

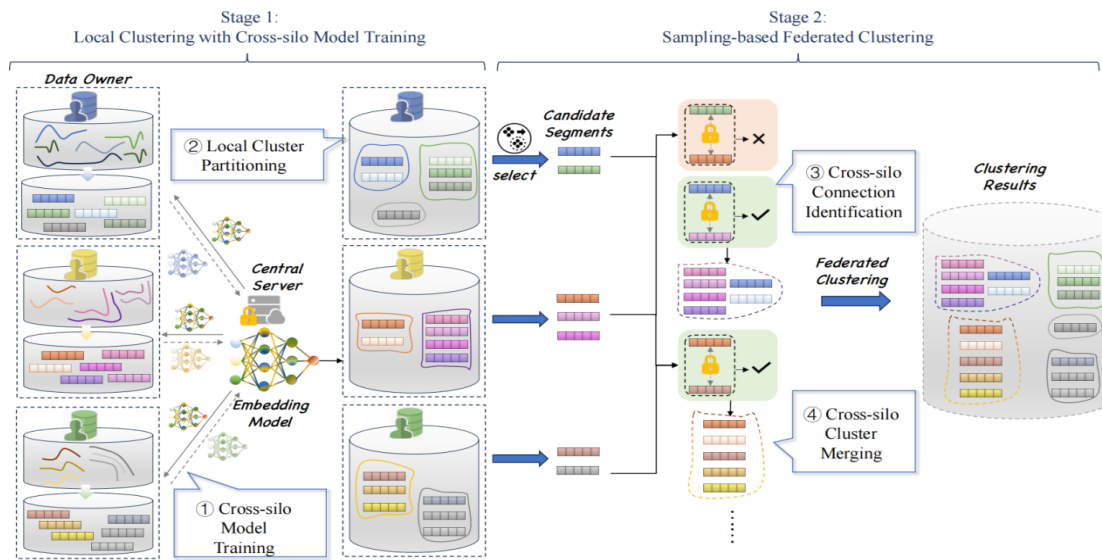
FCS-251538-FedTraj: Enabling Effective Federated Trajectory Clustering with Hierarchical Cross- Silo Interactions

Kaining ZHANG, Qian TAO, Yiming NIU, Yongxin TONG

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Problems & Ideas

- Problems of conventional centralized approaches:
 - Due to stringent privacy regulations, centralizing raw trajectory data for joint analysis is typically infeasible. Conventional centralized approaches face challenges when deployed across distributed data sources, including the lack of suitable distance metrics for heterogeneous trajectory data and efficient mechanisms for cluster generation.
- Ideas:
 - The proposed framework consists of two core components: local clustering with cross-silo model training and sampling-based federated clustering.



Main Contributions

- Contributions:
 - We introduce a basic framework designed to enable secure trajectory segments clustering across decentralized data sources;
 - Building upon the basic framework, we develop an optimized mechanism that leverages cross-silo triangular relationships to reuse distance computation results, reducing computational overhead;
 - Extensive experiments on two real-world datasets demonstrate that our method achieves promising cluster quality and efficiency.

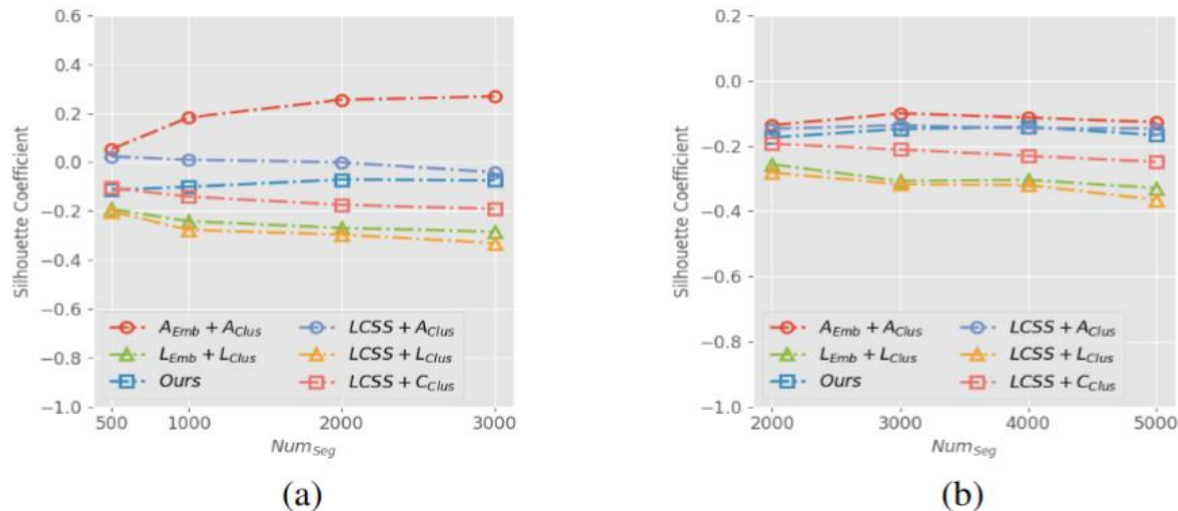


Fig. 4 Silhouette coefficient when varying Num_{seg} . (a) Results on Beijing Taxi Dataset; (b) results on Porto Dataset