

LEI Haoyu Leo

PH.D. STUDENT

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Objective

As a Ph.D. student in computer science, I am keen to explore **Machine Learning Theory** based on information theory and optimization theory with an absorbed interest. My core research interest is developing the **Trustworthy AI**, including **Robustness**, **Fairness**, and **Interpretability**. I also seek relevant applications which include the evaluation of video generation models. Besides, my future directions are the robustness and fairness in generative models and the safety of LLMs.

Education

The Chinese University of Hong Kong

Hong Kong SAR, China

Ph.D. Student in Computer Science

Aug 2022 - Jul 2026 (Expected)

- Concentration: Machine Learning Theory, Fairness and Robustness of ML
- Supervised by Prof. Farzan Farnia

The Chinese University of Hong Kong

Hong Kong SAR, China

B.Sc. in Mathematics and Information Engineering

Sep 2017 - Jul 2022

- Major GPA: 3.7, Top 10%
- Graduation with honor class in ELITE Stream
- Summer Exchange in University of California, Berkeley

Publications and Working Papers

On the Inductive Biases of Demographic Parity-based Fair Learning Algorithms

UAI 2024

LEI HAoyu, AMIN GOHARI, FARZAN FARNIA

April 2024

- Theoretically analyzed and proposed a distributionally robust method for the inductive biases of fair machine learning.

An Efficient Alternating Direction Method for Graph Learning from Smooth Signals

ICASSP 2021

WANG XIAOLU, YAO CHAORUI, LEI HAoyu, ANTHONY MC So

May 2021

- Introduced ADMM method for applications in graph learning.

PFairFL-ME: A Unified Personalized Framework for Improving Fairness in Federated Learning via Moreau Envelope

Working Paper

LEI HAoyu, FARZAN FARNIA

April 2024

- Improving group fairness in distributed learning setting by introducing Moreau Envelope in a personalized framework.

Research Experience

CUHK Faculty of Engineering, Prof. Anthony MC So

Hong Kong SAR, China

Research Assistant

Aug 2021 - April 2022

- Implemented the traditional numerical algorithms such as Branch-and-bound to solve Mixed-integer Convex Problems (MICPs).
- Explored an advanced algorithm: Polyhedral Outer Approximation (POA) to solve MICPs and Conducted simple POA algorithm in Matlab.
- Based on the well-developed POA solvers, tried to optimize to get better performance on different kinds of formulations in MICPs.

CUHK Faculty of Engineering, Prof. Anthony MC So

Hong Kong SAR, China

Research Assistant

Aug 2020 - Dec 2020

- Proposed an efficient alternating direction method of multipliers (ADMM) to solve graph learning problems.
- Analyzed ADMM methods with convergence computing and mathematical proofs.
- Explored the convergence speed and efficiency through numerical experiments conducted by Matlab.
- Published an article on ICASSP conference 2021 regarding ADMM methods as a joint author.

Key Skills

Programming Skills

- Python (Main), Pytorch (Main), Matlab, R, C, C++, C#, Julia, LaTeX

Languages

- English (Advanced), Cantonese (Intermediate), Putonghua (Native)

Awards

2022 **Postgraduate Studentship Scholarship Scheme**, CUHK Computer Science and Engineering Department

2021 **Chung Chi College Departmental Prize (Graduation Top 10%)**, CUHK Chung Chi College

2019, 2021 **Dean's List (Top 10%)**, CUHK Faculty of Engineering

2019-2021 **Chung Chi College Class Scholarship (College Top 10%)**, CUHK Chung Chi College

2019-2021 **ELITE Stream Scholarship**, CUHK Faculty of Engineering