SIJIA CHEN

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RESEARCH INTERESTS

My research is driven by the goal of developing artificial intelligence (AI) frameworks that effectively and efficiently *perceive* and *reason* in real-world scenarios. My primary interests lie in **distributed computing**, **multimodal machine learning**, and **decision-making**, as well as in the intersections among these fields. Specifically, my past and ongoing work has covered topics such as *multimodal federated learning*, *reasoning and planning with large models*, and *visual grounding*. Building on these achievements, my aim is to further explore decentralized decision-making and training systems for foundation models, develop theoretical bases for their explainable reasoning, and, most importantly, broaden the applications of these techniques in science and engineering.

EDUCATION

Ph.D. in Electrical and Computer Engineering, University of Toronto, December, 2024
Dissertation: Toward Reliable Problem Solving with Pre-trained Large Language Models
Advisor: Prof. Baochun Li, Department of Electrical and Computer Engineering; *IEEE Fellow, Fellow of the Engineering Institute of Canada, Fellow of the Canadian Academy of Engineering*

M.S. in Information and Communication Engineering, Xidian University, June, 2018
Dissertation: Research on multimodal data modeling and retrieval for common space learning
Advisor: Prof. Bin Song, Department of Information and Communication Engineering; *IEEE Senior Member, Director of Information Network Laboratory of Xidian Hangzhou Research Institute*

B.A. in Information and Communication Engineering, Xidian University, June, 2015

HONORS AND FELLOWSHIPS

Doctoral Completion Award (DCA), University of Toronto — Toronto, Canada
School of Graduate Studies Conference Grant, University of Toronto — Toronto, Canada
Edward S. Rogers Sr. Graduate Scholarships, University of Toronto — Toronto, Canada
National Scholarship, Xidian University — Xian, Chain
Outstanding graduates, Xidian University — Xian, Chain
Second Class Scholarship, Xidian University — Xian, Chain
Third Class Scholarship, Xidian University — Xian, Chain

PUBLICATIONS

Journal Papers

1. **Sijia Chen**, Bin Song, Xiaojiang Du, Nadra Guizani. "Structured Bayesian Compression for Deep Models in Mobile-enabled Devices for Connected Healthcare," in *IEEE Network*, 2020.
2. **Sijia Chen**, Bin Song, Luhai Fan, Xiaojiang Du, Mohsen Guizani. "Multi-modal Data Semantic Localization with Relationship Dependencies for Efficient Signal Processing in EH CRNs," in *IEEE Transactions on Cognitive Communications and Networking*, 2019.
3. **Sijia Chen**, Bin Song, Jie Guo, Yanling Zhang, Xiaojiang Du, Mohsen Guizani. "FPAN: Fine-grained and Progressive Attention Localization Network for Data Retrieval," in *Computer networks*, 2018.
4. **Sijia Chen**, Bin Song, Jie Guo. "Attention Alignment Multimodal LSTM for Fine-gained Common Space Learning," in *IEEE access*, 2018.

Conference Papers

1. **Sijia Chen**, Baochun Li. "Toward Adaptive Reasoning in Large Language Models with Thought Rollback," in *International Conference on Machine Learning*, ICML 2024. [Code]

2. **Sijia Chen**, Baochun Li, Di Niu. "Boosting of Thoughts: Trial-and-Error Problem Solving with Large Language Models," in *International Conference on Learning Representations*, ICLR 2024. [Code]

3. **Sijia Chen**, Ningxin Su, Baochun Li. "Calibre: Towards Fair and Accurate Personalized Federated Learning with Self-Supervised Learning," in *International Conference on Distributed Computing Systems*, ICDCS 2024. [Code]

4. **Sijia Chen**, Ningxin Su, Baochun Li. "Relic: Federated Conditional Textual Inversion with Prototype Alignment," in *International Symposium on Quality of Service*, IWQoS 2024. [Code]

5. **Sijia Chen**, Baochun Li. "Multi-modal Dynamic Graph Transformer for Visual Grounding," in *IEEE Conference on Computer Vision and Pattern Recognition*, CVPR 2022. [Code]

6. **Sijia Chen**, Baochun Li. "Towards Optimal Multi-modal Federated Learning on non-IID Data with Hierarchical Gradient Blending," in *IEEE Conference on Computer Communications*, INFOCOM 2022. [Code]

7. **Sijia Chen**, Bin Song, Jie Guo, Xiaojiang Du. "An Unbalanced Data Hybrid-Sampling Algorithm Based on Multi-Information Fusion," in *IEEE Global Communications Conference*, GLOBECOM 2017.

PROFESSIONAL EXPERIENCE

Research Assistant June, 2018 — June, 2019
Chau Yuen's Lab, Singapore University of Technology and Design (SUTD), Singapore
Associate Professor Yuen Chau with the project *Bayesian machine learning in Communication Engineering*

TEACHING EXPERIENCE

Mentored Students

Xitong Zhang December 2022 - February 2022
Served as a mentor and supervisor for a research project on multimodal federated learning, culminating in a research paper published at IEEE INFOCOM 2022.

Jason Wang May 2024 - August 2024
Provided mentorship and supervisory guidance over three months, leading to a research paper on optimizing bandwidth allocation for training large machine learning models with flow dependencies across wide-area inter-datacenter networks.

Haojian Zheng December 2024 - February 2025
Provided mentorship and supervision for a three-month research project, culminating in an ICML submission exploring the latent plan Distillation to enhance the reasoning capabilities of large language models.

PROFESSIONAL SERVICE

Journal Reviewers

IEEE Transactions on Dependable and Secure Computing
IEEE Transactions on Big Data
IEEE Transactions on Computational Social Systems IEEE Transactions on Cloud Computing
IEEE Transactions on Cloud Computing
IEEE Transactions on Network Science and Engineering

Conference Reviewers

IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2023,2024,2025
International Conference on Distributed Computing Systems (ICML), 2025

Conference on Neural Information Processing Systems (NeurIPS), 2024
International Conference on Learning Representations (ICLR), 2025
IEEE Conference on Computer Communications (INFOCOM), 2022,2023,2024,2025
International Conference on Distributed Computing Systems (ICDCS), 2023
ACM International Conference on Multimedia (ACMMM), 2023