CHENYU ZHANG

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EDUCATION

Columbia University *2022 - 2023 (expected)*

M.S. in Data Science

Overall GPA: 4.33/4

Relevant Courses

Reinforcement Learning	A+	Algorithms for Data Science	A+
Probability and Statistics for Data Science	A+	Exploratory Data Analysis	A+

Fudan University *2018 - 2022*

B.S. in Mathematics and Applied Mathematics

Honors Student of Su Buqing Top Talent Program

Overall GPA: 3.54/4

Relevant Courses

Numerical Linear Algebra and Optimization (H)	A	Deep Learning	A
Numerical Solution to Differential Equations	A	Methods of Optimization	A
Functions of Complex Variable	A	Probability Theory	A
An Introduction to Differential Manifolds (H)	A-	Advanced Algebra	A
Computational Thinking	A	Fundamentals of Mechanics	A

Relevant Seminars

Intelligent Optimization Algorithms	Convex Optimization
Complex Analysis	Global Differential Geometry
Differential Manifolds and Differential Topology	Differential Geometry of Curves and Surfaces
Non-Euclidean Geometry and Point Set Topology	Principles of Mathematical Analysis
Advanced Mathematical Analysis	

Shenzhen Middle School *2015 - 2018*

Honor Curriculum (Physics Olympiad)

Award: Chinese Physics Olympiad - First Class Award

WORKING PAPERS

- **Chenyu Zhang,** Han Wang, and James Anderson. FedSARSA: Federated SARSA with Linear Function Approximation under Environmental Heterogeneity. *Advances in Neural Information Processing Systems,* 2023. [Ready to submit]
- **Chenyu Zhang,** Rufeng Xiao, and Rujun Jiang. A Semismooth Trust Region Based Augmented Lagrangian Method for Nonsmooth Nonconvex Optimization on Riemannian Manifolds. *Computational Optimization and Applications,* 2023. [Ready to submit]
- **Chenyu Zhang,** Qi Cai, Zhuoran Yang, and Zhaoran Wang. On Reward-Free Reinforcement Learning for POMDPs with Linear Function Approximation. [Ready to submit]

TEACHING/RESEARCH EXPERIENCE

Analysis of Algorithms *January 2023 - Present*

Teaching assistant, advised by Prof. Eleni Drinea of Dept. CS, Columbia University, NY

- Designed solutions for 5 homework assginments and 2 exams, grading over 800 student submissions.
- Hosted office hours each week, providing personalized support and guidance to 50+ students on complex topics.

Federated Reinforcement Learning *September 2022 - Present*

Research assistant, advised by Prof. James Anderson of Dept. EE, Columbia University, NY

- Developed a novel federated SARSA algorithm and established its finite-time error bounds, as well as demonstrated its linear convergence speedups with the presence of environmental heterogeneity.
- Conducted three numerical experiments to verify the theoretical results of the federated SARSA algorithm.

Manifold Nonsmooth Nonconvex Optimization *October 2021 - September 2022*

Research assistant, advised by Prof. Rujun Jiang of Dept. Data Science, Fudan University, China

- Developed the first semismooth Riemannian trust-region method for nonsmooth nonconvex optimization problems on manifolds, and proved its convergence results including superlinear local convergence rate.
- Applied our semismooth Riemannian trust-region method to solve the subproblem of augmented Lagrangian methods on manifolds, and demonstrated its superiority over existing methods through two numerical experiments.
- Established a state-of-the-art iteration complexity $\tilde{O}(\epsilon^{-3/2})$ of our semismooth Riemannian trust-region method.

Reinforcement Learning for POMDPs *March 2021 - January 2022*

Research assistant, advised by Prof. Zhaoran Wang, Dept. of IEMS&CS, Northwestern University, IL

Co-advised by Prof. Zhuoran Yang, Dept. of Stat&Data Science, Yale University, CT

- Designed a reward-free RL algorithm for tabular POMDPs and established its sample efficiency guarantee.
- Extended the reward-free RL algorithm to linear POMDPs and preserved the sample efficiency.

RELEVANT PROJECTS

Course Projects: Exploratory Data Analysis and Visualization *September 2022 - December 2022*

- Created a digital garden for EDAV to learn in public: *EDAV Garden*.
- Conducted a research on music reviews and streams using R and JavaScript: *Review vs Stream*.

Internship: Database Migration and Deployment of OA Systems *July 2021 - September 2021*

Database developer intern, jointly supervised by Shanghai Weaver Network and Shenzhen Sine Electric

- Migrated the old OA system's SQL Server database and deployed it as a MySQL database for the new OA system.
- Extended the functionalities of existing workflows, such as automated email delivery and single sign-on, by developing many hooks.

Course Project: Introduction to Databases Systems *February 2021 - June 2021*

- Built an interactive library database web application using Flask and PostgreSQL: *Salt Library*.

Mathematical Contest In Modeling 2021 *February 2021*

- Designed a fast-response UAV firefighting system based on the genetic algorithm and implemented it in MATLAB.