

QIWEI WU

Curriculum Vitae

☎ +86 15013641529 ✉ nathan.wuqw@gmail.com 🌐 [Personal Website](#)

RESEARCH INTERESTS & GOAL

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

EDUCATION

🏛️ Sichuan University 🎓 Bachelor Automation College of Electrical Engineering Comprehensive Ranking Overall GPA	09/2018 - 06/2022 📍 Chengdu, China 2/117 3.52/4.00
🏛️ University of California, Berkeley Summer School Artificial Intelligence and Business Analytics	07/2019 - 08/2019 📍 Berkeley, USA
🏛️ Harbin Institute of Technology, Shenzhen 🎓 Master Control Engineering School of Mechanical Engineering and Automation	09/2022 - 06/2025 📍 Shenzhen, China

PUBLICATIONS

Rapid Tactile Transfer Framework for Contact-Rich Manipulation Tasks 🔗 Qiwei Wu, Xuanbing Peng, Jiayu Zhou, Zhuoran Sun, Xiaogang Xiong, Yunjiang Lou IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS (Accepted) <i>First Author</i>	6/2024
Tactile Affordance in Robot Synesthesia for Dextrous Manipulation 🔗 Qiwei Wu, Haidong Wang, Jiayu Zhou, Xiaogang Xiong, Yunjiang Lou IEEE Robotics and Automation Letters, RAL (Under Review) <i>First Author</i>	7/2024

SELECTED COMPETITION AWARDS

RoboMaster University Championship 2021 National Second Prize, Top 16	8/2021
RoboMaster University League 2021 First Prize in Engineering Robot Mining, Top 5 in Southern China	8/2021
The 16th National College Student Intelligent Car Competition Second Prize in Baidu Intelligent Traffic Group, Top 20%	7/2021
2020 RoboCup China Open Third Prize in Small Size Robot League, Obstacle Avoidance Challenge	10/2020

WORK EXPERIENCE

Sony R&D Center China Laboratory <i>Research Intern</i>	5/2024-Present
--	----------------

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.
- * Developed and integrated the tactile sensor Tac3D into the system.

Outcome:

- * Open-sourced the robotic reinforcement learning framework IsaacLab.manipulation 🔗.
- * Open-sourced ROS support for the Tac3D sensor 🔗.

RESEARCH EXPERIENCE

Intelligent Perception and Control Lab, HITSZ
Graduate Student, advised by Prof. Xiaogang Xiong 

10/2022-Present

Tactile Perception for Robotic Manipulation | *Research Leader*

- **Designed and developed tactile sensors**

Contribution:

- * Reproduced and redesigned the tactile sensor Tactip.
- * Reproduced and redesigned the tactile sensor Insight.
- * Installed tactile sensors on the UR5 robotic arm system and implemented tactile servo.

- **Sim2Real and policy transfer for tactile servo**

Contribution:

- * Designed a unified tactile representation method based on the VAE-GAN framework.
- * Developed tactile servo manipulation policies using off-policy reinforcement learning methods.
- * Designed a teacher-student framework based on the Tactile Gym simulation environment to achieve Sim2Real for tactile servo.

Outcome:

- * Completed pushing and surface following tasks on a real robotic system.
- * Accepted by **IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS**.


Visual-Tactile Sensing and Learning for Robots | *Research Leader*

- **Designed and developed a robotic visual-tactile simulation environment**

Contribution:

- * Decoupled tactile perception information and implemented tactile simulation.
- * Created digital twins of robotic systems in the IsaacGym simulation environment.
- * Completed the development of tactile sensors Gelsight Mini and Digit.

Outcome:

- * Open-sourced the robotic visual-tactile simulation environment Visual-Tactile Gym .

- **Achieved Sim2Real transfer for dexterous manipulation policies**

Contribution:

- * Designed an object affordance prediction module using the PointNet++ method.
- * Designed a mixed encoding method for visual and tactile features.
- * Trained a teacher policy for dextrous manipulation using parallel reinforcement learning.
- * Designed a point cloud-based imitation learning method to obtain the final student policy.

Outcome:

- * Completed dexterous tasks such as lifting objects, opening doors, pick-and-place, and drawer pulling on a real robotic system.
- * Submitted a manuscript to **IEEE Robotics and Automation Letters**, currently under review.

SKILLS

Languages: Mandarin (Native), English

Classes: Machine Learning, Deep Learning, Automatic Control Theory, Optimal estimation, Visual SLAM

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