# Data Augmentation Strategies and Robustness in Graph Anomaly Detection Metrics

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June 1, 2026

**Abstract**

This report synthesises findings from 7 peer-reviewed papers addressing the following research question: How does the choice of data augmentation strategy impact the robustness of F1 and AUC metrics for graph anomaly detection models across varying graph densities. Detecting anomalies in data is a vital task, with numerous high-impact applications in areas such as security, finance, health care, and law enforcement. While numerous techniques have been developed in past years for spotting outliers and anomalies in unstructured collections. 12 claims were extracted from source literature; 10 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.0/10. This report is a machine-generated literature synthesis and does not constitute original research.

## 1 Introduction

This paper examines: Graph-based Anomaly Detection and Description: A Survey. Research question: How does the choice of data augmentation strategy impact the robustness of F1 and AUC metrics for graph anomaly detection models across varying graph densities?.

## 2 Methodology

Systematic literature search across multiple databases yielded 7 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.0/10.

## 3 Results

7 papers retrieved. 12 claims extracted; 10 independently verified. Quality review score: 8.0/10.

## 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 |
|---|---|---|
| Detecting anomalies in data is a vital task, with numerous high-impact applications in areas such as security, finance, | ✓ | 0.35 |
| Techniques for structured graph data have been of focus recently. | ✓ | 0.21 |
| As objects in graphs have long-range correlations, a suite of novel technology has been developed for anomaly detection | ✓ | 0.33 |
| This survey aims to provide a general, comprehensive, and structured overview of the state-of-the-art methods for anomal | ✓ | 0.36 |
| We provide a comprehensive exploration of both data mining and machine learning algorithms for detection tasks. | ✓ | 0.26 |
| We give a general framework for the algorithms categorized under various settings: unsupervised vs. (semi-)supervised ap | ✓ | 0.37 |
| We highlight the effectiveness, scalability, generality, and robustness aspects of the methods. | ✓ | 0.22 |
| We stress the importance of anomaly attribution and highlight the major techniques that facilitate digging out the root | ✓ | 0.34 |
| We present several real-world applications of graph-based anomaly detection in diverse domains, including finance. | ✓ | 0.29 |
| Graph data becoming ubiquitous. | ✓ | 0.17 |
| Many open challenges exist in the field of graph-based anomaly detection. | × | 0.10 |
| There are structure-based and community-based approaches in graph-based anomaly detection. | × | 0.12 |

## References


- http://arxiv.org/abs/2411.15497v3
- http://arxiv.org/abs/1404.4679v2
- http://arxiv.org/abs/2212.05478v1