CHUNG-EN TSAI

Research Assistant in Computer Science

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RESEARCH INTERESTS

Machine learning theory, mathematical optimization, dynamical systems, and scientific computing.

CURRENT POSITION

Full-time research assistant in the Department of Computer Science at National Taiwan University.

EDUCATION

09.2024 - **Eidgenössische Technische Hochschule Zürich (ETH Zürich)**
Direct Doctorate in Computer Science.

09.2019 - 06.2023 **National Taiwan University (NTU)**
B.S. in Computer Science and Information Engineering (CSIE).
GPA: 4.23/4.30; Rank: 5/123.
Dean's list in 06.2020 and 12.2022.

EXPERIENCE

09.2021 – 07.2024 **Laboratory of Learning Theory and Optimization Methods, NTU**
Research assistant, advised by Prof. Yen-Huan Li
Working on online learning and large-scale optimization with logarithmic loss.

09.2022 – 06.2023 **Mathematics Division, National Center for Theoretical Sciences**
Undergraduate research assistant, advised by Prof. Chun-Hsiung Hsia.
Working on the Kuramoto model.

07.2022 – 08.2022 **Institute of Information Science, Academia Sinica**
Summer research intern, advised by Prof. Kai-Min Chung.
Studying circuit lower bounds and computational complexity theory.

TEACHING

02.2024 – 06.2024 **CSIE5410: Optimization Algorithms, NTU**
Teaching Assistant

09.2023 – 12.2023 **CSIE5062: Online Convex Optimization, NTU**
Teaching Assistant

02.2023 – 06.2023 **CSIE5002: Prediction, Learning, and Games, NTU**
Teaching Assistant

AWARDS

01.2024 **Outstanding Paper Award**
The Mathematical Society of the Republic of China.

06.2023 **Appier's Research Award and Undergraduate Research Award**
Department of Computer Science and Information Engineering, NTU.

06.2022 **Undergraduate Research Award**
Department of Computer Science and Information Engineering, NTU.

SERVICE

06.2023 **The 2023 IEEE International Symposium on Information Theory (ISIT 2023)**
Volunteer.

08.2021 - 07.2022 **The 44th NTU CSIE Student Council**
Minister of the Academic Department.

08.2020 - 07.2021 **The 43rd NTU CSIE Student Council**
Member of the Academic Department.

PAPERS

[6] G.-R. Wang, C.-E. Tsai, H.-C. Cheng, and Y.-H. Li. Computing Augustin information via hybrid geodesically convex optimization. In *IEEE Int. Symp. Information Theory (ISIT)*, 2024.

[5] C.-E. Tsai, H.-C. Cheng, and Y.-H. Li. Fast minimization of expected logarithmic loss via stochastic dual averaging. In *Proc. Int. Conf. Artificial Intelligence and Statistics (AISTATS)*, 2024.

[4] C.-H. Hsia and C.-E. Tsai. On the synchronization analysis of a strong competition Kuramoto model. *arXiv preprint*, 2024.

[3] C.-E. Tsai, Y.-T. Lin, and Y.-H. Li. Data-dependent bounds for online portfolio selection without Lipschitzness and smoothness. In *Adv. Neural Information Processing Systems (NeurIPS)*, 2023.

[2] C.-E. Tsai, H.-C. Cheng, and Y.-H. Li. Online self-concordant and relatively smooth minimization, with applications to online portfolio selection and learning quantum states. In *Proc. 34th Int. Conf. Algorithmic Learning Theory (ALT)*, pages 1481–1483, 2023.

[1] C.-E. Tsai, H.-C. Cheng, and Y.-H. Li. Faster stochastic first-order method for maximum-likelihood quantum state tomography. In *Int. Conf. Quantum Information Processing (QIP)*, 2023.

TALKS

08.2023 Data-dependent bounds for online portfolio selection without Lipschitzness and smoothness.
Trends in AI Theory Seminar Series, MediaTek Research.

02.2023 Online self-concordant and relatively smooth minimization, with applications to online portfolio selection and learning quantum states.
The 34th International Conference on Algorithmic Learning Theory (ALT 2023).

01.2023 Learning quantum states with the log-loss.
Trends in AI Theory Seminar Series, MediaTek Research.

06.2022 Online portfolio selection and online entropic mirror descent.
Trends in AI Theory Seminar Series, MediaTek Research.

POSTERS

05.2024 Fast minimization of expected logarithmic loss via stochastic dual averaging.
The 27th International Conference on Artificial Intelligence and Statistics (AISTATS 2024).

04.2024 Data-dependent bounds for online portfolio selection without Lipschitzness and smoothness.
Workshop on Nonsmooth Optimization and Applications (NOPTA 2024).

01.2024 Synchronization of Kuramoto model beyond sinusoidal interactions.
The 59th Annual Meeting of the Taiwanese Mathematical Society

01.2024 Improved dimension and sample size scalability for maximum-likelihood state tomography and approximating PSD permanents.
The 27th Conference on Quantum Information Processing (QIP 2024).

12.2023 Data-dependent bounds for online portfolio selection without Lipschitzness and smoothness.
The 37th Conference on Neural Information Processing Systems (NeurIPS 2023).

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