Siheng Zhao

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Education

Nanjing University 9/2020 – 6/2024
B.S. in Artificial Intelligence *Nanjing, China*

- GPA: 4.73/5.00 (94.6/100); Ranking: 1st/97; National Scholarship (the highest honor in China)
- A+ Courses: Computer Vision & Pattern Recognition, Advanced Machine Learning, Data Structure & Algorithm, Probability Theory & Statistics, Advanced Algebra, Optimization Methods, Numerical Methods, and 20 others

National University of Singapore 1/2023 – 5/2023
Fully-funded Exchange in Computer Science *Singapore*

- GPA: 4.0/4.0

Experiences

The University of Hong Kong, Natural Language Processing Group 6/2023 – 12/2023
Research Assistant *Advisor: Prof. Tao Yu & Prof. Yanchao Yang*

- Research Keywords: Language Agent; Language Grounding to Robotics; Reinforcement Learning

National University of Singapore, Department of Computer Science 7/2022 – 4/2023
Undergraduate Researcher *Advisor: Prof. Lin Shao*

- Research Keywords: Robot Learning; Deformable Object Manipulation; Differentiable Simulation

Nanjing University, Natural Language Processing Group 12/2021 – 5/2022
Undergraduate Researcher *Advisor: Prof. Shujian Huang*

- Research Keywords: Machine Translation; Memory-augmented Language Model; Domain Adaptation

Research Projects

Benchmarking Multi-modal Agent on OS-level Computer Task and Structured Data Ongoing, Leader

- Develop environment and gym-like interface for multi-modal agents in OS (computer and mobile) scenarios.
- Collect and annotate task example data for training and benchmarking multi-modal agents focused on workflow automation and structured data (table, document, etc.) processing.
- Evaluate GPT-4v and other accessible multi-modal models under the benchmarks and give an assessment of their abilities in terms of human-like UI interaction and visualized structured data.

Text2Reward: Dense Reward Generation with Language Models for Reinforcement Learning [1]

- Design reward functions is a longstanding challenge in RL, which requires expert knowledge or domain data.
- Given a goal in natural language, our proposed framework generates dense reward function as an executable program grounded in a compact representation of the environment, with a choice to interactively improve it.
- Evaluate our method on 3 different Robotics benchmarks, as well as successfully deploy the policy on a real robot.

Differentiable Cloth Simulation with Intersection-free Frictional Contact and Differentiable Two-Way Coupling with Articulated Rigid Bodies [4]

- Integrate the *Project Dynamics* and *Incremental Potential Contact* coherently to make our cloth simulation intersection-free and derive gradients effectively.
- Establish the differentiable two-way coupling mechanism between articulated rigid bodies and cloth.
- Systematically evaluate the effectiveness and accuracy and experiment on 6 various downstream robotic tasks.

Publications

* Equal contribution. Authors in alphabetical order.

[1] Tianbao Xie*, **Siheng Zhao***, Chen Henry Wu, Yitao Liu, Qian Luo, Victor Zhong, Yanchao Yang, Tao Yu, *Text2Reward: Dense Reward Generation with Language Models for Reinforcement Learning*, in submission, International Conference on Learning Representations (**ICLR**) 2024. [paper] [project] [code] **Score: 8/8/6/6**

[2] Yiheng Xu, Hongjin Su, Chen Xing, Boyu Mi, Qian Liu, Weijia Shi, ..., **Siheng Zhao**, ..., Lingpeng Kong, Bailin Wang, Caiming Xiong, Tao Yu, *Lemur: Harmonizing Natural Language and Code for Language Agents*, in submission, International Conference on Learning Representations (**ICLR**) 2024. [paper] [code] [model] **Score: 8/8/6/6**

[3] Weikun Peng, Jun Lv, Haonan Chen, **Siheng Zhao**, Jichen Sun, Cewu Lu, Lin Shao, *TieBot: Model-based Learning to Knot a Tie from Visual Demonstration via Differentiable Physics-based Simulation*, in submission, International Conference on Robotics and Automation (**ICRA**) 2024. [paper] [project]

[4] Xinyuan Yu*, **Siheng Zhao***, Siyuan Luo, Gang Yang, Lin Shao, *Differentiable Cloth Simulation with Intersection-free Frictional Contact and Differentiable Two-Way Coupling with Articulated Rigid Bodies*, International Conference on Intelligent Robots and Systems (**IROS**) 2023. [paper] [project]

[5] Bingyang Zhou, Haoyu Zhou, Tianhai Liang, Qiaojun Yu, **Siheng Zhao**, Yuwei Zeng, Jun Lv, Siyuan Luo, Qiancai Wang, Xinyuan Yu, Haonan Chen, Cewu Lu, Lin Shao, *ClothesNet: An Information-Rich 3D Garment Model Repository with Simulated Clothes Environment*, International Conference on Computer Vision (**ICCV**) 2023. [paper] [project]

HONORS

National Scholarship *(top 0.2% national-wide, the highest honor in China)* 2021
China Telecom Scholarship *(1,700 college students in China)* 2021
People's Scholarship 2022, 2023
Heng Fang Scholarship *(8 students in Nanjing University)* 2022
Bao Gang Scholarship & Special Prize Nomination *(1 student in Nanjing University)* 2023
Top-Grade Scholarship *(the highest honor in Nanjing University)* 2023
Outstanding Student Leader 2021, 2022
Outstanding Student in Social Practice 2021

SERVICES

Invited Talks

- *Text2Reward*: *Dense Reward Generation with Language Models for Reinforcement Learning*, Shanghai AI Lab, 2023
- *Large Language Model for Robotics*: *a High-level Planner*, Nanjing University NLP Group, 2023

Conference Reviewer

- IEEE International Conference on Robotics and Automation (ICRA) 2024

Contributor of GitHub open-resource paper list

- *XLang-paper-reading* [link] 240+★
- *Awesome-LLM-Robotics* [link] 1400+★
- *Awesome-Differentiable-Simulation-Robotics* [link]
- *WorldModelPapers* [link]

President of the Department Student Union 2021, 2022
Director of the Department New Media Center 2021, 2022

SKILLS

Programming	Python (PyTorch), C/C++, Bash, LaTeX, Java, Javascript, MatLab, Assembly, Verilog
Tools & Software	Git, CMake, Gym, Stable Baselines, MuJoCo, JAX, Langchain, PyBullet, Fairseq
Languages	English (TOEFL: 105), Mandarin (native)