Meitong Liu

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Research Interests

Trustworthy ML: theories and applications of algorithmic **fairness** (multi-objective optimization/multi-task learning/federated learning) and **robustness** (distribution shifts/adversarial attacks)

AI alignment: enhancing preference personalization and safety of Large Models

Education

The University of Hong Kong 09/2021 - present
- Bachelor of Engineering in Computer Science; Minor in Statistics
- GPA: 4.12/4.30 (rank not available)

University of Illinois Urbana-Champaign 01/2024 - 05/2024
- Exchange student at The Grainger College of Engineering
- GPA: 4.0/4.0

Publications

Online Mirror Descent for Tchebycheff Scalarization in Multi-Objective Optimization
Meitong Liu, Xiaoyuan Zhang, Chulin Xie, Kate Donahue, and Han Zhao
Under review at AISTATS 2025, 2024. arXiv preprint.

SCMBench: Benchmarking Domain-specific and Foundation Models for Single-cell Multi-omics Data Integration
Yixuan Wang, Yimin Fan, Xuesong Wang, Tingyang Yu, Yongshuo Zong, Xinyuan Liu, Meitong Liu, Qing Li, Kin hei Lee, Khachatur Dallakyan, Gengjie Jia, Jiao Yuan, Ting-Fung Chan, Xin Gao, Irwin King, and Yu Li
Under review at Nature Communications, 2024.

Research Experiences

Trustworthy ML, University of Illinois Urbana-Champaign 04/2024 - present
Supervised by Prof. Han Zhao, Department of Computer Science

- Proposed a new solver for Tchebycheff scalarization in multi-objective optimization using online mirror descent that alleviates training instability and enjoys promising convergence guarantees.
- Designed an adaptive online-to-batch conversion scheme that significantly improves practical performance over traditional uniform averaging while retaining the same convergence rates.
- Conducted experiments on synthetic problems and federated learning tasks across 2 datasets, 3 settings, and 8 baselines, showing SOTA results on overall accuracy and interclient fairness.

AI in Healthcare, The Chinese University of Hong Kong 06/2023 - 01/2024
Supervised by Prof. Yu Li, Department of Computer Science and Engineering

- Benchmarked 3 single-cell multi-omics integration methods, with efforts in literature review, code reproduction, experiments, figure plotting, and manuscript preparation.
- Explored possible solutions to the suboptimal accuracies on rare cell types in bulk RNA sequence deconvolution, including training data curation, imbalanced-data-robust loss functions, architectures such as auto-encoders, and paradigms such as contrastive learning.

Honors

HKU Merit-Based Scholarships and Awards

Eliot Hall Memorial Scholarship (1 student per year)	2023 - 25
VTech Group of Companies Scholarship (3 Engineering students per year)	2023 - 24
YC Cheng Engineering Scholarship	2023 - 24
Young Tsun Dart Scholarship (2 Engineering students per year)	2023 - 24
AEON Scholarship (4 Engineering students per year)	2022 - 24
The HKU Foundation Scholarship	2021 - 22
Dean's Honours List, Faculty of Engineering (not up-to-date)	2021 - 23

Contests

RoboMaster University Championship International Regional, Second Prize	2023
China Collegiate Programming Contest for Girls, Bronze Medal	2022
International Collegiate Programming Contest Asia Regional, Shanghai, rank 302/678	2021

Other Academic Experiences

HKU Student Research Assistant 07/2024 - 08/2024
Supervised by Prof. Kam-Pui Wat, Department of Statistics and Actuarial Science

- Put together a small handbook of analyses and corrections to common notation, conceptual, or technical mistakes students make when studying primary courses in probability and statistics.

HKU Astar, Algorithm Developer 12/2022 - 08/2023
Astar is a student interest group focusing on robotics and AI.

- Integrated and tuned existing algorithms for state estimation and autonomous navigation on customized floor robots for the 2023 RoboMaster University Championship.

HKUPootal, Program Developer 11/2022 - 10/2023
HKUPootal is a student association promoting social activities among students.

- Backend development for a campus tree-hole WeChat mini-program.
- Optimization for keyword searching functionalities based on ElasticSearch.
- Frontend and backend development for the tree-hole backstage management website.

HKU Student Teaching Assistant 01/2023 - 05/2023
For COMP2113/ENGG1340 Programming Technologies/Computer Programming II.

- Hosted support sessions for Q&A.

HKU Programming Team 10/2021 - 01/2022
Supervised by Prof. Hubert Chan, Department of Computer Science.

- Weekly five-hour team training and additional individual practice for ICPC.

Community Contributions

HKU Lady Ho Tung Hall, Residential Student Advisor 09/2022 - 05/2023

- Provided guidance on academic planning and coursework-activity balance as a mentor to first-year hall-mates through group and individual meetings.

HKU Summer Institute, Student Ambassador 07/2022 - 08/2022
During the HKU-ZJU, HKU-ECNU Summer Programs.

- Organized ice-breaking games and campus tours; shared about freshman experience at HKU.

Skills

Programming languages Python, C/C++, R, PHP, Java, Haskell

Technologies PyTorch, Hugging Face, Vue.js, MySQL, ElasticSearch

Tools Linux, Git, LaTeX, Markdown

English proficiency TOEFL 115 (Speaking 27), IELTS 8.0 (Speaking 8.0)