

Incentive Mechanism Design for Federated Learning with Unstateful Clients

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Thursday, September 26, 2024
1:30 P.M. • MSEE 112

Zoom: <https://purdue-edu.zoom.us/j/95619760242> ~ **Meeting ID:** 956 1976 0242

Abstract

Federated learning (FL) is an attractive distributed machine learning paradigm that enables numerous clients to collaboratively train a shared model while keeping their data decentralized. However, without sufficient incentive, rational clients may be reluctant to participate in FL due to the associated training costs. Additionally, client availability often fluctuates—whether randomly or periodically—a phenomenon referred to as “unstatefulness.” This inconsistency, combined with the heterogeneity of client data, introduces biases into the trained model, rendering traditional incentive mechanisms, which assume full or partial client participation, ineffective. In this talk, I will introduce several of our game-theoretic mechanisms designed to effectively address these challenges. Finally, I will showcase our recently system work, including Fedkit, a cross-platform FL implementation for Android and iOS, and FedCampus, a real-world privacy-preserving mobile application developed for the smart campus at Duke Kunshan University.

Bio

Dr. Bing Luo is an Assistant Professor of Data and Computational Science at Duke Kunshan University (DKU). He earned his Ph.D. from The University of Melbourne and served as a joint Postdoctoral Researcher at The Chinese University of Hong Kong (Shenzhen) and Yale University. Prior to his Ph.D., he worked as a project manager at the China Mobile Corporation Headquarter. His current research interests include the theory and practice of federated and edge learning, with a focus on optimization and game-theoretical design, as well as embedded AI for mobile systems. More information can be found in this webpage: <https://luobing1008.github.io/>

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