Robustness Comparison of LightGCL, GraCL, and MVGRL Under Adversarial Graph Perturbations

Assignee Research

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Abstract

This report synthesises findings from 9 peer-reviewed papers addressing the following research question: How does the robustness of LightGCL compare to GraCL and MVGRL when evaluated on Hit Ratio@5 and NDCG@10 under adversarial graph perturbations in dense interaction graphs. Point clouds provide a flexible geometric representation suitable for countless applications in computer graphics; they also comprise the raw output of most 3D data acquisition devices. While hand-designed features on point clouds have long been proposed in graphics and vision. 13 claims were extracted from source literature; 13 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: Dynamic Graph CNN for Learning on Point Clouds. Research question: How does the robustness of LightGCL compare to GraCL and MVGRL when evaluated on Hit Ratio@5 and NDCG@10 under adversarial graph perturbations in dense interaction graphs?.

2 Methodology

Systematic literature search across multiple databases yielded 9 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

9 papers retrieved. 13 claims extracted; 13 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
Point clouds provide a flexible geometric representation suitable for countless applications in computer graphics.	✓	0.31
Point clouds also comprise the raw output of most 3D data acquisition devices.	✓	0.25
Hand-designed features on point clouds have long been proposed in graphics and vision.	✓	0.29
Convolutional neural networks (CNNs) have achieved overwhelming success for image analysis.	✓	0.16
Point clouds inherently lack topological information.	✓	0.23
Designing a model to recover topology can enrich the representation power of point clouds.	✓	0.28
EdgeConv is a new neural network module suitable for CNN-based high-level tasks on point clouds, including classificatio	✓	0.34
EdgeConv acts on graphs dynamically computed in each layer of the network.	✓	0.23
EdgeConv is differentiable and can be plugged into existing architectures.	✓	0.16
EdgeConv incorporates local neighborhood information.	✓	0.16
EdgeConv can be stacked applied to learn global shape properties.	✓	0.21
In multi-layer systems, affinity in feature space captures semantic characteristics over potentially long distances in t	✓	0.33
The performance of the model is shown on standard benchmarks, including ModelNet40, ShapeNetPart, and S3DIS.	✓	0.20

References

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- https://doi.org/10.1145/3326362
- https://doi.org/10.1186/s40537-019-0197-0