Paper Implementation

GraphSAGE: Inductive Representation Learning on Large Graphs

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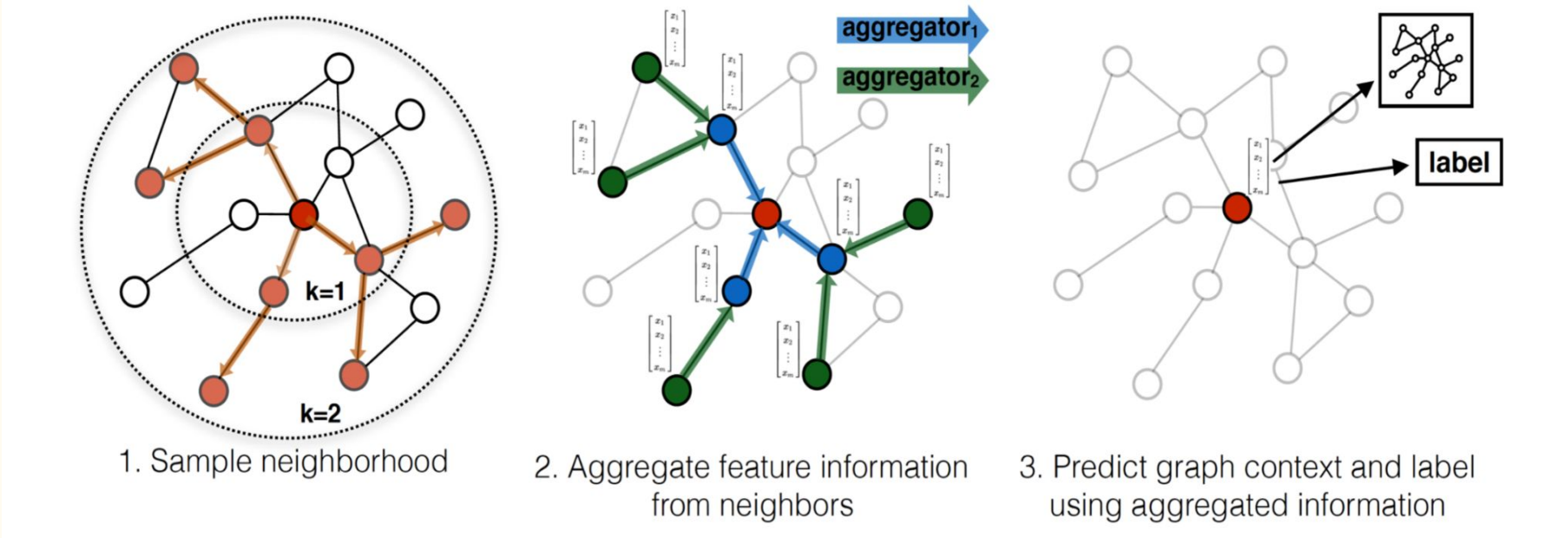
General inductive framework that leverages node features to efficiency generate node embedding for unseen dataset

Main Idea



1. Sample neighborhood

2. Aggregate feature information from neighbors

3. Predict graph context and label using aggregated information

Aggregator Architectures

$$\mathbf{h}_{\mathcal{N}(v)}^{k} \leftarrow \text{AGGREGATE}_k(\{\mathbf{h}_u^{k-1}, \forall u \in \mathcal{N}(v)\});$$

$$\mathbf{h}_v^k \leftarrow \sigma\left(\mathbf{W}^k \cdot \text{CONCAT}(\mathbf{h}_v^{k-1}, \mathbf{h}_{\mathcal{N}(v)}^{k})\right)$$

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- Mean Aggregator
- LSTM Aggregator
- Pooling Aggregator

Implementation approach

GraphSAGE paper

- Define one GraphSAGE layer: depending on the aggregator type
- Stack two GraphSAGE layers, use nonlinearity between them.
- Build the train funcion: (optimizer, loss...)
- Experiments

The Experiments

Results

Dataset	Type	Nodes	Edges	Classes	Features	Mean Aggregator	MaxPooling Aggregator
Cora	Citation network	2,708	5,429	7	1,433	80.0 ± 1	81.0 ± 1
Citeseer	Citation network	3,327	4,732	6	3,703	68 ± 1	69.5 ± 0.8

Conclusion

- GraphSAGE: inductive framework, leverages node feature information.

- Generate node embeddings for previously unseen data.

- Work on Large Scale graphs!

Thank you!