

Enhancing Attention-based Graph Neural Networks via Cardinality Preservation

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Motivation:

- We focus on the attention-based GNNs, which are GNNs adopting attention mechanism in aggregations. Although they have achieved promising results on various tasks, the understanding of their discriminative power is still missing.

Our approach:

- We reveal that previously proposed attention-based GNNs all exhibit limited discriminative power. The *only* reason is that the attention-based aggregators ignore the cardinality information when distinguishing distinct structures.
- We then propose Cardinality Preserved Attention (CPA) models to preserve cardinality in the attention mechanism to avoid the failure cases.
- Our experiments on node and graph classification tasks confirm our theoretical analysis and the improvements from our models.

Attention-based Aggregator

