual use case.	✓	0.26
Most deep learning-based anomaly detection models require domain knowledge for appropriate deployment.	✓	0.26
The review comparatively analyzes state-of-the-art deep-anomaly-detection models for time series using several benchmark	✓	0.26

References

- https://doi.org/10.1109/access.2021.3107975
- https://doi.org/10.1109/access.2021.3140175
- https://doi.org/10.1109/tpami.2022.3170559