KAIXUAN LIU

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EDUCATION

School of Mechanical Engineering, Shanghai Jiao Tong University Sep 2024-Present

B.S. in Mechanical Engineering, expected Jul 2028

- Enrolled in the **Zhiyuan Honors Program**
- Selected Relevant Coursework (score/100):
  Design and Manufacturing I (98) Theoretical Mechanics (Honors) (96)
  Modeling, Analysis and System Control (95) Linear Algebra (Honors) (92)

PUBLICATIONS

[1] **Kaixuan Liu**, Chenkun Qi, Jinkai Wang, Chengjie Li, Jiaqi Liu, Qiao Sun, Haojie Liu, Jiangwei Zhong. Learning Adaptive Ladder Climbing for a Quadruped Robot Using Egocentric Vision and Contact-Sensing End Effectors. *IEEE Robotics and Automation Letters (RA-L), under review*.

RESEARCH EXPERIENCE

Institute of Design and Control Engineering

Research Assistant, advised by Prof. Chenkun Qi

Reinforcement Learning of Quadrupedal Ladder Climbing Mar 2026-Oct 2026

- Developed a **hook-shaped contact-sensing end effector** with a **force-sensitive resistor** for secure rung engagement, and used the **ADC of an STM32 microcontroller** to sample the voltage divider output during deployment for local contact feedback.
- Adapted the **Legged Gym** framework to train quadrupedal ladder-climbing policies using **contact-aware reward functions** and an **adaptive terrain curriculum**.
- Proposed an **RL-based locomotion policy** fusing forward depth, contact sensing and proprioception through **explicit state reconstruction**, which enabled a quadruped Unitree Go2 to climb ladders of **different inclinations and rung spacings** with an overall **82.9%** success rate.

Machine Vision and Intelligence Group

Research Assistant, advised by Prof. Cewu Lu and Prof. Chuan Wen

Development of a Low-Cost Force-Feedback Teleoperation System Nov 2026-Present

- Reduced the I2RT YAM driver latency to **6 ms** and designed a **force feedback controller with latency compensation** to collect teleoperated demonstrations.
- Developing a manipulation policy that uses **force feedback** as an input to perform **contact-rich tasks** such as Lego brick assembly.

PROJECT EXPERIENCE

Electronics and Control Division of Team Jiaoloong

Deputy Head (Sep 2025-Present); Member (Sep 2024-Aug 2025)

Control of a 6-DOF Robot Arm on a Swerve Drive Chassis Nov 2024-Oct 2025

- Programmed an **STM32 microcontroller** for Cartesian pose interpolation through **multiple waypoints**.
- Integrated **Manipulator Dynamics Compensation** into the arm controller.
- Implemented **forward and inverse kinematics** for a **swerve drive chassis**.

Modeling and Simulation of a Wheeled Bipedal Robot Nov 2025-Dec 2025

- Modeled a **wheeled bipedal robot** with parallel leg mechanisms as a W-SLIP system**.**
- Applied an **NMPC controller** to the robot in Gazebo Simulator.

Development of a Foldable Dual-Arm Robot May 2026-Aug 2026

- Co-designed the **kinematic configuration** and selected the **joint actuators** for both manipulators.
- Designed the robot's **electrical architecture** and led the **electrical wiring**.
- Demonstrated **impedance control** for part assembly, including a translation and two sequential rotations.

AWARDS AND HONORS

National Champion, RoboMaster University Championship 2025

Team Jiaoloong, Shanghai Jiao Tong University

Zhiyuan Honors Scholarship 2025, 2026

Zhiyuan College, Shanghai Jiao Tong University

TECHNICAL SKILLS

Programming: Python, C, C++
Manufacturing: 3D Printing, Soldering, Benchwork
Engineering Software: SolidWorks, MATLAB, LabVIEW, ADAMS, EasyEDA
Robotics & Control: Embedded systems, Manipulator Kinematics & Dynamics, Impedance Control
Robot Learning & Simulation: ROS 2, Isaac Gym, MuJoCo, Gazebo
Hardware Platforms: Unitree Go2, I2RT YAM, NVIDIA Jetson Orin, Intel RealSense
English Proficiency: TOEFL iBT **5.5/6** (ETS comparable total: **110/120**), 14 Mar 2026.