Multi-view graph convolutional networks with attention mechanism

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Introduction

- Importance of graph data in various AI applications
- Limitations of single-view GCNs
- Introduction to Multi-View Graph Convolutional Networks (MAGCN)

Problem Statement

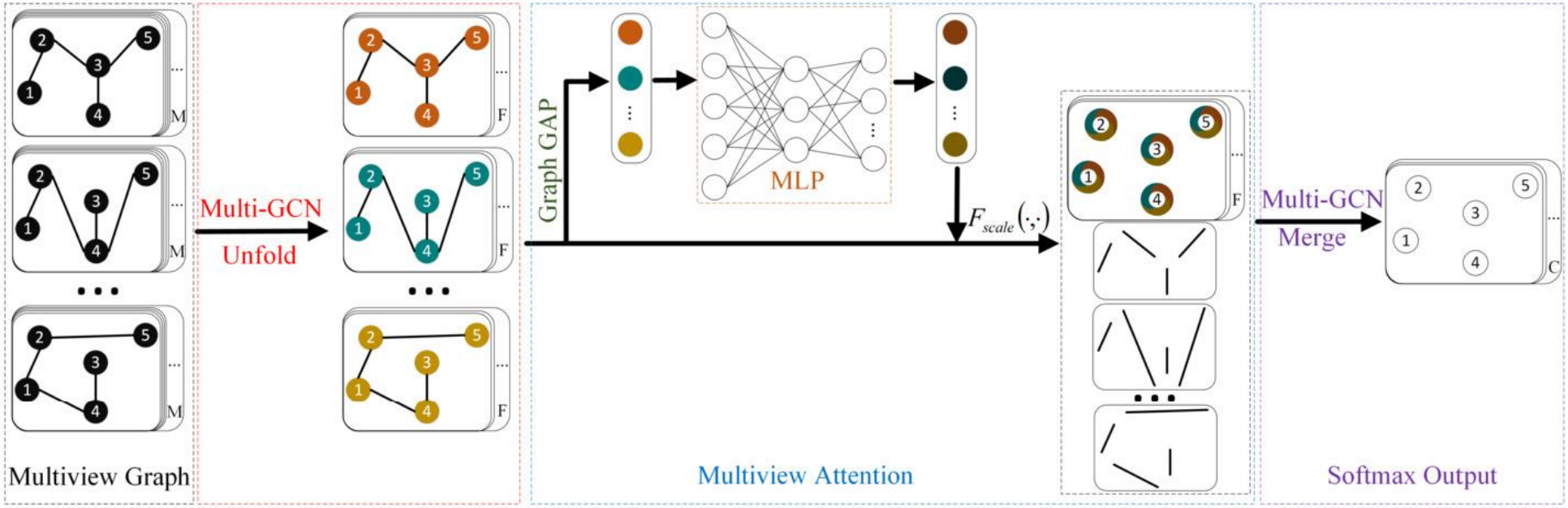
- Single-view topology's limitations
- Importance of considering multiple views

