Zihong Luo

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Profile

Research-driven undergraduate transitioning from **Multimodal Perception** to **Embodied Intelligence**. Possesses a strong track record in representation learning (publications in **AAAI, BIBM, ICPR**) and recent hands-on experience in **VLA policy learning** and **robotic manipulation**. Seeking a **Master's program** to bridge the gap between high-level AI reasoning and low-level **control/dynamics**, aiming to build generalizable robotic agents that interact robustly with the physical world.

Education

University of Liverpool (UoL) — *Liverpool, UK*
BSc in Computing Science — ***GPA: 3.87/4.0*** *(First Class Honours projected)* — *Expected Jun 2026*

Xi'an Jiaotong-Liverpool University (XJTLU) — *Suzhou, China*
BSc in Information & Computing Science — ***GPA: 3.87/4.0*** — *Sep 2022 – Jun 2026*

Relevant Coursework: *Machine Learning, Deep Learning, Computer Vision, Knowledge Representation.*

Research Experience

SmartLab, University of Liverpool — *Liverpool, UK*
Research Assistant (Advisor: Prof. Trendaferov) — *Oct 2025 – Present*

- **Project:** High-level trajectory reasoning for robotic end-effectors (Final Year Project).
- Proposed **GVLA**, a gripper-aware Vision-Language-Action policy using Mixture-of-Experts to fuse gripper morphology with visual input.
- Engineered a unified text bottleneck to align natural language instructions with **kinematic constraints**, demonstrating zero-shot transfer to unseen tools on real-robot benchmarks (Franka)

Jifu Medical (AI Algorithm Group) — *Shenzhen, China*
Algorithm Intern — Multimodal Robotics & Perception — *Jun 2025 – Aug 2025*

- Led the feasibility study for extending clinical workflow from recognition to **robotic manipulation**.
- Deployed **ACT** and **ALOHA** frameworks; built a full control loop using **LeRobot** for data logging and teleoperation on SO-101 dual-arm robots.
- Prototyped a Sim-to-Real pipeline using **NVIDIA Isaac Sim**, mapping perception data to actionable policies.

MBZUAI — *Abu Dhabi, UAE*
Research Assistant (Remote, Advisor: Prof. Imran Razzak) — *Dec 2024 – Jul 2025*

- Developed a **Modality Prior Aligner** leveraging Medical LLMs to guide pixel-level segmentation.
- Designed a fusion decoder with iterative mask optimization, bridging the gap between semantic reasoning and dense prediction (relevant to robotic affordance detection).
- Outcome: Paper submitted to **BIBM 2025**.

University of Exeter — *Exeter, UK*
Summer Research Assistant (Advisor: Prof. Yanda Meng) — *Mar 2024 – Aug 2024*

- Contributed to **IMDR**, a framework for disentangling shared vs. specific modalities in noisy environments.

– Implemented proxy-learning modules to ensure robust representation under missing data, a key challenge in sensor fusion.
– Outcome: Accepted at **AAAI 2025** (Oral/Poster).

Tongji University School of Medicine (TUSM) *Shanghai, China*
Research Contributor (Prof. Xiaoyun Xie) *Nov 2023 - Jan 2024*

– Built interpretable ML models for **DPN/LEAD** prediction; applied **SHAP** for risk factor analysis aiding DFU prevention.

XJTLU *Suzhou, China*
Research Assistant *Sep 2023 – Nov 2023*

– Developed encoder–decoder with Deep Belief Network for **modality completion**; dual losses for accuracy and integration; accepted at **ICPR 2024**. (Prof. Xiaobo Jin)
– Integrated **image + temporal** signals via spiking networks for anomaly detection; published at **ICPR 2024**. (Prof. Shuliang Zhao)

Publications

PG-SAM: Prior-Guided SAM with Medical for Multi-organ Segmentation (BIBM) *2025*
– Yiheng Zhong*, **Zihong Luo***, et al. [arXiv].

Incomplete Modality Disentangled Representation for Ophthalmic Diagnosis (AAAI) *2024*
– Chengzhi Liu*, Zile Huang*, **Zihong Luo**, et al. [Project].

ARIF: Adaptive Attention-Based Cross-Modal Representation Integration (ICANN) *2024*
– Chengzhi Liu*, **Zihong Luo***, et al. [SpringerLink].

MTSA-SNN: Multimodal Time Series via Spiking Neural Networks (ICPR) *2024*
– Chengzhi Liu*, **Zihong Luo***, et al. [arXiv].

MC-DBN: Modality Completion with Deep Belief Networks (ICPR) *2024*
– **Zihong Luo***, Chengzhi Liu*, et al. [arXiv].

Interpretable ML for Peripheral Neuropathy & LEAD (BMC Medical Informatics) *2024*
– Ya Wu, Danmeng Dong, **Zihong Luo**, et al. [SpringerLink].

Robotics & Hardware Projects

LeRobot SO-101 Implementation | *Python, PyTorch, LeRobot* *2025*
– Implemented dual-arm teleoperation and data collection pipelines; synchronized dual-camera streams for imitation learning.
– Recorded and validated 50+ episodes for manipulation tasks, contributing to the open-source robot learning community.

Bipedal Wheeled Robot Reproduction | *C++, Arduino, ESP32* *2025*
– Built a self-balancing wheel-legged robot from scratch. Implemented **Inverse Kinematics (IK)** for 5-link leg structure.
– Designed cascaded **PID controllers** for balance and velocity control using IMU feedback; achieved stable RC locomotion.
– *This project demonstrates capability in embedded systems and classical control theory.*

Skills

AI & Compute: Python, PyTorch, TensorFlow, OpenCV, Transformers, LLMs
Robotics & Sim: ROS/ROS2, Isaac Sim, MuJoCo, LeRobot, URDF, Kinematics (IK/FK)
Hardware & Embedded: C++, Arduino, Raspberry Pi, Sensors (IMU, LiDAR)
Awards: International Quant Championship (Top 0.1%, UK Finals), Biology Olympiad (Provincial 1st Prize)