Yu Xia

yxia072@ucr.edu | Riverside, CA | linkedin.com/in/yu-xia-b34074262

EDUCATION

University of California, Riverside Sep. 2023 – Jun. 2025
Master of Science in Robotics Riverside, CA, USA

Wuhan Huaxia University of Technology Sep. 2017 – Jun. 2021
Bachelor of Engineering in Computer Science and Technology Wuhan, China

PUBLICATIONS

BOLT: Bandwidth Efficient Object State Streaming for XR Robot Teleoperation

MobiCom 2027 (Under Review) Jun. 2026

- **Yu Xia**, Hang Qiu
- Designed an XR 3D scene streaming system that replaces repeated complete-scene transmission with compact object state updates backed by reusable geometry, using mesh-backed object ID/6DoF pose updates and segmented RGB-D fallback until runtime mesh promotion.
- Built a complete XR teleoperation prototype spanning RGB-D sensing, object-state streaming, XR rendering, and physical manipulator control; across five live runs, single-L515 perception uplink with masked fallback stayed within **0.22–0.34 Mbps**, at least **120**$\times$ below **41.5 Mbps** point-cloud streaming for the same task.
- Evaluated GMC under injected pose noise and live robot tasks: at **50 mm** translation noise, GMC reduced median ADD-S error from **18.8 mm** to **5.5 mm**; an operator completed three manipulation task types in five live runs, including grasping an object hidden from one camera.

Towards Generalizable Safety in Crowd Navigation via Conformal Uncertainty Handling

CoRL 2025 Sep. 2024

- Jianpeng Yao, Xiaopan Zhang*, **Yu Xia***, Zejin Wang, Amit K. Roy-Chowdhury, Jiachen Li
- A conformal inference–guided constrained RL framework for crowd navigation, achieving **96.93% success rate** and **3.72**$\times$ **fewer collisions** with robust out-of-distribution performance.
- Led the real-robot deployment: built the ROSMASTER X3 sim-to-real stack with LiDAR-based pedestrian detection feeding real-time 3D positions to the RL policy, and conducted crowd-interaction experiments in both sparse and dense environments.

NL2SpaTiaL: Generating Geometric Spatio-Temporal Logic Specifications from Natural Language for Manipulation Tasks

IROS 2026 Nov. 2025

- Licheng Luo, Kaier Liang, **Yu Xia**, Mingyu Cai
- A hierarchical translation framework that converts natural language into verifiable geometric spatio-temporal logic (SpaTiaL) specifications for manipulation tasks.
- Conducted early-stage real-robot validation on ALOHA 2, evaluating π_0-generated manipulation trajectories against translated SpaTiaL specifications to verify spatio-temporal constraint satisfaction.

ROBOT HARDWARE EXPERIENCE

TurtleBot 4 — *Differential-Drive Mobile Robot*

- Differential-drive mobile robot with iRobot Create 3 base, Raspberry Pi 4, OAK-D stereo camera, and RPLIDAR A1M8 2D LiDAR.
- Used in earlier real-world experiments of the crowd navigation work (CoRL 2025), running the same LiDAR-based pedestrian detection pipeline for real-time avoidance in dynamic indoor environments.

Yahboom ROSMASTER X3 — *Omnidirectional Mobile Robot*

- Mecanum-wheel omnidirectional mobile robot with Jetson Orin, SLAMTEC LiDAR, and Astra depth camera.
- Primary sim-to-real platform for the CoRL 2025 crowd navigation deployment: LiDAR-based pedestrian detection provides real-time 3D pedestrian positions to the RL policy for avoidance in both sparse and dense crowds.

ALOHA 2 — *Bimanual Teleoperation System*

- Low-cost bimanual teleoperation system with 4× Trossen ViperX/WidowX 6-DoF arms, leader-follower control, and multi-view RGB cameras.
- Used for early-stage real-robot evaluation in the NL2SpaTiaL project (IROS 2026): action trajectories generated by π_0 are evaluated against translated SpaTiaL formulas to verify whether executed manipulations satisfy the spatio-temporal specifications.

Kinova Gen3 — *7-DoF Collaborative Arm*

- 7-DoF ultra-lightweight collaborative arm (8.2 kg, 902 mm reach, 4 kg payload) with integrated torque sensors and 2D/3D vision module.
- Serving as the manipulation execution end for an ongoing VR teleoperation project. Integrating Kortex API with WebRTC-based remote control for real-time manipulation over WAN.

Hexapod Robot (DIY) — *Legged Locomotion Platform*

- Custom-built six-legged robot for RL-based locomotion research, including gait training and flip-recovery behavior.
- Trained RL locomotion and fall-recovery policies in simulation. Developed the real-robot controller for deployment; sim-to-real transfer pending due to hardware actuator limitations.

PROJECT EXPERIENCE

Robotics Fabrication: Ball Balancing Car Apr. 2024

- **Role**: Perception & Control Developer. Built subsystems for sensing, wireless communication, and PID motor control for real-time ball balancing.

  Keywords: Arduino, PID, IMU, Bluetooth

UAV Path Planning and Obstacle Avoidance Dec. 2023

- **Role**: Simulator & Communication Developer. Set up simulator, configured UAV sensors, established ROS–PX4 communication for RL training.
- Developed a rule-based baseline for navigating obstacles; contributed to RL reward function design to accelerate convergence.

  Keywords: ROS, PX4, Gazebo, PPO

Mask Wearing Detection with YOLOv5 Sep. 2021

- Trained and optimized YOLOv5 for face mask verification, achieving **85% accuracy** on SF-MASK via iterative hyperparameter tuning.

  Keywords: YOLOv5, PyTorch, OpenCV

Image Classification System Design May 2021

- Enhanced AlexNet architecture and achieved **85% accuracy** on CIFAR-10 through comparative experiments using TensorFlow.

  Keywords: TensorFlow, AlexNet, CIFAR-10

SKILLS

Programming: Python, C/C++, Java, MATLAB, HTML5, SQL
Robotics & Sim: ROS / ROS 2, MoveIt 2, Gazebo, MuJoCo, Isaac Sim, PX4, Unity
AI / ML: PyTorch, TensorFlow, OpenCV, MediaPipe, YOLO, Reinforcement Learning
Tools: Docker, Git, Linux (Ubuntu), WebRTC, SolidWorks, Blender, Photoshop
Robot Platforms: TurtleBot 4, ROSMASTER X3, ALOHA 2, Kinova Gen3, Hexapod (DIY), UAV (PX4)

SUMMARY

Robotics M.S. from UC Riverside with work at CoRL 2025 and IROS 2026, and BOLT under review at MobiCom 2027. Hands-on experience in robot manipulation, deep reinforcement learning, XR teleoperation, and sim-to-real deployment across 6 physical robot platforms. Proficient in Python, C++, ROS 2, MoveIt 2, PyTorch, and simulation tools (Gazebo, MuJoCo, Isaac Sim). U.S. Permanent Resident.