

THE HONG KONG POLYTECHNIC UNIVERSITY DEPARTMENT OF MANAGEMENT AND MARKETING

MIS-RIFL Joint Seminar

Revisiting Cross-Silo Federated Learning: Cross-Algorithm Federated Learning via Federated Kalman Filter By



Dr Hengrun Zhang
East China University of Science and Technology

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Time : 10:30 am – 12 noon
Venue : M802, PolyU

Abstract

Federated learning (FL) has evolved into a diverse ecosystem of algorithms designed for different data distributions, system constraints, and application requirements. In practical cross-silo settings, however, organizations may independently adopt different FL algorithms, creating a new form of heterogeneity that cannot be adequately addressed by conventional cross-silo FL. This talk introduces cross-algorithm federated learning (CAFL) and discusses how models produced by heterogeneous FL algorithms can be effectively coordinated without modifying the internal training or aggregation procedures of individual silos. Inspired by multi-sensor information fusion, we present CAFL-FKF, a two-level framework that combines state correction with federated fusion through a federated Kalman filter. The talk will explain how Bayesian uncertainty estimation is used to characterize process noise and algorithm drift, how Kalman filtering enables adaptive cross-silo model fusion, and why algorithm heterogeneity can become a source of complementary knowledge rather than merely an obstacle. Experimental observations on multiple real-world datasets will also be discussed to demonstrate the convergence, robustness, and practical potential of CAFL-FKF for complex federated learning scenarios.

Dr Hengrun Zhang is an assistant professor in the Department of Computer Science and Engineering at East China University of Science and Technology. He received his Ph.D. in Computer Science from George Mason University and was selected for the Shanghai Overseas High-level Talents Program. His research interests include federated learning, data engineering, AI privacy and security. He has published in CCF-A journals and conferences, including ACM MM, ACL, IEEE TIFS, IEEE TDSC, and IEEE INFOCOM.



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