Semi-Supervised Multi-View Aggregation in Mul-GAD vs. Unsupervised GNNs on Adversarially Perturbed Heterophilic Graphs

Assignee Research

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Abstract

This report synthesises findings from 14 peer-reviewed papers addressing the following research question: How does the semi-supervised multi-view aggregation approach in Mul-GAD compare to fully unsupervised GNN-based methods in terms of AUC performance on heterophilic graphs under adversarial edge. Benefiting from the message passing mechanism, Graph Neural Networks (GNNs) have been successful on flourish tasks over graph data. However, recent studies have shown that attackers can catastrophically degrade the performance of GNNs by maliciously modifying the graph structure. 9 claims were extracted from source literature; 8 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.3/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Reliable Representations Make A Stronger Defender. Research question: How does the semi-supervised multi-view aggregation approach in Mul-GAD compare to fully unsupervised GNN-based methods in terms of AUC performance on heterophilic graphs under adversarial edge perturbations?.

2 Methodology

Systematic literature search across multiple databases yielded 14 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.3/10.

3 Results

14 papers retrieved. 9 claims extracted; 8 independently verified. Quality review score: 8.3/10.

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
Graph Neural Networks (GNNs) have been successful on various tasks over graph data due to the message passing mechanism.	✓	0.19
Attackers can catastrophically degrade the performance of GNNs by maliciously modifying the graph structure.	✓	0.26
Existing methods use either raw features or representations learned by supervised GNNs to model edge weights.	✓	0.37
Raw features cannot represent various properties of nodes, such as structure information.	✓	0.27
Representations learned by supervised GNNs may suffer from poor classifier performance on poisoned graphs.	✓	0.21
The authors propose an unsupervised pipeline named STABLE to optimize graph structure.	✓	0.23
The authors designed an advanced GCN that enhances the robustness of vanilla GCN without increasing time complexity.	✓	0.18
Experiments were conducted on four real-world graph benchmarks.	×	0.11
STABLE outperforms state-of-the-art methods on the tested benchmarks.	✓	0.15

References

- https://doi.org/10.1145/3534678.3539484
- https://doi.org/10.1609/aaai.v37i4.25573
- https://doi.org/10.48550/arxiv.2205.07424