Jinghuan Shang

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Education

Stony Brook University, NY, USA **2018 – Present**
Ph.D. Candidate in Computer Science, GPA: 3.98/4, Advisor: Prof. Michael S. Ryoo

Shanghai Jiao Tong University, Shanghai, China **2014 – 2018**
B.S. in Computer Science, IEEE Pilot Class

Research Interest

Embodied agents that understand complex visual, sequential, and vision-language representations, and thus have active perception ability and make strategic decisions.

Selected Publications

1. **Shang**, **J.** & Ryoo, M. S. *Active Reinforcement Learning under Limited Visual Observability* in *Proceedings of Conference on Neural Information Processing Systems (**NeurIPS**)* (2023).
2. Li, X., Belagali, V., **Shang**, **J.** & Ryoo, M. S. Crossway Diffusion: Improving Diffusion-based Visuomotor Policy via Self-supervised Learning. *arXiv preprint.* eprint: 2307.01849 (2023).
3. **Shang**, **J.**, Das, S. & Ryoo, M. S. *Learning Viewpoint-Agnostic Visual Representations by Recovering Tokens in 3D Space* in *Proceedings of Conference on Neural Information Processing Systems (**NeurIPS**)* (2022).
4. Li, X., **Shang**, **J.**, Das, S. & Ryoo, M. S. *Does Self-supervised Learning Really Improve Reinforcement Learning from Pixels?* in *Proceedings of Conference on Neural Information Processing Systems (**NeurIPS**)* (2022).
5. Burgert, R., **Shang**, **J.**, Li, X. & Ryoo, M. S. *Neural Neural Textures Make Sim2Real Consistent* in *Conference on Robot Learning (CoRL)* (2022).
6. **Shang**, **J.**, Li, X., Kahatapitiya, K., Lee, Y.-C. & Ryoo, M. S. StARformer: Transformer with State-Action-Reward Representations for Robot Learning. *IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**)* (2022).
7. **Shang**, **J.**, Kahatapitiya, K., Li, X. & Ryoo, M. S. *StARformer: Transformer with State-Action-Reward Representations for Visual Reinforcement Learning* in *European Conference on Computer Vision (**ECCV**)* (2022).
8. **Shang**, **J.** & Ryoo, M. S. *Self-Supervised Disentangled Representation Learning for Third-Person Imitation Learning* in *IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**)* (2021).

Research Experience

Research Intern, Motional AD Inc **Aug 2022 – Dec 2022**
Trajectory prediction models, benchmarks and datasets

Research Assistant, Stony Brook University **May 2020 – Present**
Visual Representation Learning for Robotics

- **Active Vision Agent with Vision-Language Guidance**
  - Learning to see and act with the commonsense knowledge in VLMs and LLMs.
- **Code Generation Based Robot Policy Optimization**
  - LLM-based optimizer to rewrite the LLM-generated code for higher manipulation efficiency.
- **Active Vision Reinforcement Learning** [1]
  - Learning to see and act simultaneously through a task in limited observable environments.
- **Viewpoint-agnostic Representation** [3]
  - A learnable, differentiable, and light-weighted plugin for Transformer that learns viewpoint-agnostic representations from monocular 2D image.
- **Imitation Learning for Egocentric Tasks from Third-person Experiences** [8]
  - A disentanglement approach to align first-person view and third-person view experiences for reward assignment that benefits the robot learning from third-person view observations.

Sequence Representation Learning for Robotics

- **Transformer for Robot Learning** [6, 7]
  - StARformer, a decision transformer model with explicit separate local and long-horizon representations for better offline-RL and imitation performance, especially for longer sequences.
- **Diffusion Model for Sequential Behavior Generation** [2]
  - Crossway Diffusion, a diffusion model with a self-supervised branch that enhances imitation learning.

Professional Activities

Conference Reviewer: CVPR'22,'24, ECCV'22, AISTATS'23, ICML'23,'24, ICCV'23, NeurIPS'23, AAAI'24, ICLR'22,'24, ICRA'24
Guest Talk: Google Inc. (2022, Transformer for Robot Learning), CSE527 Introduction to Computer Vision (Fall 2021, graduate level), CSE525 Introduction to Robotics (Spring 2023, 2022, 2021, graduate level)
Teaching Assistant: CSE378 Introduction to Robotics (Fall 2023), CSE548 Analysis of Algorithms (Spring 2019, graduate level), CSE564 Visualization (Spring 2020, graduate level), CSE101 Computer Science Principles (Fall 2018)

Honors and Awards

NeurIPS 2022 Scholar Award	2022
Chairman's Fellowship, Stony Brook University	2018-2019
Outstanding Graduate of Colleges and Universities in Shanghai, China (Top 5%)	2018
1st Prize in China Undergraduate Mathematical Contest in Modeling	2017
Academic Excellence Scholarship of SJTU (Top 20%)	2015, 2016, 2017

Technical Skills

Competitive Programming: [My LeetCode] Ranked 9/54 in SBU ACM ICBC Selection Contest, 2020
Technologies/Frameworks: PyTorch, Linux, Git, Tensorflow, Unity3D
Simulated Environments: RLBench, Pybullet, MuJoCo, DeepMind Control Suite, Robosuite, Atari_py