

Yuxing LIU

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EDUCATION

Fudan University (FDU)

Shanghai, China

Bachelor of Science in Data Science

Aug 2020 - Jul 2024 (Expected)

- **Overall GPA:** 3.58/4.0; **Major GPA:** 3.76/4.0;
- Relevant Course Work: Mathematical Analysis (A), Linear Algebra, Probability Theory (A), Data Structure (A), Statistics: Principles, Methods and R, Numerical Algorithms (A), Method of Optimization (A), Stochastic Processes, Statistical Learning and Machine Learning, Computational Statistics, Applied Functional Analysis (A), Artificial Intelligence, Linear Programming, Neural Network and Deep Learning (A).

Hong Kong University of Science and Technology (HKUST)

Hong Kong, China

UG Visiting Internship Student in Department of Mathematics

Aug 2023 - Sep 2023

Advisor: Tong Zhang, Professor, Department of Mathematics, HKUST

RESEARCH EXPERIENCES

SGD and Acceleration

Jun 2023 - Sep 2023

Research Assistant | Advisor: Tong Zhang, Professor, Department of Mathematics, HKUST

- Aimed to theoretically explain the speedup of SGD with Heavy Ball Momentum (SHB) over SGD on quadratic objective functions.
- Developed and applied new techniques on bounding non-commutative matrix products in order to prove convergence results when the a decaying step size scheduler is employed.
- Proved that the convergence of SHB achieves overall (near)-minimax rate and SHB converges within fewer iteration than SGD under the large batch setting.
- Under review for ICLR 2024.

Decentralized First-Order Strongly Convex Optimization

Mar 2023 - Nov 2023

Research Assistant | Advisor: Luo Luo, Assistant Professor, School of Data Science, FDU

- Aimed to reduce computation costs by applying techniques inspired by variance reduction, so as to reduce the total first-order oracle complexity of all agents.
- The proposed method also lowers time complexity in the decentralized finite-sum optimization case by replacing the dependence on local condition number to global condition number.
- Inspired novel lower bounds based on the employed parameters.

Studies on Bandit Algorithms

Jul 2023 - Aug 2023

Group Seminar | Advisor: Luo Luo, Assistant Professor, School of Data Science, FDU

- Studied broadly the multi-arm bandits problem and some classic algorithms.
- Researched through the UCB and MOSS algorithm and discussed their merits and limitations.

Projects on Neural Network and Deep Learning Course

Apr 2022 - Jun 2022

Class Project | Advisor: Yanwei Fu, Professor, School of Data Science, FDU

- Researched the smoothness of a network and how batch normalization helps training.
- Tried to deal with the Novel Image Captioning task on the MSCOCO dataset.

PREPRINTS AND MANUSCRIPTS

Research on SGD Heavy Ball Momentum: <https://openreview.net/forum?id=Clqjp9yTDq>

Research on Decentralized Optimization: <https://infinity-stars.github.io/publications/>