# Hongzong LI

hongzongli-cs.github.io/ | hongzli2-c@my.cityu.edu.hk | Google Scholar

## Research Interests

Optimization, Machine Learning, Computational Intelligence, Neural Networks, Clustering

## Education

**City University of Hong Kong, Kowloon, Hong Kong** Jan. 2021 - Dec. 2024 (Expected)

Ph.D. candidate in Computer Science

- Advisor: Prof. WANG Jun (Member of Academia Europaea, Life FIEEE, FIAPR)
- Developing optimization algorithms for capacitated clustering, quadratic unconstrained binary optimization, binary matrix factorization, etc. (Published: 6 first-authored papers. Under review: 1 first-authored papers)
- Developing clustering algorithms and implementing clustering applications (Published: 4 first-authored papers)

**Northeastern University, Shenyang, China** Sept. 2016 - July 2020

B.E. in Automation, School of Information Science and Engineering

- Overall GPA: 3.9891/5 - ranking within the top 5%.
- Advisor: Prof. Dong Xiao
- Focusing on the applications of machine learning (Published: 8 papers, 5 student first-authored papers, and 8 filed patents and software copyrights)

## Honors & Awards

**Doctor of Philosophy (Ph.D.)**

- Outstanding Academic Performance Award, 16 Aug. 2024
- Outstanding Academic Performance Award, 16 Aug. 2023
- Postgraduate Studentship (18,270 HKD per month)
- Institutional Research Tuition Scholarship (3,508 HKD per month)
- Institutional Research Tuition Grant (3,508 HKD per month)

**Bachelor of Engineering (B.E.)**

- Outstanding Graduates of Liaoning Province in 2020
- The Special Prize of excellent students of Baosteel in 2019 (20,000 CNY)
- The Fourth most influential graduate of the College in 2020
- The First Prize of "TI" Cup Electronic Design Competition for undergraduate students in Liaoning Province
- The Special Prize of the 7th China TRIZ Cup Undergraduate Innovation Method Competition
- The First Prize of the fourth Liaoning "TRIZ Cup" college students innovation method competition
- Northeastern University (2019) National Innovation Training Program for College Students - National Excellent
- Northeastern University (2019) National Innovation Training Program for College Students - my favorite innovation program for College Students
- Northeastern University (2018) National Innovation Training Program for College Students - Provincial Qualification
- The Second Prize of the 17th Undergraduate Electronic Design Competition of "Jianlong iron and steel" of Northeastern University in 2018
- The Third Prize of the fourth Internet plus China Northeastern University Student Competition
- First-class scholarship for outstanding students at Northeastern University (2018-2019, and 2019-2020)
- Third-class scholarship for outstanding students at Northeastern University (2016-2017, and 2017-2018)

## Selected Publications (15 out of 22)

**Journal Papers:**

[1] **H. Li** and J. Wang, "From Soft Clustering to Hard Clustering: A Collaborative Annealing Fuzzy c-means Algorithm," *IEEE Transactions on Fuzzy Systems*, vol. 32 pp. 1181-1194, 2024. (IF: 12.253)

[2] **H. Li** and J. Wang, "Capacitated Clustering via Majorization Minimization and Collaborative Neurodynamic Optimization," *IEEE Transactions on Neural Networks and Learning Systems*, vol. 35 pp. 6679-6692, 2024. (IF: 14.255)

[3] **H. Li** and J. Wang, "A Collaborative Neurodynamic Algorithm for Quadratic Unconstrained Binary Optimization," *IEEE Transactions on Emerging Topics in Computational Intelligence*, accepted & in press, 2024. (IF: 5.3)

[4] **H. Li**, J. Wang, N. Zhang, and W. Zhang, "Binary Matrix Factorization via Collaborative Neurodynamic Optimization," *Neural Networks*, vol. 176 pp. 106348, 2024. (IF: 7.8)

[5] **H. Li** and J. Wang, "CAPKM++ 2.0: An Upgraded Version of the Collaborative Annealing Power K-means++ Clustering Algorithm," *Knowledge-Based Systems*, p. 110241, 2023. (IF: 8.139)

[6] **H. Li** and J. Wang, "Collaborative Annealing Power K-means++ Clustering," *Knowledge-Based Systems*, vol. 255, p. 109593, 2022. (IF: 8.139)

[7] **H. Li** and J. Wang, "Machine-Cell and Part-Family Formation via Neurodynamics-Driven Constrained Binary Matrix Factorization," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 2024. (under review)

[8] **H. Li** and J. Wang, "Co-clustering for Binary Data via Neurodynamics-driven Binary Matrix Factorization," 2024. (under review)

[9] D. Xiao, **H. Li**, and X. Sun, "Coal Classification Method Based on Improved Local Receptive Field-Based Extreme Learning Machine Algorithm and Visible–Infrared Spectroscopy," *ACS Omega*, vol. 5, no. 40, pp.25 772–25 783, 2020.

[10] D. Xiao, **H. Li**, C. Liu, and Q. He, "Large-Truck Safety Warning System Based on Lightweight SSD Model," *Computational Intelligence and Neuroscience*, vol. 2019, 2019.

**Conference Papers:**

[11] **H. Li**, J. Wang, and J. Wang, "Solving the Travelling Salesman Problem Based on Collaborative Neurodynamic Optimization with Discrete Hopfield Networks," in *11-th International Conference on Information Science and Technology (ICIST)*. IEEE, 2021, pp. 456–465.

[12] **H. Li** and J. Wang, "A Collaborative Neurodynamic Optimization Algorithm Based on Boltzmann Machines for Solving the Traveling Salesman Problem," in *11-th International Conference on Intelligent Control and Information Processing (ICICIP)*. IEEE, 2021, pp. 325–333.

