Metapath Context Convolutions vs. Message Passing in Heterogeneous Graph Networks

Assignee Research

June 1, 2026

Abstract

This report synthesises findings from 5 peer-reviewed papers addressing the following research question: What is the trade-off between representation accuracy and computational cost when applying metapath context convolutions versus standard message passing in deep heterogeneous graph networks. Heterogeneous graph neural networks (HGNNs) were proposed for representation learning on structural data with multiple types of nodes and edges. To deal with the performance degradation issue when HGNNs become deep, researchers combine metapaths into HGNNs to associate nodes. 11 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 3.2/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: MECCH: Metapath Context Convolution-based Heterogeneous Graph Neural Networks. Research question: What is the trade-off between representation accuracy and computational cost when applying metapath context convolutions versus standard message passing in deep heterogeneous graph networks?.

2 Methodology

Systematic literature search across multiple databases yielded 5 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 3.2/10.

3 Results

5 papers retrieved. 11 claims extracted; 0 independently verified. Quality review score: 3.2/10.

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
MECCH was evaluated on five heterogeneous graph datasets: IMDB, ACM, DBLP, LastFM, and PubMed.	×	0.12
For node classification, MECCH was tested on IMDB, ACM, and DBLP datasets.	×	0.07
For link prediction, MECCH was tested on LastFM and PubMed datasets.	×	0.10
The IMDB dataset contains 12,722 nodes of 3 types and 37,288 edges of 4 types.	×	0.02
The ACM dataset contains 8,994 nodes of 3 types and 25,922 edges of 4 types.	×	0.02
The DBLP dataset contains 18,405 nodes of 3 types and 67,946 edges of 4 types.	×	0.02
The LastFM dataset contains 20,612 nodes of 3 types and 201,908 edges of 5 types.	×	0.02
The PubMed dataset contains 63,109 nodes of 4 types and 368,245 edges of 16 types.	×	0.02
MECCH achieved a Macro-F1 score of 0.905 and a Micro-F1 score of 1.727 on the ACM dataset.	×	0.01
MECCH achieved a Macro-F1 score of 4.142 and a Micro-F1 score of 3.645 on the DBLP dataset.	×	0.01
The performance of MECCH varies with different metapath lengths and number of layers.	×	0.07

References

- http://arxiv.org/abs/2211.12792v2
- http://arxiv.org/abs/1606.00955v2
- http://arxiv.org/abs/2008.12578v2