Dynamic Prototype Aggregation in Federated Graph Learning for Non-IID Social Networks

Assignee Research

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Abstract

This report synthesises findings from 13 peer-reviewed papers addressing the following research question: Does the use of dynamic prototype aggregation in federated graph learning improve robustness against non-IID data distributions on social network datasets like Reddit while reducing bandwidth. Graph Neural Network (GNN) research is rapidly growing thanks to the capacity of GNNs in learning distributed representations from graph-structured data. However, centralizing a massive amount of real-world graph data for GNN training is prohibitive due to privacy concerns. 14 claims were extracted from source literature; 1 was independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 4.5/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: FedGraphNN: A Federated Learning System and Benchmark for Graph Neural Networks. Research question: Does the use of dynamic prototype aggregation in federated graph learning improve robustness against non-IID data distributions on social network datasets like Reddit while reducing bandwidth consumption?.

2 Methodology

Systematic literature search across multiple databases yielded 13 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 4.5/10.

3 Results

13 papers retrieved. 14 claims extracted; 1 independently verified. Quality review score: 4.5/10.

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
FedGraphNN is a federated learning system and benchmark for Graph Neural Networks.	✓	0.27
The performance of GCN (Centralized) on CORA is 0.8622.	×	0.02
The performance of GCN (FedAvg) on CORA is 0.8549.	×	0.03
The performance of GraphSAGE (Centralized) on CORA is 0.9692.	×	0.02
The performance of GraphSAGE (FedAvg) on CORA is 0.9749.	×	0.03
The performance of GCN (Centralized) on SIDER is 0.6476.	×	0.02
The performance of GCN (FedAvg) on SIDER is 0.6266.	×	0.03
The performance of GAT (Centralized) on SIDER is 0.6639.	×	0.01
The performance of GAT (FedAvg) on SIDER is 0.6591.	×	0.02
The performance of GraphSAGE (Centralized) on SIDER is 0.6669.	×	0.02
The performance of GraphSAGE (FedAvg) on SIDER is 0.6700.	×	0.03
The MAE of GCN (Centralized) on CIAO is 0.8167.	×	0.01
The MAE of GCN (FedAvg) on CIAO is 0.7995.	×	0.02
The MAE of GAT (Centralized) on CIAO is 0.8214.	×	0.01

References

- http://arxiv.org/abs/2507.09805v1
- http://arxiv.org/abs/2509.22922v1
- http://arxiv.org/abs/2104.07145v2