Qiwei Wu

Curriculum Vitae

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Research Interests & Goal

My primary research interests encompass the dextrous manipulation and multimodal perception of **robotics**, focusing on **reinforcement learning**, **imitation learning**. I aim to enhance robotic perception diversity and enable the completion of more complex tasks, achieving **embodied AI**.

Education

Sichuan University | **Bachelor** | **Automation** 09/2018 - 06/2022
College of Electrical Engineering (Outstanding Engineer Program) Chengdu, China
Comprehensive Ranking 2/117
Overall GPA 3.6/4.0

University of California, Berkeley | **Summer School** 07/2019 - 08/2019
Artificial Intelligence and Business Analytics Berkeley, USA

Harbin Institute of Technology | **Master** | **Control Engineering** 09/2022 - 03/2025
School of Mechanical Engineering and Automation Shenzhen, China

The Hong Kong University of Science and Technology | **PhD Student** 01/2025 -
Robot Manipulation,Humanoid Robotics Guangzhou, China

Publications

Rapid Tactile Transfer Framework for Contact-Rich Manipulation Tasks 6/2024
Qiwei Wu, Xuanbing Peng, Jiayu Zhou, Zhuoran Sun, Xiaogang Xiong, Yunjiang Lou | IEEE/RSJ International Conference on Intelligent Robots and Systems, **IROS** | *First Author*

Tactile Affordance in Robot Synesthesia for Dextrous Manipulation 7/2024
Qiwei Wu, Haidong Wang, Jiayu Zhou, Xiaogang Xiong, Yunjiang Lou
IEEE Robotics and Automation Letters, **RAL** | *First Author*

Gentle Manipulation of Long-Horizon Tasks without Human Demonstration Data 6/2025
Jiayu Zhou, Qiwei Wu, Haitao Jiang, Xiaogang Xiong, Renjing Xu, Yunjiang Lou
Submitted to RAL, Under Review | *Co-first Author*

GradedMotion-X: A Scalable Mixed-Difficulty Humanoid Motion Dataset for Humanoid Policy Learning 6/2025
Weisheng Xu, Qiwei Wu, Jing Tan, Renjing Xu
Submitted to RAL, Under Review | *Co-first Author*

Selected Awards

Outstanding Thesis (Harbin Institute of Technology) 1/2025
Master Top 5%

Outstanding Thesis (Sichuan University) 7/2022
Bachelor Top 5%

RoboMaster University Championship 2021 8/2021
National Second Prize, Top 16

The 16th National College Student Intelligent Car Competition 7/2021
Second Prize in Baidu Intelligent Traffic Group, Top 20%

2020 RoboCup China Open 10/2020
Third Prize in Small Size Robot League, Obstacle Avoidance Challenge

Work Experience

Sony R&D Center China Laboratory 5/2024-8/2024
Research Intern

Reinforcement Learning for Robotic Manipulation

- **Robotic Grasping System Design**
  Contribution:
  * Developed digital twins of robots in NVIDIA's IsaacLab simulation environment.
  * Designed robotic grasping environments and implemented reinforcement learning algorithms for training.

  Outcome:
  * Open-sourced the robotic reinforcement learning framework IsaacLab.manipulation 🔗 (**Github 100+ star**).

Research Experience

Intelligent Perception and Control Lab, HITSZ 10/2022-01/2025
Graduate Student, advised by Prof. Xiaogang Xiong 🔗

Tactile Perception for Robotic Manipulation | ***Research Leader***

- **Designed and developed tactile sensors**
  Contribution:
  * Reproduced and redesigned the tactile sensor Tactip and Insight.
  * Design and implement the robotic arm - tactile gripper - camera system.
- **Sim2Real and policy transfer for tactile servo**
  Contribution:
  * Proposed a method that applies semi-supervised learning to unify the features of tactile sensors.
  * Proposed a framework that applies Reinforcement Learning and Imitation Learning for achieving sim2real of tactile manipulation policies.

  Outcome:
  * Some algorithms and codes are open-sourced (Github).
  * Published a paper at a conference (**IROS2024**).

Dexterous manipulation of robots | ***Research Leader***

- **Designed and developed a robotic visual-tactile environment (Sim & Real)**
  Contribution:
  * Built a hardware system platform for visual-tactile robotic grasping.
  * Built a robot dexterous manipulation environment (digital twin) based on visual and tactile point clouds in Isaacgym.
- **Achieved Sim2Real transfer for dexterous manipulation policies**
  Contribution:
  * Designed and successfully trained the reinforcement learning manipulation policy with tactile feedback.
  * Proposed a robot manipulation framework for visual-tactile fusion that realizes the transition between contact and non-contact states.

  Outcome:
  * Open-sourced the robotic visual-tactile simulation environment Visual-Tactile Gym 🔗.
  * Published a paper in Journal **IEEE Robotics and Automation Letters**.
- **Designed a long-horizon planning framework that applies LLM**
  Contribution:
  * Designed a robot manipulation framework that combines reinforcement learning atomic skills with LLM.

  Outcome:
  * Submit a paper to RAL as co-first author.

Human Computing Lab, HKUST-GZ 01/2025-Present
PhD Student, advised by Prof. Renjing Xu

Digital Twins of Humanoid Robots and Robot Arms | ***Research Leader***

- **Designed the robotic simulation environment and algorithm training framework.**
  Contribution:
  * The digital twin simulation of Unitree G1, Franka robotic arm, and ARX-Lift2 dual-arm mobile robot is being established in simulation environments such as IsaacLab, Isaac Gym, and Genesis.
  * Assisted in designing the mixed-difficulty dataset for humanoid robot motion tracking.

  Outcome:
  * Some algorithms and codes are open-sourced (Github).
  * Submit a paper to RAL as co-first author.

SERVICES

Reviewed for ICRA, IROS.
Project manager of the Robotics Laboratory at Sichuan University.
Assistant captain of the Sichuan University Robot Football Team.

SKILLS

Languages: IELTS Score: **7.0** (Academic).
Programming: Python, C, C++, Linux Shell, HTML, CSS, JavaScript.
Others: Deep learning framework (Torch, Tensorflow, Paddlepadlle), robot simulation (IsaacLab, IsaacGym, Pybullet, Gazebo), ROS & ROS2, Embedded System Development, Photo & Video Editing.