Tong Yang

Email: tongyang@stu.pku.edu.cn
Personal Site: https://pptmiao.github.io
Research Interests:
Optimization, Machine Learning Theory

Education

Peking University Sep 2022–Current
M.S. in Data Science

University of California, Berkeley Jan 2022–May 2022
Exchange Program, GPA: 4.0/4.0

Xi'an Jiaotong University Sep 2018–July 2022
B.S. in Mathematics (Honors Program), GPA: 4.01/4.3, Major rank:1/50

Research & Project Experience

Research Topic: Algorithm Design for Solving Variational Inequalities
Jan 2022–Current, University of California, Berkeley
Collaborators: Michael I. Jordan, Tatjana Chavdarova, Matteo Pagliardini

- Worked on the project *solving variational inequalities via a first-order interior point-based method* with Tatjana Chavdarova and Michael I. Jordan. This paper has been accepted by *NeurIPS 2022* Workshop *OPT*. The full version has been accepted by *ICLR 2023* as *spotlight* paper. (https://arxiv.org/abs/2206.10575)
  1. Designed a new algorithm whose convergence rate could match the theoretical lower bound of this algorithm under mild conditions.
  2. Verified the theoretical results on several experiments (e.g. GANs).
- Improved the previous work with Michael I. Jordan, Tatjana Chavdarova, and Matteo Pagliardini. We are going to submit this work to *NeurIPS 2023*. (https://arxiv.org/abs/2210.15659)
  1. Derived a way to relax the assumptions in the previous work while maintaining the same convergence rate.
  2. Gave the *first* analytically derived last-iterate convergence rate for general monotone variational inequalities.
  3. Managed to finish the book-long proofs (about 40 pages) within a week.

Research Topic: Cascade Optimization for Inverse Problems with Entropy-Preserving Hyperparameter Tuning
July 2022–Current, New York University
Collaborators: Qi Lei, Quan Zhang, Tianci Liu

- Proposed an automated and principled framework to solve inverse problems with deep generative models. This work has been accepted by *ICML 2023*. (https://arxiv.org/abs/2210.13983)
  1. Designed a cascade optimization algorithm that has a global convergence guarantee to efficiently reconstruct images in inverse problems.

2. Developed a method to solve a bilevel optimization problem for automated hyperparameter tuning.

Research Topic: Design of Efficient Algorithms for Finding Points on High-dimensional Convex Polyhedra
Sep 2021–Jan 2022, Peking University
Advisor: Zhouchen Lin

- My first project on optimization and machine learning theory.

1. Studied convex analysis with a focus on interior point methods and common first-order methods.
2. Designed a new interior-point point algorithm to find a point on a high-dimensional convex polyhedron efficiently.

Research Topic: Multi-task Self-supervised Object Detection and Other Tasks in Machine Learning
June 2020–Jan 2022, Xi'an Jiaotong University
Adviser: Junmin Liu

- This is my first deep learning project.

1. Reproduced classical backbones in Computer Vision, such as ResNet, the Transformer, and Vision Transformer (ViT) using Pytorch.
2. Reproduced two-stage object detection networks using Pytorch, including R-CNN, Fast R-CNN, and Faster R-CNN, etc.
3. Studied different self-supervised object detection models.
4. Designed new auxiliary tasks for two-stage multi-task self-supervised object detection models.

Competition Experience

- The first prize of China Undergraduate Mathematical Contest in Modeling in Shaanxi division, 2019.
- The first prize of China Undergraduate Mathematical Contest in Modeling in Shaanxi division, 2020.
- Honorable Mention of Mathematical Contest In Modeling, 2020.
- The second prize of The Chinese Mathematics Competitions (Mathematics Group), 2019.
- The first prize of Campus Mathematical Contest in Modeling, 2019.
- The second prize of Campus Collegiate Programming Contest, 2021.

Scholarships & Awards

- Outstanding Student of Xi'an Jiaotong University (2%), 2018-2019, 2019-2020, 2020-2021.
- National Encouragement Scholarship (3%), 2018-2019.
- HIWIN Scholarship (1%), 2019-2020.
- ZhuFeng Scholarship (1%), 2018-2019,2019-2020.
- National Scholarship (1%), 2020-2021.