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Self expressive federated data analytics for networked systems

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We propose a novel federated learning framework on a network of clients with heterogeneous data. Unlike conventional federated learning, which creates a single aggregated model shared across all nodes, our approach develops a personalized aggregated model for each node using the information (and not the raw data) of neighboring nodes in the network. To do so, we leverage the topology of the underlying (similarity) network to guide how models (nodes) influence one another. While our approach is general to any modeling framework, we create a formulation based on Generalized Linear Models (GLMs). To estimate the model parameters, we develop a decentralized optimization algorithm based on the alternating direction method of multipliers (ADMM) to efficiently solve the problem without central coordination. Experimental results demonstrate that our method outperforms existing federated and personalized learning baselines in terms of predictive performance, adaptability, and robustness to network sparsity.

Special/ Invited session

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