Xiong Zhixiao

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Education Background

Weiyang College, Tsinghua University, Beijing, China — Sep 2021 – Jun 2025 (expected)

- Double Major: Mathematics and Physics + Industrial Engineering
- GPA: 3.93/4.0
- Core Courses:
  - Math: Elementary Probability Theory (A-), Statistical Inference (A), Calculus(1)(A-), Calculus(2)(A), Linear Algebra (A)
  - ML&CS: Introduction to Statistical Learning (A-), Advanced Computer Programming (A)
  - OR: Stochastic Optimization (Graduate), OR (1): Deterministic Models (A), OR (2): Stochastic Processes (B), OR (3): Decision Making (A)
- Honors:
  - First Prize in the 31st China Physics Olympiad (Shanghai Region) — Oct 2019
  - First Prize in the Tsinghua University Physics Autumn Camp — Nov 2019
- Area of interest: Machine learning for combinatorial optimization, Large-scale optimization, Mixed-Integer Nonlinear Programming

Research Experience

A Machine Learning Enhanced Decomposition Approach to Solving Maximum Clique on Quantum Annealers

University of Toronto, Toronto, Canada — Oct 2023 - now

Research assistant; Advisor: Chi-Guhn Lee, professor in the Department of MIE, U of T

- Proposed an exact decomposition method to separate graphs for the maximum clique problem via vertex separators.
- Proposed a supervised learning model based on graph features to learn the optimal vertex for decomposition.
- Developed a RL model by representing the identification of vertex separators on graphs as a sequential decision process.

Research on Large-Scale Mixed Integer Programs Based on Machine Learning Methods

Tsinghua University, Beijing, China — Apr 2023 - now

Research leader; Advisor: Xu Hua, associate professor at Department of Computer Science, Tsinghua

- Proposed a hypergraph-based method to completely encode quadratically constrained quadratic programs as a hypergraph and improved existing hypergraph neural networks to predict optimal solutions.
- Proposed a neighborhood crossover algorithm based on linearization techniques, which enabled small-scale solvers to solve large-scale problems and strengthened traditional large neighborhood search methods by paralleling.
- Led the project with two other undergraduates, developed all the code and written most part of our paper.
- Paper under review: NeuralQP: A General Hypergraph-based Optimization Framework for Large-scale QCQPs (ICLR2024).

Curriculum Learning Algorithm Development and Open-Source Framework Construction

Tsinghua University, Beijing, China — Oct 2022 - Oct 2023

Research assistant; Advisor: Wang Xin, research assistant at Department of Computer Science, Tsinghua

- Contributed to the curriculum learning benchmark repo and developed the code based on the RL-teacher paper.
- Conducted experiments for the RL-teacher algorithm by systematically testing all combinations of parameters.
- Paper under review: CurBench: Curriculum Learning Benchmark (CVPR2024).

Skills and Others

- Language: Chinese (Native), English (Fluent): TOEFL 108, GRE 328
- Computer: Python, C/C++, Julia, Rust, SQL, MATLAB, R

Updated: Dec 2023