Federated heterogeneous graph contrastive network with fine-grained bidirectional knowledge distillation

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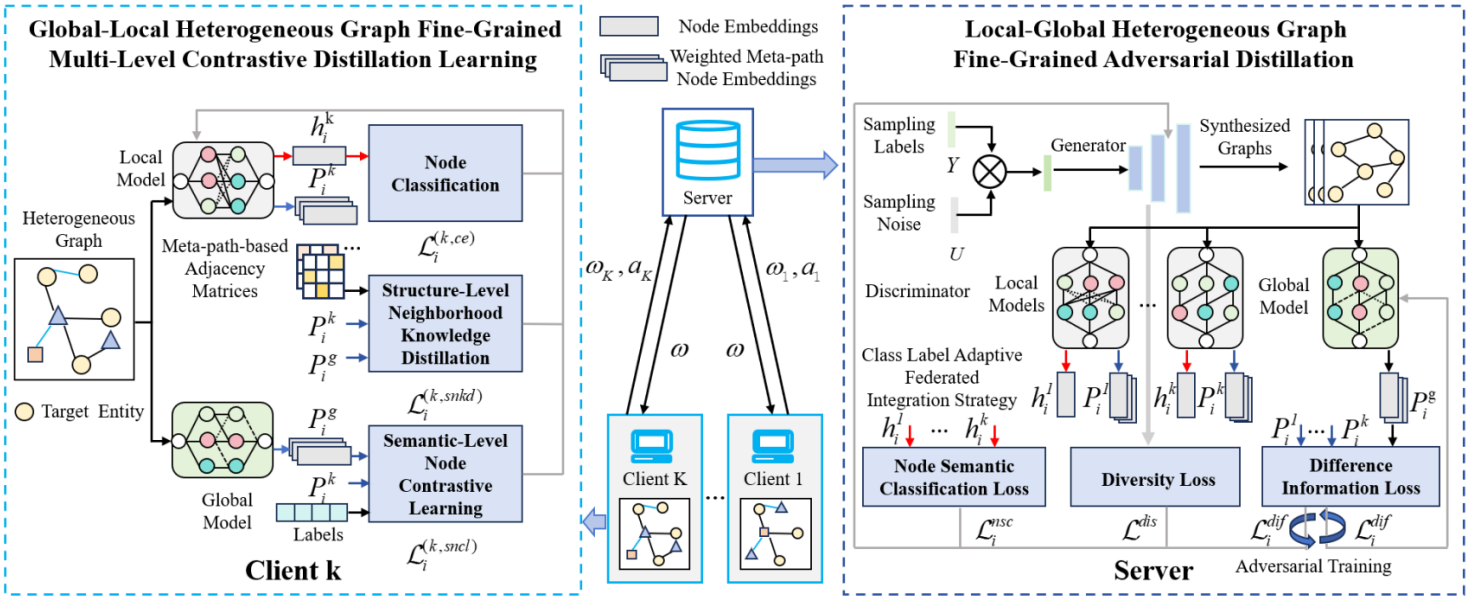
Problems & Ideas

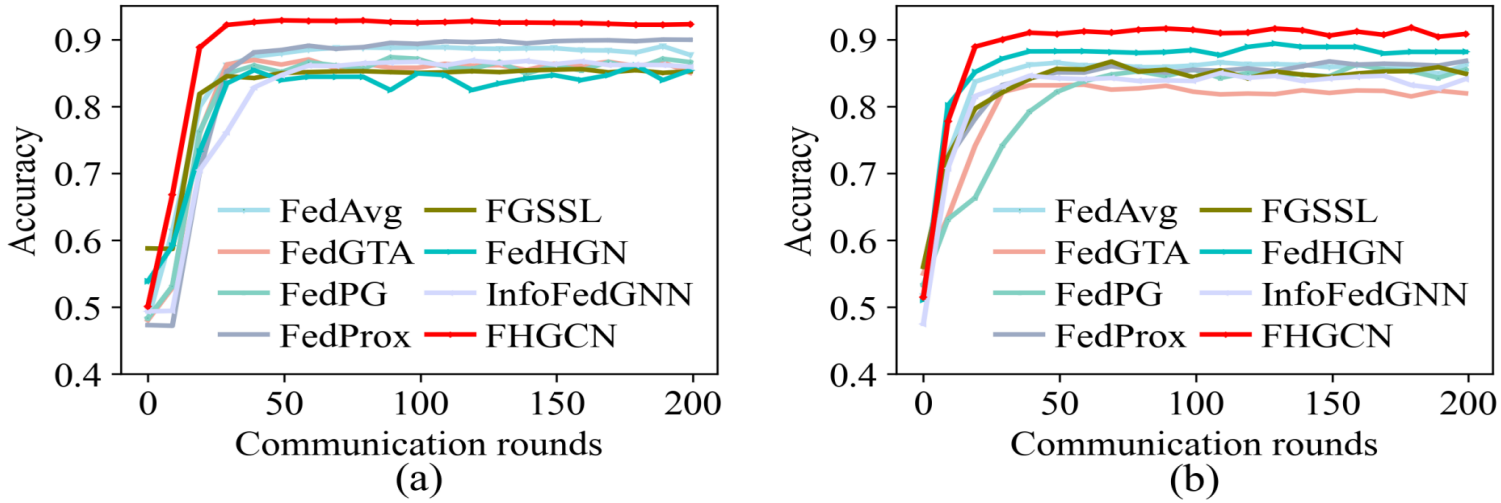
- Problems of conventional stereo matching approaches:
  - Client data heterogeneity induces semantic and structural divergence, causing client drift and information loss during aggregation.
  - Existing federated graph learning methods fail to both mitigate client drift and recover aggregation-induced information loss.
- Ideas: A bidirectional collaborative optimization between the global and local models to alleviate data heterogeneity.



On the client side, a contrastive distillation module that aligns local model with the global model at fine-grained semantic and structural levels to mitigate client drift; On the server side, an adversarial distillation module that refines the global model by generating meta-path graphs to recover aggregation-induced knowledge loss.

Main Contributions

- Contributions:
  - A novel FHGL framework that enables bidirectional collaborative optimization between the global and local models to alleviate data heterogeneity;
  - A contrastive distillation module that aligns local model with the global model at fine-grained semantic and structural levels to mitigate client drift.;
  - An adversarial distillation module that refines the global model by generating meta-path graphs to recover aggregation-induced knowledge loss.



Test accuracy curves yielded by each method under the Metis partitioning method with different numbers of clients versus the communication rounds. Left: ACM with 3 clients; Right: DBLP with 5 clients.