Shangzhe Li

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RESEARCH INTERESTS

Reinforcement Learning, Generative Models, Robotics.

EDUCATION

South China University of Technology, Guangzhou, China .... 2021.09—present
Bachelor of Science in Artificial Intelligence .... Cumulative GPA: 3.86/4.00   Rank: 5/80

Technical University of Munich, Munich, Germany .... 2023.10—2024.07
Exchange student in Department of Informatics

PUBLICATIONS

Reward-free World Models for Online Imitation Learning

- Author: **Shangzhe Li**, Zhiao Huang, Hao Su
- Conference: The Thirteenth International Conference on Learning Representations (ICLR 2025)   *under review*
- Main Contributions: We propose an online imitation learning approach that utilizes reward-free world models to address tasks in complex environments. By incorporating latent planning and dynamics learning, our model can have a deeper understanding of intricate environment dynamics. We demonstrate stable, expert-level performance on challenging tasks, including dexterous hand manipulation and high-dimensional locomotion control.

Augmenting Offline Reinforcement Learning with Observation-only Interactions

- Author: **Shangzhe Li**, Xinhua Zhang
- Conference: The Thirteenth International Conference on Learning Representations (ICLR 2025)   *under review*
- Main Contributions: We proposed a novel data augmentation method DITS for offline RL, where state-only interactions are available with the environment. The generator based on conditional diffusion models allows high-return trajectories to be sampled, and the stitching algorithm blends them with the original ones. The resulting augmented dataset is shown to significantly boost the performance of base RL methods.

Data-efficient Offline Domain Adaptation for Model-free Agents using Model-based Trajectory Stitching

- Author: **Shangzhe Li**, Hongpeng Cao, Marco Caccamo
- Conference: IEEE International Conference on Robotics and Automation (ICRA 2025)   *under review*
- Main Contributions: This work improves the sampling efficiency for policy adaptation in the deployment environment by stitching the offline experiences with newly collected few-shot experiences from the new environment. The proposed stitching algorithm incorporates the dynamics information of the true-MDP with the new dataset, meanwhile increasing the data diversity and de-correlating the newly collected data. The experiments on two cases show that the pre-trained policies are improved more efficiently with higher accumulated reward by using the stitched dataset than direct fine-tuning using raw data.

ACADEMIC EXPERIENCE

Imitation Learning with World Models   Supervisor: Prof. Hao Su
                                                                                                        Mentor: Zhiao Huang
Research intern   2024.05—present

- Propose a robust method for online imitation learning with world models.
- Achieve stable, expert-level imitation learning performance on complex scenarios.

Data Augmentation for Offline Reinforcement Learning   Supervisor: Prof. Xinhua Zhang
Research intern (remote)   2023.05—2024.01

- Propose a novel data augmentation method for offline RL.
- Utilize conditional diffusion model to generate high-reward trajectories with observation-only interactions.
- Achieve state-of-the-art performance on D4RL datasets.

Research on the Control Approach for Two-way Coupled Fluid Simulation   Supervisor: Prof. Nils Thuerey
                                                                                                        Mentor: Patrick Schnell
Research intern   2023.10—2024.03

- Explore difficult settings of obstacle control tasks in fluids.
- Analyze the control approach of coupling a controller neural network with a differentiable solver.
- Apply techniques of gradient clipping to stabililze the training process.

Research on the Fast Adaptation Methods on Reinforcement Learning   Supervisor: Prof. Marco Caccamo

Mentor: Hongpeng Cao

Research intern   2024.01—2024.09

- Explore offline-to-online fast adaptation approach on reinforcement learning settings.
- Develop a new method of continual learning via trajectory stitching.
- Deploy the new algorithm to actual robotics environments.

Knowledge Distillation for LLMs   Supervisor: Prof. Xinhua Zhang

Mentor: Zishun Yu

Research intern (remote)   2024.03—present

- Explore the probability of using inverse reinforcement learning for LLM knowledge distillation.
- Provide theoretical analysis for the optimality of the method.

Neural Networks Compression and Acceleration Research   Supervisor: Prof. Ye Liu

Undergraduate research   2022.09—2023.04

- Accelerate the process of convolutions in the Neural Networks and reduce the amount of parameters during inference by quantizing matrix multiplication process.
- Deploy our method on VGG-16 and DenseNet network.
- Achieve 10-15% parameter size shrinkage.

SELECTED COURSES

Bachelor Courses:

- **Mathematics:** Calculus II(1) (4.0/4.0), Calculus II(2) (4.0/4.0), Complex Variable (4.0/4.0).

- **CS:** Deep Learning and Computer Vision (4.0/4.0), Machine Learning (4.0/4.0), Data Structures (4.0/4.0), C++ Programming Foundations (4.0/4.0), Python Programming (4.0/4.0), Advanced Language Programming (4.0/4.0), Introduction to Artificial Intelligence (4.0/4.0).

- **EE:** Signal and System (4.0/4.0), Digital Signal Processing (4.0/4.0), Digital Image Processing (4.0/4.0).

- **Others:** General Physics(1) (4.0/4.0), General Physics(2) (4.0/4.0), Introduction to Engineering (4.0/4.0), Engineering Drawing (4.0/4.0).

AWARDS

Asia and Pacific Mathematical Contest in Modeling(APMCM)   International competition

First Prize   2022

National Contemporary Undergraduate Mathematical Contest in Modeling(CUMCM)   National competition

Second Prize   2022

Baidu "Paddle Paddle" Cup   Enterprise competition

Second Prize   2021

Mathematical Contest in Modeling(MCM)   International competition

Successful Participant   2022

Mathematical Contest in Modeling(MCM)   International competition

Successful Participant   2023

SCHOLARSHIPS

Taihu Academic Innovation Scholarship   Enterprise scholarship (CNY 8000)

First Prize   2022

Taihu Science Innovation Scholarship   Enterprise scholarship (CNY 5000)
Second Prize   2022

OTHER EXPERIENCES

Baidu Songguo Artificial Intelligence Elite Class   Baidu Online Network Technology
Outstanding student   2022.05 — 2023.05

- Top 3 in total score of online judge (OJ) programming competition.
- Build a convolutional neural network to achieve ImageNet dataset classification.
- Build a neural network based on Yolo architecture for object detection.
- Build a transformer based model for news topics classification.

Presentation: Application of Diffusion Model on Offline RL   Artificial Intelligence Association of SCUT
                                                                                            2023.09

- Link to talk video: video

Presentation: Application of Diffusion Model on Offline RL   Doctoral Seminar of Thuerey's Group, TUM
                                                                                            2023.12

ENGLISH PROFICIENCY

- **TOEFL iBT: 106** (overall score)
- **CET6: 584** (overall score)

SKILLS

- **Programming:** C/C++ (Mainly used), Java, Python (Mainly used), C#, VHDL, Verilog.
- **Deep Learning Framework:** Pytorch (Mainly used), TensorFlow.
- **Software:** MATLAB, AutoCAD.
- **Platform:** Linux, Windows.

REFERENCES

Prof. Hao Su
Associate Professor, Department of Computer Science and Engineering, University of California, San Diego, La Jolla, USA
Link: Homepage

Prof. Xinhua Zhang
Associate Professor, Department of Computer Science, University of Illinois Chicago, Chicago, USA
Link: Homepage

Prof. Nils Thuerey
Associate Professor, Department of Informatics, Technical University of Munich, Munich, Germany
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Prof. Marco Caccamo
Associate Professor, Chair of Cyber-Physical Systems in Production Engineering, School of Engineering and Design, Technical University of Munich, Munich, Germany
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Prof. Ye Liu
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