[13] **H. Li** and J. Wang, "Collaborative Neurodynamic Algorithms for Solving Sudoku Puzzles," in *12-th International Conference on Information Science and Technology (ICIST)*. IEEE, 2022, pp. 8–17.

[14] **H. Li** and J. Wang, "A Collaborative Neurodynamic Optimization Algorithm Based on Boltzmann Machines and 2-Opt Heuristic for Solving the Traveling Salesman Problem," in *17-th International Conference on Advanced Computational Intelligence (ICACI)*. IEEE, 2025. (under review)

[15] X. Ye*, **H. Li*** and J. Wang, "HVAC System Fault Diagnosis via Feature Selection and Classification," in *13-th International Conference on Information Science and Technology (ICIST)*. IEEE, 2023, pp 432-440.

## Academic Service

**Publication chair and committee member:** The 17th International Conference on Advanced Computational Intelligence (ICACI2025), Bath, UK.

**Session chair and committee member:** The 13th International Conference on Information Science and Technology (ICIST2023), Cairo, Egypt.

**Reviewer of the following journals and conferences:** • IEEE Transactions on Pattern Analysis and Machine Intelligence, • IEEE Transactions on Neural Networks and Learning Systems, • IEEE Transactions on Knowledge and Data Engineering, • IEEE Transactions on Industrial Electronics, • IEEE Transactions on Consumer Electronics, • IEEE Transactions on Computational Social Systems, • Neural Networks, • Mathematical Biosciences and Engineering, • Signal Processing, • Journal of Low Frequency Noise, Vibration & Active Control, • Science China Technological Sciences, • Cloud Computing and Data Science, • ICIST2022, • ICIST2024, • ICICIP2024, • ISNN2024, • ICCA2024, • NeurIPS2024, • AAAI2025, • ICLR2025, • AISTATS2025.

## Mentoring Experience

**Ran Zhang** Jun. 2021 - Dec. 2021

*Master at City University of Hong Kong*

➢ Topic: Portfolio and Index Tracking

**Xuntan Ye** Jan. 2023 - Dec. 2023

*Undergraduate at City University of Hong Kong*

➢ Topic: Classification for HVAC System Fault Diagnosis

## Teaching Experience

| | |
|---|---|
| Teaching assistant in CS5487 Machine Learning: Principles and Practice at CityU, Hong Kong | Fall 2024 |
| Teaching assistant in CS4386 AI Game Programming at CityU, Hong Kong | Spring 2024 |
| Teaching assistant in CS5489 Machine Learning: Algorithms and Applications at CityU, Hong Kong | Fall 2023 |
| Teacher in CS5486 Intelligent Systems at CityU, Hong Kong | Fall 2022 |
| Teaching assistant in CS4386 AI Game Programming at CityU, Hong Kong | Spring 2023 |
| Teaching assistant in GE2313 Global IT Case Studies at CityU, Hong Kong | Spring 2022, Fall 2022 |
| Teaching assistant in CS1302 Introduction to Computer Programming at CityU, Hong Kong | Spring 2021 |

## Talks & Presentations

- A Collaborative Neurodynamic Optimization Algorithm Based on Boltzmann Machines and 2-Opt Heuristic for Solving the Traveling Salesman Problem
  In ISNN2024, Weihai, Shandong, Jul. 2024
- HVAC System Fault Diagnosis via Feature Selection and Classification
  In ICIST2023, Cario, Egypt, Dec. 2023
- Collaborative Neurodynamic Algorithms for Solving Sudoku Puzzles
  In ICIST2022, Online, Oct. 2022
- Solving the Travelling Salesman Problem Based on Collaborative Neurodynamic Optimization with Discrete Hopfield Networks
  In ICIST2021, Online, May 2021
- A Collaborative Neurodynamic Optimization Algorithm Based on Boltzmann Machines for Solving the Traveling Salesman Problem
  In ICICIP2021, Online, Dec. 2021

## Patents

Patents of Invention:

- Anti-collision method and device for mine car, Dong Xiao, **Hongzong LI**, Qifei He, CN110395207A, 2019.11.01
- Mine truck anti-collision warning system and method based on radar and WIFI, Dong Xiao, **Hongzong LI**, Qifei He, CN110459074A, 2019.11.15
- Method and device for detecting iron content in iron ore, Dong Xiao, Guotai Jiang, **Hongzong Li**, Zeyuan Zhang, CN109060675A, 2018.12.21

Software Copyrights:

- Vehicle panoramic assisted driving system, Dong Xiao, **Hongzong LI**, Qifei He, 2019SR0716144
- WIFI-based anti-collision warning system for mining trucks, Dong Xiao, **Hongzong LI**, Qifei He, 2019SR1029773

Patents of Utility Model:

- Anti-collision device for mine car, Dong Xiao, **Hongzong LI**, Qifei He, CN210653003U, 2020.06.02
- Mine truck anti-collision warning system based on radar and WIFI, Dong Xiao, **Hongzong LI**, Qifei He, Xiaotong Zhang, Yuan Lin, Chenyi Liu, CN210574333U, 2020.05.19
- A radar and GPS based collision avoidance device for mine cars, Qifei He, **Hongzong LI**, Jian He, CN212675166U, 2021.03.09

## Technical Skills

**Programming languages:** MATLAB, Python, C++

**ML/AI:** Pytorch, Numpy, Pandas, Matplotlib

**Web Technologies:** HTML

**Miscellaneous:** Git, Shell, Latex, Unity