Ruizhe Shi

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Education

University of Washington, Seattle, USA **Feb. 2024 – Present**
Research Visitor at Paul G. Allen School of Computer Science

Tsinghua University, Beijing, China **Sept. 2021 – Present**
*Undergraduate at Special Pilot Class in Computer Science (**Yao class**)* *Overall GPA: 3.93/4.00*

- Major: *Computer Science and Technology*
- Minor: *Chinese Language and Literature*

Publications

(⋆ indicates equal contribution.)

[2] Ruizhe Shi⋆, Yuyao Liu⋆, Yanjie Ze, Simon S. Du, Huazhe Xu.
Unleashing the Power of Pre-trained Language Models for Offline Reinforcement Learning.
International Conference on Learning Representations, 2024.

[1] Yanjie Ze, Yuyao Liu⋆, Ruizhe Shi⋆, Jiaxin Qin, Zhecheng Yuan, Jiashun Wang, Huazhe Xu.
H-InDex: Visual Reinforcement Learning with Hand-Informed Representations for Dexterous Manipulation.
Annual Conference on Neural Information Processing Systems, 2023.

Research Experience

Decoding-time Language Model Alignment **Dec. 2023 – Present**
Supervised by Prof. Simon S. Du *Paul G. Allen School of Computer Science, University of Washington*

Representation Theory of Transformer for Reinforcement Learning **Nov. 2023 – Jan. 2024**
Supervised by Prof. Huazhe Xu *IIIS, Tsinghua University*

- Second-authored work submitted to **ICML 2024**, under review (ratings: 556).

Tuning Language Model for Offline Reinforcement Learning **June 2023 – Sept. 2023**
Supervised by Prof. Huazhe Xu *IIIS, Tsinghua University*

- We leverage the power of pre-trained Language Models for low-level motion control in offline reinforcement learning. First-authored work accepted by **ICLR 2024**.
- We demonstrate the superiority of LaMo over DT-based and value-based offline RL algorithms. Specifically, we find that LaMo could successfully handle the challenging low-data regime while DT could not. This highlights the great potential of our cross-domain pre-training for sequential modeling.

Visual Representation for Reinforcement Learning **Mar. 2023 – May 2023**
Supervised by Prof. Huazhe Xu *IIIS, Tsinghua University*

- We propose H-InDex, a hand-informed visual representation for dexterous manipulation with reinforcement learning. Second-authored work accepted by **NeurIPS 2023.**
- We show the effectiveness of our framework on 12 challenging visual dexterous manipulation tasks, comparing with recent strong foundation models such as VC-1. Our study has offered valuable insights into the application of pre-trained models for dexterous manipulation, by exploring the direct application of a 3D human hand pose estimation model

Awards & Honors

Jiang Nanxiang Scholarship **Nov. 2023**
Tsinghua University *top scholarship; 1 student per major*

China National Endeavor Scholarship **Oct. 2022**
Beijing Education Bureau *1 student per major*

Xue Tang Scholarship of Tsinghua University **Oct. 2021 – Present**
Tsinghua University

First Prize in College Student Mathematics Competition (Beijing) **Oct. 2022**
Chinese Mathematical Society

First Prize in National High School's Mathematics Competition of China (Jiangsu) **Oct. 2020**
Chinese Mathematical Society *top 20*

Service

Workshop Program Committee **Oct. 2023**
FMDM 2023 at NeurIPS *Online*

Drop-in Tutoring for STEM Courses **Oct. 2022 – Present**
Volunteering at Tsinghua University *Beijing, China*

I have 157 hours of officially recorded volunteering work.

Selected Courses

Mathematics and Theory: Calculus ($\mathbf{A}^+$), Linear Algebra (**A**), Abstract Algebra (**A**), Introduction to Complex Analysis (**A**), Probability and Statistics (**A**), Introduction to Optimization Theory (**A**), Theory of Computation (**A**), Physics of Information (**A**);
Programming and AI: Introduction to Programming in C/C++ ($\mathbf{A}^+$), Intelligent Unmanned System ($\mathbf{A}^+$), Type-safe Modern System Practice (**A**), Machine Learning (**A**), Artificial Intelligence: Principles and Techniques (**A**), Natural Language Processing (**A**).

Technical Skills

Programming Skills: Python, C/C++, LaTeX, Bash, Scala, Matlab.
Language Skills: Chinese Mandarin (native), English (CET-6, TOEFL 104 [R30/L26/S23/W25]).