MAGCN Overview

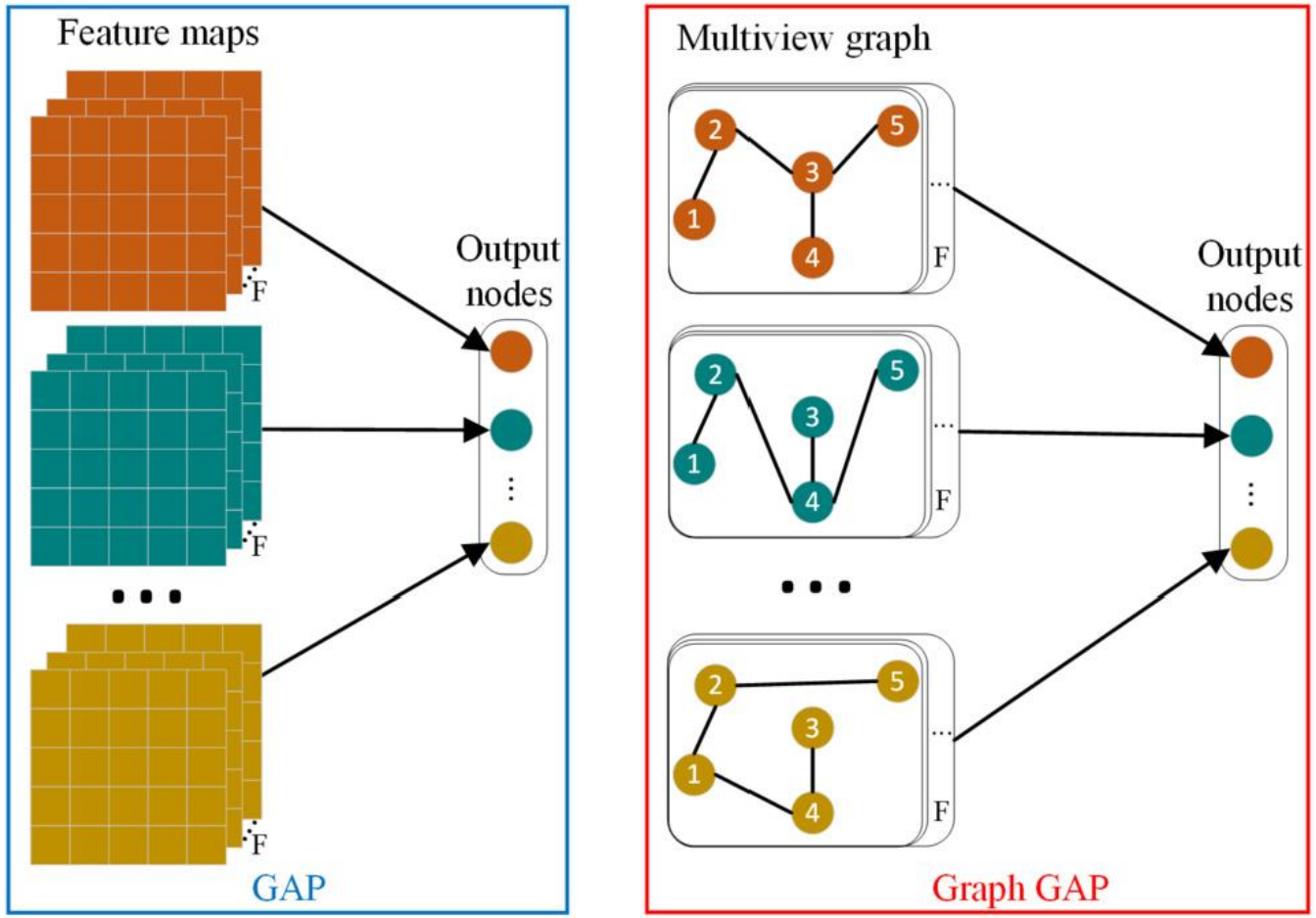
- Incorporation of multiple adjacency matrices
- Attention mechanism for feature aggregation
- Framework overview

MAGCN Architecture

- Multi-GCN (unfold) block: Handling multiple views
- Attention block: Aggregating information from different views
- Multi-GCN (merge) block: Final classification



Graph GAP


Feature maps
F
F
F
Output nodes
GAP
Multiview graph
1
2
3
4
5
F
Output nodes
Graph GAP

Datasets

Label Rate: indicating the proportion of labeled nodes used for training in semi-supervised learning

- Cora
  - Nodes: 2,708
  - Edges: 5,429
  - Features: 1,433
  - Classes: 7
  - Label Rate: 0.052
- Citeseer
  - Nodes: 3,327
  - Edges: 4,732
  - Features: 3,703
  - Classes:
  - Label Rate: 0.036
- Pubmed
  - Nodes: 19,717
  - Edges: 44,338
  - Features: 500
  - Classes: 3
  - Label Rate: 0.001

Experiments

Table 2
Summary of the semi-supervised classification accuracy (%) on Cora, Citeseer, and Pubmed datasets.

