YAN ZHU

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Research interests: Robot learning, physical-state-aware manipulation, multimodal perception, and decision-making under uncertainty.

EDUCATION

Xi'an Jiaotong-Liverpool University (XJTLU) | Sep 2024 – Jul 2028 (expected)

BEng in Mechatronics and Robotic Systems; English-medium programme

Academic average: 74/100 (Years 1–2; UK First-Class mark band begins at 70/100).

Awards: Academic Achievement Scholarship (2024/25).

Selected coursework: Multivariable Calculus (95), Calculus (94), Linear Algebra (87).

RESEARCH EXPERIENCE

RemoteTac-VLA: Tool-Mediated Tactile Perception for Physical-State-Aware Planning and Manipulation | May – Sep 2026

First Author | Research Assistant, XJTLU | Advisor: Asst. Prof. Haoran Li

- Built a physical-state perception and decision pipeline for fork-based food acquisition, using tool-mediated tactile evidence to verify language-specified targets and select acquisition skills when appearance alone is ambiguous.
- Adapted and evaluated a dual-TacTip force estimator with six-axis force/torque supervision (**0.08 N MAE**, $R^2 = 0.988$ on held-out data); combined estimated force and tool motion into a calibrated penetration-resistance descriptor.
- Connected Qwen3-VL planning to separately fine-tuned $\pi_{0.5}$ acquisition policies through a deterministic state-to-skill selector.
- The integrated framework achieved **28/30** single-object acquisitions (vision-only: 18/30) and **48/60** two-object tasks requiring correct target selection and acquisition (vision-only: 28/60).

3WD-VLA: Hierarchical Three-Way Decision for Collaborative Dual-View Robotic Grasping | Dec 2025 – Mar 2026

Co-first Author | Research Assistant, XJTLU | Advisor: Prof. Xinheng Wang

- Built a high-level decision pipeline that routes robot tasks to execution, clarification, replanning, or rejection under ambiguity, occlusion, stacking, and safety constraints.
- Fine-tuned Qwen3-VL using LoRA on dual-view samples to generate action preferences and safety reasoning; combined Bradley–Terry preference estimation with a decision-theoretic rough-set threshold.
- Integrated the decision layer with SO-100 manipulation policies; the framework completed **32/40 executable subtasks (80.0%)** versus 21/40 (52.5%) for SmolVLA without the 3WD layer.

Language Instructions and Task Representation in VLA Models | 2026 – Present

Research Project, Shanghai Jiao Tong University | Advisor: Assoc. Prof. Lipeng Chen

- Reviewed instruction representations across visual grounding, planning, action generation, and feedback; developed a taxonomy of language-related failure modes in robot manipulation.
- Proposed controlled evaluation protocols to separate missing information from failures to use available information; outlined a conceptual task representation linking user intent, visual evidence, physical preconditions, and robot capabilities.

BoundaryBench-ECom: A Controlled Diagnostic Benchmark for Procedural Boundary Preservation in Multi-Turn E-Commerce Support Agents | 2026

Research Contributor, XJTLU | Advisor: Asst. Prof. Zongyang Ma

- Supported multi-turn model evaluation, experiment processing, and turn-level classification of skipped prerequisites, unsupported expectations, and premature actions. Team-wide benchmark scope: 18 models, 750 cases, and 13,500 conversations.

PUBLICATIONS

Published / Accepted

- **3WD-VLA: Hierarchical Three-Way Decision for Collaborative Dual-View Robotic Grasping.**
  Yan Zhu*, Kaiyue Chen*, Lingyu Li, Xiaohui Zhu, and Xinheng Wang.
  EAI CollaborateCom 2026, accepted. *Equal contribution. **[PDF]**
- Zhaowei Cui, Jiawei Lyu, Zhuoyang Li, **Yan Zhu**, Jiayi Qian, Ziyu Peng, and Martijn ten Bhömer. "Exploring a Smart Textile-Based Pressure-Sensitive Skin Fabrication Workflow for Aftermarket Tactile Augmentation of Robotic Platforms." *HCI International 2026 Posters*, Springer, 2026. doi:10.1007/978-3-032-30819-1_3.

Under Review

- **RemoteTac-VLA: Tool-Mediated Tactile Perception for Physical-State-Aware Planning and Manipulation.**
  Yan Zhu et al. Submitted to *ICRA 2027*. First author.
- Xuanyu Chang, Zongyang Ma, **Yan Zhu**, Sirui Yu, Yubo Xie, Haoran Tao, and Yan Miao. "BoundaryBench-ECom: A Controlled Diagnostic Benchmark for Procedural Boundary Preservation in Multi-Turn E-Commerce Support Agents." Submitted to *AAAI 2027*.

ADDITIONAL RESEARCH EXPERIENCE

Textile-Based Tactile Skin for Quadruped Robots | Mar – Sep 2025

Research Assistant, XJTLU | Advisor: Assoc. Prof. Martijn ten Bhömer

- Designed and prototyped a knitted piezoresistive tactile array and quadruped leg-guard textiles, combining conductive-yarn sensing with digital design and textile fabrication.

INTERNSHIP EXPERIENCE

AI4EDA: Diffusion Models for Chip Placement | Mar – Apr 2026

Algorithm Research Intern, Shanghai Jiao Tong University | Advisor: Prof. Guohao Dai

- Applied reinforcement-learning fine-tuning to a diffusion-based chip-placement policy, targeting wirelength reduction under non-overlapping macro-placement constraints.

Siasun Robot & Automation | Jan 2026

Hardware Engineering Intern

- Developed an STM32F407–LAN9252 EtherCAT slave prototype with SPI communication, isolated digital I/O, and schematic-to-PCB implementation for industrial robotic systems.

COMPETITION EXPERIENCE

27th China Robot and Artificial Intelligence Competition | Aug 2025

Baidu Service Robot Track | **National First Prize**

- Developed ROS/C++ components for navigation and restaurant delivery, including SLAM adaptation, object detection, and motion-parameter tuning.

TECHNICAL SKILLS

Programming & Tools: Python, C/C++, PyTorch, Linux, Git

Robot Learning: Imitation learning, diffusion policies, LoRA fine-tuning, real-robot policy evaluation

Robotics & Sensing: ROS1/ROS2, manipulation, teleoperation, visuo-tactile sensing, force estimation

Additional Tools: STM32, EtherCAT, SolidWorks, Rhino

Languages: Mandarin Chinese (native); English (fluent)