YUXI ZHAO

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OVERVIEW

Result-driven researcher with a strong background in federated learning and data crowdsourcing. Skilled at theoretical analysis, truthful incentive mechanism design, differential privacy, and multi-armed bandits problems. Solid mathematical background and coding ability. Effective communicator and team leader with ability to manage collaboration projects and present works to all-level audiences.

EDUCATION

Doctor of Philosophy in Electrical Engineering 08/2018-12/2022
Auburn University, Auburn, AL, USA

Master of Engineering in Electrical Engineering 08/2021-12/2022
Auburn University, Auburn, AL, USA

Master of Engineering in Communication Engineering 09/2015-06/2018
Harbin Engineering University, Harbin, Heilongjiang, China

- Third-class scholarship for postgraduates in October 2016
- First-class scholarship for postgraduates in October 2015

International Exchange Program in the Department of Electrical and Computer Engineering 02-05/2016
Western New England University, Springfield, MA, USA

Bachelor of Engineering in Electronic and Information Engineering 09/2011-06/2015
Harbin Engineering University, Harbin, Heilongjiang, China

- Scholarship for Top 15 Students: All academic years from 2012 to 2014

PUBLICATIONS

Journal Articles

2. **Y. Zhao**, X. Gong, F. Lin and X. Chen, "Data Poisoning Attacks and Defenses in Dynamic Crowdsourcing with Online Data Quality Learning," IEEE Transactions on Mobile Computing, 2021

1. **Y. Zhao**, X. Gong and X. Chen, "Privacy-Preserving Incentive Mechanisms for Truthful Data Quality in Data Crowdsourcing," IEEE Transactions on Mobile Computing, 2020

Conference Proceedings

6. **Y. Zhao**, X. Gong, S. Mao, "Truthful Incentive Mechanism for Federated Learning with Crowdsourced Data Labeling," IEEE INFOCOM, 2023

5. D. Li, **Y. Zhao** and X. Gong, "Quality-Aware Distributed Computation and Communication Scheduling for Fast Convergent Wireless Federated Learning," WiOpt, 2021

4. **Y. Zhao** and X. Gong, "Quality-Aware Distributed Computation for Cost-Effective Non-Convex and Asynchronous Wireless Federated Learning," WiOpt, 2021

3. **Y. Zhao** and X. Gong, "Quality-Aware Distributed Computation and User Selection for Cost-Effective Federated Learning," IEEE INFOCOM Workshops, 2021

2. **Y. Zhao** and X. Gong, "Truthful Quality-Aware Data Crowdsensing for Machine Learning," SECON, 2019

1. **Y. Zhao**, L. Qi, Z. Dou and R. Zhou, "MIMO waveform design using Spectrally Modulated Spectrally Encoded (SMSE) framework," ICCSNT, 2016

RESEARCH EXPERIENCE

Graduate Research Assistant | Auburn University 2018-2022

Truthful Incentive Mechanism for Federated Learning with Crowdsourced Data Labeling

- Analyzed the impact of the strategic behavior of clients on the training loss of Federated Learning
- Devised Labeling and Computation Effort and local Model Elicitation (LCEME) mechanisms

Quality-Aware Distributed Computation and User Selection for Cost-Effective Federated Learning

- Analyzed the impact of quality of clients on the training loss of Federated Learning
- Developed cost-effective dynamic distributed learning algorithms for FL in wireless networks

Data Poisoning Attacks and Defenses in Dynamic Crowdsourcing with Online Data Quality Learning

- Devised malicious data attacks on dynamic crowdsourcing and characterized the conditions under which the attack is effective
- Developed online quality learning algorithm as a defense mechanism against the data poisoning attack

Privacy-Preserving Incentive Mechanisms for Truthful Data Quality in Data Crowdsourcing

- Devised Single-task and Multi-task Privacy-preserving crowdsourcing mechanisms for truthful Data Quality Elicitation (S-PDQE and M-PDQE)
- Designed differentially private task allocation and data aggregation algorithms

Truthful Quality-Aware Data Crowdsensing for Machine Learning

- Devised truthful quality-aware crowdsensing mechanisms based on machine learning model
- Investigated the socially optimal and the requester's optimal effort assignments

Visiting Scholar | Western New England University 02-05/2016

Adaptive Pulse Compression based Software Defined Radar Implementation and Demonstration

- Implemented APC (Adaptive Pulse Compression) algorithm using MATLAB
- Demonstrated the SDRadar system using USRP
- Got the acceptance notification from QRS2017

Graduate Research Assistant | Harbin Engineering University 2015-2018

Design and Parameter Optimization Selection of MIMO Waveform Generator Based on SMSE

- Developed the MIMO SMSE model which generates the transmit waveforms of multiple systems
- Proposed a MIMO SMSE model based on soft decision
- Developed frequency selection algorithm based on intelligent soft decision to maximize system throughput

Data Analytics and Feature Extraction for Wireless Communications

- Analyzed data and extract features for wireless signal detection and classification
- Implemented convolutional encoding and Viterbi decoding using Matlab
- Differentiated modulation mode with eye diagram

SMSE-based Dynamic Frequency Spectrum Access

- Analyzed Bit Error Rate (BER) statistically
- Designed and analyzed wireless channel model

WORK EXPERIENCE

Lab Instructor 2020-2022

- Digital System Design (Undergraduate curriculum)

Intern 07/2014

Neusoft Group CO., Ltd, Shenyang, Liaoning, China

- Developed an embedded palmtop for doctors
- Had a good mastery of development tools, including XP hyper terminal, Linux, mini2440 etc.

HONOURS

- INFOCOM 2021 Student Conference Award 03/2021
- ICCNT 2016 Best Student Paper Award 12/2016
- Silver Award in Second “Jinhe” Cup Dancing Contest in Northeast China Region (Youth Group) 09/2014
- Excellent League Member 05/2014
- Excellent Student Cadre in the 2012 to 2013 academic year 10/2013
- Advanced Individual for Organization Work (Twice) 12/2012&12/2011

EXTRACURRICULAR ACTIVITIES

Member of Feilu Dance Troupe 09/2012-09/2016
Director of Students’ Association Union in Harbin Engineering University 09/2012-09/2013

TECHNICAL SKILLS

Background: Federated Learning, Data Crowdsourcing, Economic Mechanism, Multi-Armed Bandits, Differential Privacy, Optimization, Statistic, Data Analytics
Programming: MATLAB, Python, Verilog, VHDL
Languages: Native in Chinese, Fluent in English