



TMLR Young Scientist SEMINAR

2023 SERIES

Trustworthy Machine Learning and Reasoning Group



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Date: 19 January 2023 (Thursday)
Time: 09:00 – 10:00 (HKT)
Zoom: <u>https://meeting.tencent.com/dm/h8d4o1p4e2bB</u>

Towards Efficient Federated Learning: Anytime, Anywhere and with Any Data

ABSTRACT

Federated Learning (FL) has been a prevailing distributed learning framework in recent years aiming to promoting collaborations while preserving privacy. Thanks to such benefits, FL has been increasing popular and successful especially in modern deep learning fields, including but not limited to applications in healthcare, FinTech, advertisement, etc. Owing to the uniqueness of FL itself, when measured up to classic distributed learning, FL also introduces two main technical challenges: data and system heterogeneity (e.g., Non-IID data, different computation capacity, flexible device availability and heterogeneous communication channels). In this work, the overarching theme is to explore the theoretical understanding for gradient-based FL training and, in turn, to design efficient FL algorithms and frameworks to promote flexible device participation under the challenges of data/system heterogeneity. We will focus on three mutually reinforcing research questions, each of which tackles one key aspect to support efficient FL systems: i) will FL with Non-IID datasets achieve the state-ofthe-art convergence rate as that of mini-batch SGD prevalent in classic distributed learning? ii) how does the system heterogeneity (abstracted as device/client participation) impact FL and under what conditions to guarantee the convergence? iii) how to design efficient FL frameworks/algorithms to facilitate flexible device participation to enable participation/exit at will? Collectively, by answering the above questions, this work contributes to the further understanding of FL and serves as a foundation of the next-generation federated learning framework that supports anytime and anywhere learning.



Haibo Yang is a Ph.D. candidate in the Department of Electrical and Computer Engineering at Ohio State University working with Jia (Kevin) Liu. His research interests are in distributed optimization, federated learning, and robust machine learning.

ENQUIRY

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