Graph Embedding Techniques in Mul-GAD for Cross-Domain Anomaly Detection Performance

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Abstract

This report synthesises findings from 11 peer-reviewed papers addressing the following research question: How do different graph embedding techniques (e.g., graph attention networks vs. graph convolutional networks) within the Mul-GAD framework impact its performance on cross-domain graph anomaly. Anomaly detection is defined as discovering patterns that do not conform to the expected behavior. Previously, anomaly detection was mostly conducted using traditional shallow learning techniques, but with little improvement. 10 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 3.7/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Mul-GAD: a semi-supervised graph anomaly detection framework via aggregating multi-view information. Research question: How do different graph embedding techniques (e.g., graph attention networks vs. graph convolutional networks) within the Mul-GAD framework impact its performance on cross-domain graph anomaly detection tasks, as measured by F1-score and AUC-ROC?.

2 Methodology

Systematic literature search across multiple databases yielded 11 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 3.7/10.

3 Results

11 papers retrieved. 10 claims extracted; 0 independently verified. Quality review score: 3.7/10.

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
The Mul-GAD approach outperforms the state-of-the-art not only on detection performance, but also in terms of generaliza	×	0.14
Experiments show that computing the feature similarity matrix plays an important role in boosting the detection performa	×	0.05
The final model, which equipped with label-oriented objective function and fusion strategies, has a significant improvem	×	0.14
Adequate experimental validation is the foundation for selecting the objective function.	×	0.06
The Mul-GAD approach achieves a performance of 0.97, 0.97, 0.87, 0.97, 0.94, 0.93, 0.94, 0.95, 0.95, 0.65 on the first d	×	0.04
The Mul-GAD approach achieves a performance of 0.67, 0.63, 0.67, 0.6, 0.51, 0.55, 0.65, 0.66, 0.5, 0.56 on the second da	×	0.04
The Mul-GAD approach achieves a performance of 0.93, 0.89, 0.88, 0.88, 0.88, 0.95, 0.9, 0.91, 0.92, 0.85 on the third da	×	0.04
The Mul-GAD approach achieves a performance of 0.54, 0.62, 0.62, 0.62, 0.62, 0.62, 0.56, 0.57, 0.56, 0.63 on the fourth	×	0.04
Local outlier factor (LOF) acquires the rank of anomaly scores via computing the spatial density of each node and the lo	×	0.10
K-nearest neighbor (KNN) seeks out the k closest neighbors and uses the majority class to determine the class of the cur	×	0.02

References

- http://arxiv.org/abs/2305.02496v1
- http://arxiv.org/abs/1404.4679v2
- http://arxiv.org/abs/2212.05478v1