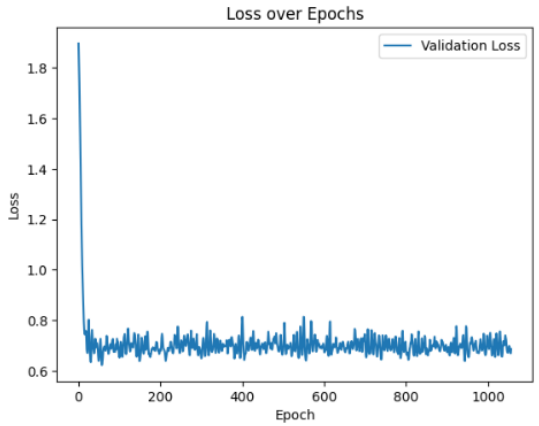
Method	Datasets		
	Cora	Citeseer	Pubmed
DeepWalk	67.2	43.2	65.3
Planetoid	75.7	64.7	77.2
ChebNet	81.2	69.8	74.4
MPNN	79.1	65.9	76.6
Graph-SAGE	75.3	68.2	77.4
GCN	81.5	70.3	79.0
GAT	83.0	72.5	79.0
DGI	82.3	71.8	76.8
AdaLNet	81.4	69.7	78.1
Multi-GCN	82.5	71.3	-
MAGCN-3Views (Ours)	**84.5 ± 0.2**	**73.5 ± 0.3**	**80.6 ± 0.2**

