SIJIN CHEN

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EDUCATION

Princeton University   New Jersey, United States
Ph.D. in Electrical and Computer Engineering   *Sept. 2023 – present*

- Cumulative GPA: 3.9/4.0
- Honors and Awards: Gordon Wu Fellowship (2023)
- Courses: Theoretical Machine Learning, Measure-Theoretic Probability, Stochastic Calculus, Reinforcement Learning

The Chinese University of Hong Kong   Hong Kong
B.Sc. in Computer Science with Honours, First Class; Minor in Mathematics   *Sept. 2019 – Jun. 2023*

- Major GPA: 4.0/4.0; Cumulative GPA: 3.9/4.0
- Honors and Awards: Hong Kong Government Scholarship (2022); Department Award for Outstanding Academic Performance (2022); Best Project Award of Research Internship (2020)
- Courses: Advanced Algorithms, Computational Learning Theory, Real Analysis, Abstract Algebra, Stochastic Processes

RESEARCH INTEREST

Theory and provable algorithms for machine learning and optimization.

PUBLICATIONS

1. **Sijin Chen**, Zhize Li, and Yuejie Chi, *Escaping Saddle Points in Heterogeneous Federated Learning via Distributed SGD with Communication Compression*, International Conference on Artificial Intelligence and Statistics (AISTATS), 2024. https://arxiv.org/abs/2310.19059

2. **Sijin Chen**, Xiwei Cheng, and Anthony Man-Cho So, *Non-Convex Joint Community Detection and Group Synchronization via Generalized Power Method*, International Conference on Artificial Intelligence and Statistics (AISTATS), 2024. https://arxiv.org/abs/2112.14204

3. Wu Zheng, Weiliang Tang, **Sijin Chen**, Li Jiang, and Chi-Wing Fu, *CIA-SSD: Confident IoU-Aware Single-Stage Object Detector from Point Cloud*, AAAI Conference on Artificial Intelligence (AAAI), 2021. https://ojs.aaai.org/index.php/AAAI/article/view/16470

RESEARCH EXPERIENCES

Second-order stationarity of communication-efficient distributed SGD
supervised by Prof. Yuejie Chi   *May 2022 – Oct. 2023*

- Designed a distributed SGD algorithm with a novel error-feedback mechanism for communication compression
- Proved a high-probability bound for the convergence to second-order stationary points of the proposed algorithm by showing the saddle-escaping property with the coupling sequence technique
- Removed the commonly used assumptions on local objective similarity to accommodate the federated learning settings
- Implemented a PyTorch optimizer based on the proposed algorithm to empirically validate our theory through neural network training experiments

Provably fast methods for non-convex optimization problems
supervised by Prof. Anthony Man-Cho So   *June 2021 – Dec. 2021*

- Proposed a generalized power method (GPM) with spectral initialization to solve a joint problem of group synchronization and community detection
- Established an estimation error bound for the spectral initialization using random matrix and random graph arguments
- Proved the linear convergence guarantee for GPM, ensuring a significantly lower time complexity than the state-of-the-art semidefinite relaxation method

3D computer vision via deep learning
supervised by Prof. Philip Chi-Wing Fu   *June 2020 – Nov. 2020*

- Cooperated with PhD researchers to design 3D convolutional neural network models for autonomous driving scenes
- Proposed data augmentation methods for performance improvement, validated their efficiency for model training on the benchmark dataset KITTI
- Won the Best Project Award of Summer Research Internship

SKILLS

Languages: Mandarin Chinese (native), Cantonese (conversational)
Programming: Python, PyTorch, MATLAB, C/C++, Java, HTML/CSS, LaTeX
Computer: Linux, SSH, Microsoft Office