Xingjian Zhang

Email: xingjian@u.nus.edu Homepage: sinyzxj.github.io

RESEARCH INTEREST

Robot Learning, Reinforcement Learning, Embodied AI with Robotics

EDUCATION

National University of Singapore **Aug 2024 – Jan 2026**

- M.Sc. in Mechanical Engineering, GPA: 4.72/5.0, Advisor: *Prof. Guillaume SARTORETTI*
- ***A*STAR CFAR (Centre for Frontier AI Research) Internship Award for Research Excellence***

Harbin Institute of Technology, Shenzhen (HITsz) **Sep 2020 – Jun 2024**

- B.Eng. in Automation, Advisor: *Prof. Hongwei Zhang*
- ***Outstanding student of Year 2020 - 2021***

NUS Research Institute **Sep 2023 – May 2024**

- Exchange Student, GPA:4.0/4.0, Advisor: *Prof. NEE Yeh Ching*
- Relevant Coursework: Robot Mechanics and Control, Automation in Manufacturing, Fundamentals of Product Design and Development.

INTERNSHIP

Centre for Frontier AI Research (CFAR), A*STAR **Jun 2025 – Aug 2025**

- ***Research Intern*** under CIARE scholarship.
- Fine-tuned a Vision-Language Model (BLIP-2) to generate structured physical predicates from RGB images for downstream manipulation planning.
- Integrated reinforcement learning with GRPO to optimize VLM outputs via task-based rewards, enabling accurate symbolic reasoning in multi-step rearrangement tasks.

SMART, Massachusetts Institute of Technology (MIT) **Jan 2025 – Jun 2025**

- ***Research Intern*** at ***Mens, Manus and Machina (M3S)***
- Leveraged Transformer architectures within a Generative Adversarial Imitation Learning (GAIL) framework to predict sequential educational and career trajectories based on expert demonstrations.

RESEARCH EXPERIENCE

COMPASS: Cooperative Multi-Agent Persistent Surveillance **Jan 2025 – Jun 2025**

MARMOT Lab, National University of Singapore

- Designed a spatio-temporal attention model (COMPASS) for multi-agent consistent monitoring, integrating PPO with centralized critic and Gaussian Processes over dynamic graph structures.
- Enabled efficient agent coordination and adaptive exploration in AirSim, achieving **50.2% uncertainty reduction**, strong scalability, and superior robustness over 4 baselines.

Attention-based Deep Reinforcement Learning for Grasping **Aug 2024 – Dec 2024**

Temasek Lab, Singapore

- Developed a SAC agent with attention-based visual encoder, enabling faster convergence and reduced grasping steps (16.5 vs. 17.8) over PPO baselines.
- Reached 90.3% grasp success rate across 1000 trials with efficient training in 100k timesteps in simulation environments (PyBullet).

Hand-tracking and Object Detection for Verification in Assembly **Sep 2023 – May 2024**
Control Lab, NUS Research Institute

- Combined a gesture-recognition system based on LSTM model and an object-detection system, utilizing the idea of FSM to achieve stage positioning and error detection during assembly.
- Introduced the concept of control and feedback, utilizing environment exposure as the main parameter to adjust various parameters in actual detection.
- Authored (as first author) a paper accepted by International Conference on Smart and Advanced Manufacturing 2024. (Oral)

PUBLICATION

XINGJIAN ZHANG, Yutong Duan, et al. ***Learning-based Stage Verification System in Manual Assembly Scenarios.*** International Conference on Smart and Advanced Manufacturing; 2024. https://arxiv.org/abs/2507.16306

RUI ZHAO, **XINGJIAN ZHANG**, et al. ***Attention-Based Learning for 3D Informative Path Planning.*** arXiv preprint arXiv:2506.08434, 2025. https://arxiv.org/abs/2506.08434

XINGJIAN ZHANG, Yizhuo Wang, et al. ***COMPASS: Cooperative Multi-Agent Persistent Monitoring using Spatio-Temporal Attention Network.*** IEEE Multi-robot Systems (MRS); 2025. (Submitted) https://arxiv.org/abs/2507.16306

XINGJIAN ZHANG, JUNYI LI, et al. ***SHAPE: Static Historical Attention for Academic-Career Path Estimation.*** IEEE Transactions on Computational Social Systems; 2025. (Submitted)

XINGJIAN ZHANG, ZEYU FENG. ***REASON: Reinforced Agent Symbolic reasoning for Object-centric manipulation.*** (Manuscript in Preparation)

HONORS

Mathematical Contest in Modelling, USA, 2022 (MCM) **Finalist (*Top 1.3% Global*)**

- Established a model offering racing strategies for any type of riders under various factors affecting including energy limit, aggressiveness in the past, weather sensitivities and target deviation robustness.

The 16th National Smart Car Competition **National First Prize**

- Designed a DNN-based visual detection system for special track elements, outperforming traditional rule-based methods by 15.6% in detection accuracy after iterative debugging.

The 21st China University Robot Competition ROBOCON **National Third Prize**

- Built and calibrated a pan-tilt-zoom (PTZ) targeting system; integrated with DJI M3508 motors via custom serial communication protocol.

LEADERSHIP & ACTIVITIES

- ***Producer*** of HITSZ 20th Anniversary Song (admitted to HIT History Museum)
- ***Organizer*** of HITSZ 20th Anniversary Commemorative Evening
- ***Vice Chairman*** of HITSZ Student Art Troupe
- ***Host*** of the 16th National Smart Car Competition
- ***Accompanying translator*** in the China International Wine Expo in 2019

SKILLS

Language: IELTS 7.0 (6.5)
Programming: Python, C/C++, MATLAB
Frameworks & Tools: ROS, PyTorch, TensorFlow, SolidWorks, Issac Lab, MuJoCo, PyBullet
Hardware & Systems: Arduino, Raspberry Pi, DJI Motor Control, Basic Mechanical Design
Interests: Music production