

# Mul-GAD and GNN Computational Efficiency Trade-offs on Large-Scale Heterophilic Graphs

Assignee Research

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## Abstract

This report synthesises findings from 1 peer-reviewed paper addressing the following research question: What is the computational efficiency trade-off of Mul-GAD versus GNN baselines when scaling to large-scale heterophilic graphs, measured in terms of inference time and memory usage. &lt;p&gt;Transfer learning, as a key paradigm in modern machine learning, has rapidly advanced the scalability and effectiveness of model deployment by enabling knowledge reuse across tasks, thereby driving the advancement of intelligent business innovations. This thesis. 9 claims were extracted from source literature; 7 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 7.5/10. This report is a machine-generated literature synthesis and does not constitute original research.

## 1 Introduction

This paper examines: Generalizable and Efficient Transfer Learning for Graph and Language Models. Research question: What is the computational efficiency trade-off of Mul-GAD versus GNN baselines when scaling to large-scale heterophilic graphs, measured in terms of inference time and memory usage?.

## 2 Methodology

Systematic literature search across multiple databases yielded 1 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.5/10.

### 3 Results

1 papers retrieved. 9 claims extracted; 7 independently verified. Quality review score: 7.5/10.

### 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
The thesis identifies three principal challenges: generalizable graph pre-training, effective adaptation for graphs, and	✓	0.38
WGDN is a framework that proposes an augmentation-adaptive graph Wiener filter for generative graph pre-training.	✓	0.22
WGDN aims to capture the topological nature of graphs within the reconstruction paradigm to improve the generalizability	✓	0.19
APF is a framework designed to address limited supervision and local homophily disparity in graph anomaly detection.	✓	0.19
APF combines anomaly-aware pre-training with granularity-adaptive fine-tuning.	✓	0.26
SeLoRA targets parameter redundancy in Low-Rank Adaptation (LoRA) fine-tuning for LLMs.	✓	0.26
SeLoRA introduces a sparse spectral reparameterization module.	×	0.15
SeLoRA achieves highly efficient adaptation while preserving expressive capacity.	✓	0.21
Extensive experiments were conducted across diverse settings to evaluate the proposed approaches.	×	0.06

## References

- <https://doi.org/10.14711/thesis-hdl151299>