XGCN: a library for large-scale graph neural network recommendations

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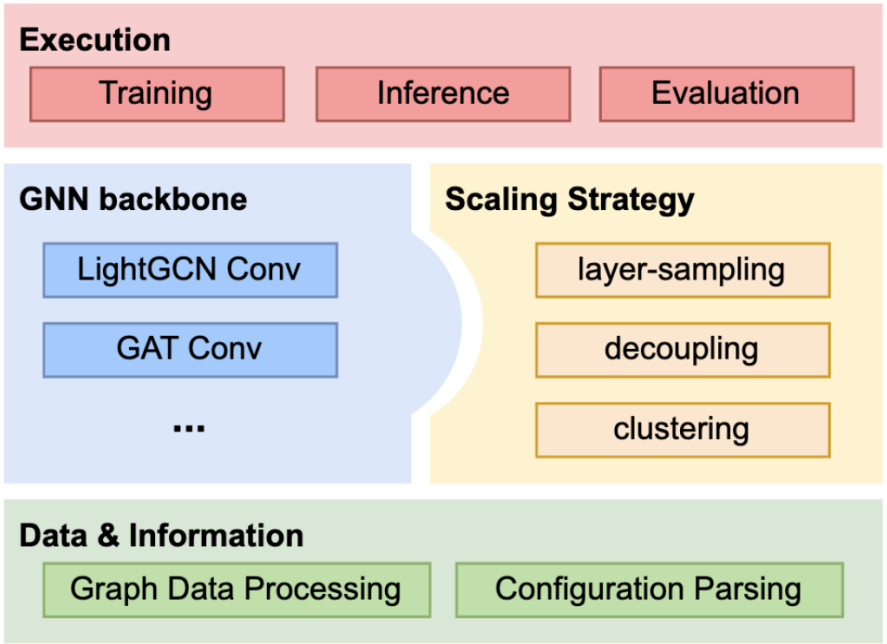
Problems & Ideas

- Existing open-source GNN recommendation libraries:
  - Inadequate consideration of GNN scaling strategies.
  - Lack of large graph processing optimizations.
- Our work: XGCN library, which aims at building and running large-scale GNNs in a single-machine environment.



Overall framework of the XGCN library

Main Contributions

- Contributions:
  - We propose a Python-based library named XGCN, which aims at building and running large-scale GNNs;
  - XGCN supports various different GNN scaling strategies;
  - XGCN offers optimized implementations for large graphs.

Supported models in XGCN

Category	Models
pure propagation	RandNE
shallow embedding	node2vec, UltraGCN
MP or layer-sampling	GraphSAGE, GAT, GIN, LightGCN, SimpleX
decoupling-based	PPRGo, SGC, S^2GC, SIGN, GAMLP, GBP
clustering-based	Cluster-GCN
extreme convolution	xGCN

Scalability study of light graph convolution implementations, displayed in seconds for an epoch training

	Datasets: (#nodes, #edges) in million			
	(0.5, 2.9)	(1, 9)	(2, 27)	(3, 49)
Official	85.1	OOM	OOM	OOM
RecBole	86.1	813	6591	OOM
XGCN	31.6	248	1825	5462