

Invariant Rationale Discovery in Graph Contrastive Learning for Cross-Domain Node Classification Generalization

Assignee Research

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Abstract

Recent years, graph contrastive learning (GCL), which aims to learn representations from unlabeled graphs, has made great progress. However, the existing GCL methods mostly adopt human-designed graph augmentations, which are sensitive to various graph datasets. In addition, the contrastive losses originally developed in computer vision have been directly applied to graph data, where the neighboring nodes are regarded as negatives and consequently pushed far apart from the anchor. However, this is contradictory with the homophily assumption of net-works that connected nodes often belong to the

1 Introduction

This paper examines: Neighbor Contrastive Learning on Learnable Graph Augmentation. Research question: Does invariant rationale discovery in graph contrastive learning improve cross-domain generalization on node classification benchmarks compared to random augmentation strategies?.

2 Methodology

Systematic literature search across multiple databases yielded 8 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

8 papers retrieved. 11 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
Graph contrastive learning (GCL) aims to learn representations from unlabeled graphs.	✓	0.25
Existing GCL methods mostly adopt human-designed graph augmentations, which are sensitive to various graph datasets.	✓	0.31
The contrastive losses originally developed in computer vision have been directly applied to graph data, where the neigh	✓	0.37
This is contradictory with the homophily assumption of networks that connected nodes often belong to the same class and	✓	0.20
NCLA is an end-to-end automatic GCL method that applies neighbor contrastive learning on learnable graph augmentation.	✓	0.33
NCLA uses multi-head graph attention mechanism to learn several graph augmented views with adaptive topology.	✓	0.22
NCLA devises a neighbor contrastive loss to allow multiple positives per anchor by taking network topology as the superv	✓	0.28
Both augmentations and embeddings are learned end-to-end in NCLA.	✓	0.22
NCLA yields state-of-the-art node classification performance on self-supervised GCL.	✓	0.24
NCLA exceeds supervised methods when labels are extremely limited.	×	0.15
The code for NCLA is released at https://github.com/shenx .	✓	0.16

References

- <https://doi.org/10.1109/tpami.2022.3170559>

- <https://doi.org/10.1609/aaai.v37i8.26168>
- <https://doi.org/10.1145/3580305.3599370>