Yi Tian

Contact Information

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Research Interests

Machine/Reinforcement Learning, Control Theory, Robotics, Optimization, Game Theory, and their intersections

Education

Massachusetts Institute of Technology, Cambridge, MA, USA
Ph.D. Student in Electrical Engineering and Computer Science
Minor in Mathematics
M.S. in Electrical Engineering and Computer Science, May 2021

Tsinghua University, Beijing, China
B.E. in Automation, Jul. 2019

Research Experience

Massachusetts Institute of Technology, Cambridge, MA, USA Aug. 2019 – Present
Research Assistant with Suvrit Sra, Laboratory for Information and Decision Systems

- Sample-efficient representation learning for control (also with Russ Tedrake, Kaiqing Zhang)
- Sample-efficient reinforcement learning in Markov decision processes and Markov games

Tsinghua University Oct. 2018 – Jun. 2019
Research Assistant with Keyou You, Institute of System Integration

- Asynchronous and decentralized distributed training of deep neural networks

Tsinghua University Nov. 2016 – Jun. 2018
Research Assistant with Jiwen Lu, Intelligent Vision Group

- Deep progressive reinforcement learning for skeleton-based action recognition
- Egocentric hand segmentation and its facilitation for action recognition

Industrial Experience

Amazon Robotics, Cambridge, MA, USA May. 2022 – Aug. 2022
Applied Scientist Intern, Manager: Paul Birkmeyer, Mentor: Yifan Hou

- NeRF-based training of dense descriptors for bin manipulation

Amazon Search, Palo Alto, CA, USA Jun. 2021 – Aug. 2021
Applied Scientist Intern, Manager: Sujay Sanghavi, Mentor: Han Cheng

- Multi-task training of ranking models

Publications & Manuscripts

Haochuan Li*, Jian Qian*, **Yi Tian**, Alexander Rakhlin, Ali Jadbabaie. Convex and Non-Convex Optimization under Generalized Smoothness. Under review.

Yi Tian, Kaiqing Zhang, Russ Tedrake, Suvrit Sra. Toward Understanding Latent Model Learning in MuZero: A Case Study in Linear Quadratic Gaussian Control. *62nd IEEE Conference on Decision and Control (CDC)*, 2023.

Yi Tian, Kaiqing Zhang, Russ Tedrake, Suvrit Sra. Can Direct Latent Model Learning Solve Linear Quadratic Gaussian Control? *5th Annual Learning for Dynamics & Control Conference (L4DC)*, 2023. (**Oral**)

Ali Jadbabaie, Haochuan Li, Jian Qian, **Yi Tian**. Byzantine-Robust Federated Linear Bandits. *61st IEEE Conference on Decision and Control (CDC)*, 2022.

Haochuan Li, **Yi Tian**, Jingzhao Zhang, Ali Jadbabaie. Complexity Lower Bounds for Nonconvex-Strongly-Concave Min-Max Optimization. *35th Conference on Neural Information Processing Systems (NeurIPS)*, 2021.

Tiancheng Yu, **Yi Tian**, Jingzhao Zhang, Suvrit Sra. Provably Efficient Algorithms for Multi-Objective Competitive RL. *38th International Conference on Machine Learning (ICML)*, 2021. (**Long talk**)

Yi Tian*, Yuanhao Wang*, Tiancheng Yu*, Suvrit Sra. Online Learning in Unknown Markov Games. *38th International Conference on Machine Learning (ICML)*, 2021.

Yi Tian*, Jian Qian*, Suvrit Sra. Towards Minimax Optimal Reinforcement Learning in Factored Markov Decision Processes. *34th Conference on Neural Information Processing Systems (NeurIPS)*, 2020. (**Spotlight**)

Congyue Deng*, **Yi Tian***. Towards Understanding the Trade-off Between Accuracy and Adversarial Robustness. *International Conference on Machine Learning Workshop on Security and Privacy (ICMLW)*, 2019.

Yansong Tang*, **Yi Tian***, Peiyang Li, Jiwen Lu, Jie Zhou. Deep Progressive Reinforcement Learning for Skeleton-Based Action Recognition. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018.

Yansong Tang, **Yi Tian**, Jiwen Lu, Jianjiang Feng, Jie Zhou. Action Recognition in RGB-D Egocentric Videos. *IEEE International Conference on Image Processing (ICIP)*, 2017.

Awards

Presidential Fellowship, Massachusetts Institute of Technology 2019
Excellent Graduate Awards, both Tsinghua University and City of Beijing 2019
Excellent Undergraduate Thesis, Tsinghua University 2019
Top Grade Scholarship (10/3600), Tsinghua University 2018
Qualcomm Scholarship, Tsinghua University 2017
Silver Medal in the 30th National Physics Olympiad, Chinese Physics Society 2013

Teaching Experience

Massschusets Institute of Technology, Cambridge, MA, USA Jan. 2022 – May 2022
Teaching Assistant for 6.231 Dynamic Programming and Reinforcement Learning

- Taught for the first time in recent years by John Tsitsiklis, many materials newly designed
- Class size about 70, overall subject rating 6.0/7.0, TA rating 6.6/7.0

Presentations

Can Direct Latent Model Learning Solve Linear Quadratic Gaussian Control?

- 28th Annual LIDS Student Conference, MIT Feb. 2, 2023
- LIDS & Stats Tea Talk, MIT Dec. 7, 2022

Online Learning in Unknown Markov Games

- LIDS & Stats Tea Talk, MIT Oct. 6, 2021

Towards Minimax Optimal Reinforcement Learning in Factored Markov Decision Processes

- 26th Annual LIDS Student Conference, MIT Feb. 3, 2021

Academic Service

Reviewer
IEEE Conference on Decision and Control (CDC), 2023
International Conference on Artificial Intelligence and Statistics (AISTATS), 2023
Conference on Neural Information Processing Systems (NeurIPS), 2022 & 2023
International Conference on Machine Learning (ICML), 2022 (top 10% reviewer) & 2023

Outreach

Cultural Chair, Sidney-Pacific Graduate Residence, MIT May 2021 – Apr. 2023
Organized cultural movie series and cultural festivals

President, 11th Spark Talent Program, Tsinghua University Sep. 2017 – Jun. 2019
Organized ten-day industrial visit to Germany and other community building events

Vice President, Student Association of Science and Technology, Department of Automation, Tsinghua University Sep. 2017 – Jun. 2018
Co-organized Tsinghua Electronics Design Competition and Programming Competition

Skills

Programming: Python (Pytorch/TensorFlow/Keras), C/C++, MATLAB, Julia
Languages: Chinese (native), English (fluent), German/French/Spanish (elementary)