

Tianxing Liu

Master's Student
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Shenzhen, Mainland China

RESEARCH INTERESTS

Robotic manipulation, deep learning, and generative models for robotics. Particular interests include manipulation in the wild, world action models (WAM), and the generalization capabilities of compact models for robot learning.

EXPERIENCE

- **Southern University of Science and Technology** Nov. 2025 – Sep. 2026
Research Intern, CLEAR Lab Shenzhen, China
 - Conducted research on robotic manipulation and imitation learning, with a focus on Diffusion Policy.

EDUCATION

- **Southern University of Science and Technology** Sep. 2026 – Present
Master's in Control Science and Engineering (Academic) Shenzhen, China
 - School of Automation and Intelligent Manufacturing
 - **Advisor:** Prof. Wei Zhang, CLEAR Lab
 - Expected graduation: Jul. 2029
- **Northeastern University** Sep. 2022 – Jul. 2026
Bachelor of Engineering in Industrial Intelligence Shenyang, China
 - College of Information Science and Engineering
 - Average Grade: 85.366/100
 - **Undergraduate Thesis:** Multimodal Fusion in Diffusion Policies for Robotic Manipulation

PROJECTS

- **Control-Note: A Practical Guide to Control Theory** Apr. 2026 – Aug. 2026
Open-source lecture notes in Chinese and English 
 - Compiled study notes and practical insights accumulated over four years of undergraduate work in optimization and control into a structured guide to control theory, with AI-assisted organization and editing.
 - Released Chinese and English editions on GitHub, emphasizing intuitive explanations and applications to robotics engineering.
- **Dexterous Manipulation: Data Collection and Imitation Learning** Jan. 2025 – Mar. 2025
Institute for AI Industry Research (AIR), Tsinghua University; winter camp project 
 - Built a data collection pipeline integrating an INSPIRE ROBOTS dexterous hand with an AIRBOT Play robotic arm.
 - Constructed a MuJoCo simulation environment and trained imitation learning policies using ACT.
 - Open-sourced selected project code in the [AIR_SIM](#) repository.
- **RoboMaster: Autonomous Sentry Robot Development** Sep. 2022 – Sep. 2024
T-DT Team, Northeastern University; RoboMaster University Championship 
 - Designed circuits and control algorithms for the autonomous sentry robot and developed the team's embedded software framework for STM32F4 and STM32H7 microcontrollers.
 - Improved a six-axis IMU attitude estimation algorithm based on Madgwick gradient-descent fusion, enhancing robot operational stability and attitude estimation accuracy; released the implementation as [6-Axis-AHRS](#).
 - Contributed to the team's national runner-up finish in 2023 and third-place finish in 2024.

MANUSCRIPTS UNDER REVIEW

[1] Tianxing Liu et al. **Residual-Gated Language Injection in Diffusion Policies for Language-Conditioned Robotic Manipulation (RGLI)**.
Sole first author. Submitted to the 2027 IEEE International Conference on Robotics and Automation (ICRA 2027); decision pending.

- Developed a residual-gated cross-attention interface that injects token-level language into temporal U-Net Diffusion Policies while preserving visual and diffusion-time FiLM conditioning.
- Demonstrated same-scene adaptation on LIBERO-90 by updating only the conditioning interface, achieving 75.5% success versus 58.6% for DP-Cat; assessed instruction dependence and paraphrase robustness through controlled interventions.
- Evaluated on four LIBERO suites and six real-world manipulation tasks, achieving 94.17% mean real-world success versus 83.33% for the matched U-Net baseline.

SKILLS

- **Programming Languages:** C, C++, Python, MATLAB
- **Robot Learning:** Imitation learning (ACT, Diffusion Policy); reinforcement learning (PPO)
- **Frameworks & Simulation:** PyTorch, ROS, MuJoCo
- **Embedded Systems & Robotics:** STM32 embedded software development (STM32F4, STM32H7), sensor calibration, robot debugging
- **Development Tools:** Linux, Git
- **AI-Assisted Development:** Software development using Codex and Claude Code

HONORS AND AWARDS

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| • National First Prize, Creativity Group | 2024 |
| <i>National University Student Intelligent Car Competition</i> | |
| • Honorable Mention | 2024 |
| <i>Interdisciplinary Contest in Modeling (ICM), Problem D; COMAP</i> | |
| • National Third Place (Team Award) | 2024 |
| <i>RoboMaster University Championship; T-DT Team, Northeastern University</i> | |
| • National Runner-Up (Team Award) | 2023 |
| <i>RoboMaster University Championship; T-DT Team, Northeastern University</i> | |

ADDITIONAL INFORMATION

Languages: Mandarin Chinese (native); English (reading, writing, and conversation)
Interests: Badminton, photography