Zixuan Liu

zx-liu21@mails.tsinghua.edu.cn

Research Interests

Reinforcement Learning in Real-World Scenarios

*Focusing on **dynamics adaptation** and **safety constraints** in real-world scenarios, such as **robotics** and **smart grid**.*

Education

Tsinghua University	2021.09 – Present
M.E. Degree in Electronic and Information Engineering; GPA: 3.80/4.00	*Beijing, China*
Harbin Institute of Technology	2016.09 – 2021.06
B.E. Degree in Mechatronics Engineering; GPA: 94.6/100.0; R: 5/125	*Harbin, Heilongjiang, China*

Research Experience

General Robotic Manipulation with Foundation Models — 2023.09 – Present
NUS School of Computing, Robot Learning and Intelligent System Lab — *Singapore*

- Designing network architecture for the foundation model
- Ongoing work

Reinforcement Learning with Hard Safety Constraints — 2022.10 – 2023.09
Tencent, AI Lab — *Shenzhen, Guangdong, China*

- Combining optimization with policy networks
- Combining optimization with simulators

Adversarial Imitation Learning with Dynamics Adaptation — 2022.01 – 2022.06
Tencent, AI Lab — *Shenzhen, Guangdong, China*

- Proposing a method to deal with dynamics shift between source and target domains
- Providing a theoretical guarantee for the method

Other Experience

The 4th Power Dispatching AI Application Competition 2022 — 2022.09 – 2022.09
China Southern Power Grid — *Guangzhou, Guangdong, China*

- Ranking: 12/24
- Introducing graph neural networks to predict powerflow
- Designing an action filter to optimize unsafe actions

New Power System Artificial Intelligence Application Competition — 2022.07 – 2022.09
China Electricity Council — *Beijing, China*

- Ranking: 13/34
- Introducing grid safety constraints to reinforcement learning through regularization
- Alternatively using traditional optimization to output safe actions

Research Presentations

Revisiting Plasticity in Visual Reinforcement Learning: Data, Modules and Training Stages (Accepted to ICLR 2024) [OpenReview]
*Guozheng Ma, Lu Li, Sen Zhang, **Zixuan Liu**, Zhen Wang, Yixin Chen, Li Shen, Xueqian Wang, Dacheng Tao*

UniContact: A Basic Model for Robotic Manipulation of Contact Synthesis on Rigid and Articulated Rigid Bodies with Arbitrary Manipulators (Under review for ICLR)
*Gang Yang, Zhixuan Xu, **Zixuan Liu**, Jichen Sun, Hanwei Fan, Xinghao Zhu, Lin Shao*

Differentiable Frank-Wolfe Optimization Layer (Accepted to Tiny Papers @ ICLR 2024) [OpenReview][GitHub]
***Zixuan Liu**, Liu Liu, Xueqian Wang, Peilin Zhao*

Dynamics Adapted Imitation Learning (Published in TMLR) [OpenReview][GitHub]
***Zixuan Liu**, Liu Liu, Bingzhe Wu, Lanqing Li, Xueqian Wang, Bo Yuan, Peilin Zhao*

NN-Based Reinforcement Learning Optimal Control for Inequality-Constrained Nonlinear Discrete-Time Systems With Disturbances (Published in TNNLS) [IEEE]
*Shu Li, Liang Ding, Miao Zheng, **Zixuan Liu**, Xinyu Li, Huaiguang Yang, Haibo Gao, Zongquan Deng*

Patents

Power Grid Dispatching Method, Device, Equipment and Storage Medium [GooglePatent]
*Liu Liu, Peilin Zhao, **Zixuan Liu**. Guangdong: CN116960997A*

Neural Network Training Method and Device for Industrial System Control [GooglePatent]
*Liu Liu, Peilin Zhao, **Zixuan Liu**. Guangdong: CN116956995A*

Training Method, Training Device, Training Equipment, Training Medium and Training Program Product for Strategy Generator [GooglePatent]
*Liu Liu, **Zixuan Liu**, Peilin Zhao. Guangdong: CN116956018A*

Method and Apparatus for Generating Controlstrategy for Industrial System [GooglePatent]
*Liu Liu, **Zixuan Liu**, Peilin Zhao. Guangdong: CN116954162A*

Awards & Honors

Outstanding Research Scholarship
Tsinghua University   *2023*

Outstanding Graduates
Harbin Institute of Technology   *2021*

National Scholarship
Ministry of Education of the People's Republic of China   *2019*

Provincial Merit Students
Heilongjiang Provincial Education Department   *2019*

Specialized Skills

Programming Languages: Python
Deep Learning Framework: PyTorch
English: TOEFL (107), GRE (322)