School of Engineering Seminar

SAN FRANCISCO STATE UNIVERSITY

Speaker:

Fei Dou
Ph.D. Candidate,
Department of Computer
Science and Engineering,
University of Connecticut

Date:
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1:00-1:50 PM

Location:
Hensill Hall 803

Machine Intelligence of Ubiquitous Computing in the Internet of Things

Abstract: The penetration of technologies such as Machine Learning (ML), Artificial Intelligence (AI), wireless broadband, and the Internet of Things (IoT) is propelling the rapid adoption of ubiquitous devices across a variety of sectors. However, the enhancement of machine intelligence in ubiquitous computing in the IoT is hindered by various barriers, including: 1) inefficiency and low scalability of trained models, 2) security and privacy concerns surrounding user data, 3) data heterogeneity across devices, and imbalanced data distribution on individual devices, 4) communication bottlenecks and high computational costs.

In this talk, I will present my research in the field of Indoor Location-based Services (ILBS) in the IoT, which aims to overcome the aforementioned challenges by learning useful information from ubiquitous devices while preserving user privacy. Specifically, I will discuss how we have designed a bisection reinforcement learning approach by formulating a novel Markov Decision Process (MDP) for indoor localization, as opposed to existing classification or regression formulations, to ensure efficient and effective model training in large solution spaces, and to improve the scalability of trained models. Furthermore, I will present an on-device ILBS framework by developing a personalized federated reinforcement learning method to rigorously protect the privacy of personal data on IoT devices over wireless edge networks, while addressing model oscillation/drifting and reducing communication costs in the presence of system heterogeneity.

Speaker Bio: Fei Dou is a final-year Ph.D. candidate in the Department of Computer Science and Engineering at the University of Connecticut, under the supervision of Prof. Jinbo Bi. Her research centers on exploring how AI/ML can improve the efficiency, privacy, and scalability of the IoT. Specifically, Fei is mainly working on Indoor Location-based Services (ILBS), Edge Computing, and Remote Sensing Imagery Analysis by developing new methods from the perspectives of Reinforcement Learning, Federated Learning, and Contrastive Learning. Fei's work has been published in highly-selective and high-impact journals such as IEEE IOT-J, and she has served as a reviewer at top-notch conferences and journals including ICLR, AAAI, IJCAI, Sensors, etc. More information can be found on her webpage https://fayedou.github.io/.

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