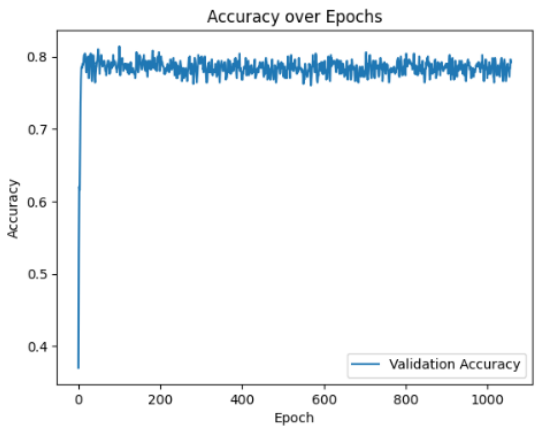
Results

- Cora: 0.83
- Citeseer: 0.71
- Pubmed: 0.79

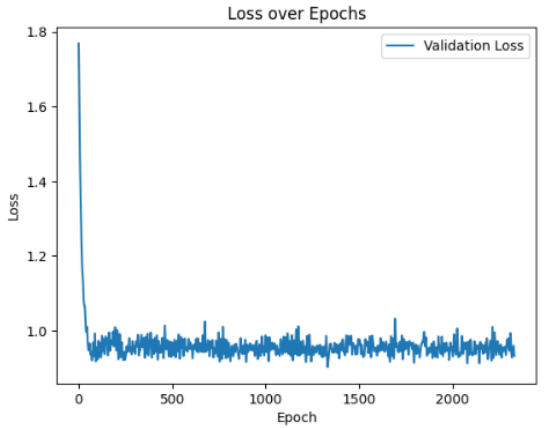
Plots

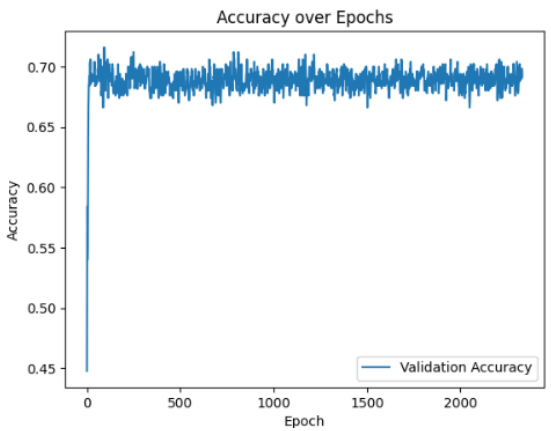
Cora



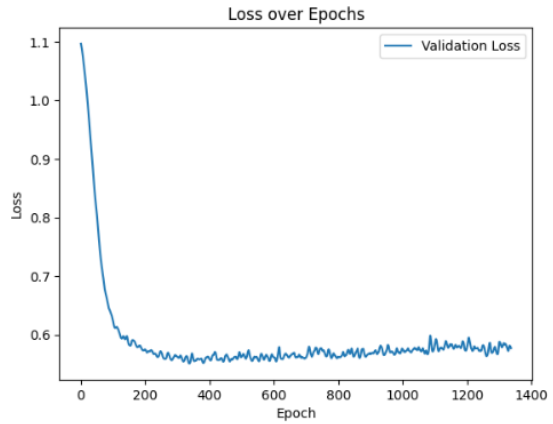


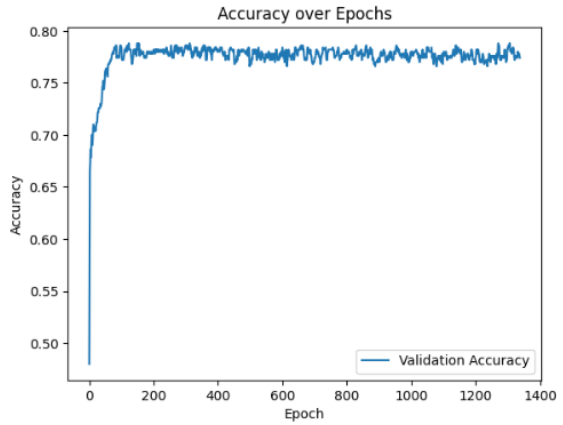
Citeseer





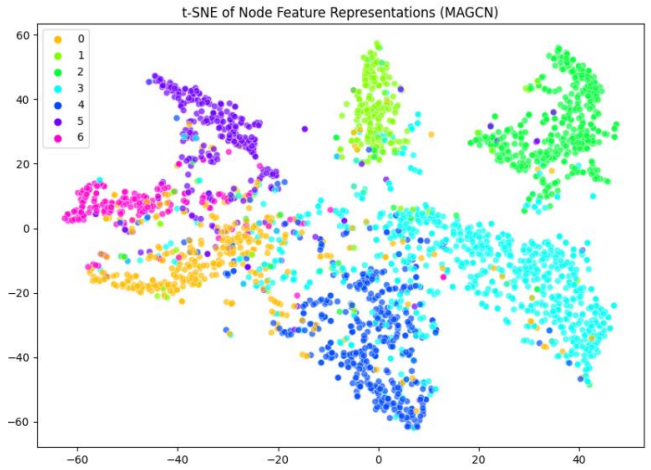
Pubmed



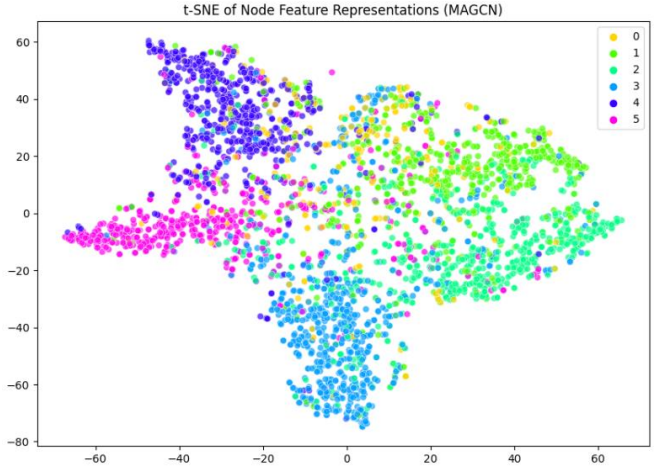


t-SNE Visualization

Cora



Citeseer



Pubmed