# Lu-Ching Wang

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## Research Interests

Rescue Robots, Vision-Language Navigation, Quadruped Robots, Reinforcement Learning, Visual Servoing, Control Theory.

## Education

- **National Taiwan University (NTU)**  **Taipei, Taiwan**
  Master of Science, Department of Electrical Engineering (GPA: 4.1/4.3)  Sep. 2022 - Aug. 2024
  Networked Control Systems Lab (NCS Lab), Advisor: Dr. Feng-Li Lian
  Master's thesis: Hybrid Visual Servo Manipulation for Isotropic Target Using Individual Spatio-Temporal Image Feedback
- **National Yang Ming Chiao Tung University (NYCU)**  **Hsinchu, Taiwan**
  Bachelor of Science, Department of Mechanical Engineering (GPA: 3.9/4.3)  Sep. 2016 - Jun. 2021

## Research & Working Experience

- **Inventec Corporation**  **Taipei, Taiwan**
  Robotics Research Engineer, AI Center, Group of Robotics, Advisor: Dr. Wei-Chao Chen  Aug. 2024 - Present
  - **Feasibility-Guided Planning over Multi-Specialized Locomotion Policies**
    - Developed a learning-based planning system that selects the optimal path and locomotion policy for traversing diverse terrains.
    - Maintained interpretability while adding new policies; achieved a success rate of 99.8% in simulations and 70% in experiments.
    - Conducted CNN deployment on Feasibility-Net and out-of-distribution (OOD) analysis for heightmap inputs.
    - Executed real-world experiments involving mapping, navigation, and policy switching; results published at [1].
  - **Quadruped Robots SDK Development / Sim-to-Real Deployment**
    - Built a quadruped robot interface for customized actuators and sensors through LCM communication.
    - Trained locomotion policies in IsaacGym and IsaacLab; deployed in C++ with parameters tuning (action scales, motor gains).
    - Assembled a quadruped robot with actuators, sensors and computing unit into a compact design.
  - **Quadruped Robot Challenges (QRC)**
    - Team leader. Operator during the competition.
    - Deployed the planner based on *Feasibility-Guided Planning* research.
    - Integrated ROS2 for navigation, locomotion, manipulator teleoperation, and image detection.
- **National Taiwan University (NTU)**  **Taipei, Taiwan**
  Master's Student, Networked Control Systems Lab (NCS Lab), Advisor: Dr. Feng-Li Lian  Sep. 2022 - Aug. 2024
  - **Mobile Armed Robot for Tomato Harvesting**
    - Built a tomato harvesting wheeled-mobile robot for greenhouse scenario, achieving a 68.4% harvesting success rate.
    - Proposed a novel dual-camera image-based visual servoing control algorithm to solve the dislocation problem.
    - Proved the system's asymptotical convergence properties using Lyapunov stability analysis.
    - Reduced the harvesting time from 21.2 to 6.26 seconds under a 60kg payload; results published at [2] and [3].
  - **Teaching Assistant**
    - Teaching assistant of course "Control System" (EE 3024). Supervision of students' assignments and exams.
- **Academia Sinica (National Academic Institution)**  **Taipei, Taiwan**
  Research Assistant, Research Center for Information Technology Innovation, Advisor: Dr. Yennun Huang  Jan. 2022 - Aug. 2022
  - **Autonomous Patrol System for Greenhouse Farming**
    - Designed a patrol robot for soil, humidity, and disease monitoring in greenhouse environment.

## Publications

[1] **Lu-Ching Wang**\*, Ying-Sheng Luo\*, Hanjaya Mandala\*, Yu-Lun Chou\*, Guilherme Christmann\*, Yu-Chung Chen, Yung-Shun Chan, Chun-Yi Lee and Wei-Chao Chen, *"Feasibility-Guided Planning over Multi-Specialized Locomotion Policies"*, in 2026 IEEE Int. Conf. Robot. Autom. ICRA, accepted. (\*denotes equal contribution) (link)

[2] **Lu-Ching Wang**, Yu-Cheng Chang and Feng-Li Lian, *"A Perception and Alignment Framework for Fruit Harvesting Using Spherical Object Modeling and Hybrid Visual Servoing"*, in 2025 IEEE/ASME (AIM) Int. Conf. on Advanced Intelligent Mechatronics, July 2025. (link)

[3] **Lu-Ching Wang**, Yen-Cheng Chu, Yennun Huang, and Feng-Li Lian, *"Enhancement on Target-Gripper Alignment: A Tomato Harvesting Robot with Dual-Camera Image-Based Visual Servoing"*, in 2024 IEEE Int. Conf. Robot. Autom. ICRA, May 2024. (link)

## Awards & Competitions

- **2025 ICRA Quadruped Robot Challenge (QRC) – Participation Certificate, Autonomous** (link)
- **2024 IROS Quadruped Robot Challenge (QRC) – 3$^{rd}$ Placement, Teleoperation** (link)
- **2024 ARIS Best Student Paper Award – 1$^{st}$ Place**, 2024 Int. Conf. on Advanced Robotics and Intelligent Systems (ARIS) (link)
- **2024 Master Thesis Award – Distinction Award** from Robotics Society of Taiwan (RST) (link)

## Technical Skills

- **Software**
  - Python (NumPy, Pytorch, OpenCV, Matplotlib), C++, CMake, MATLAB (Simulink), Git, Autodesk Fusion 360, Blender
  - IsaacSim, IsaacLab, IsaacGym, ROS1 & ROS2 (Fast-LIO, RTAB-Map, Navigation2, MoveIt, URDF)
- **Hardware**
  - Real-time operating system, multi-threading, RS-485, Serial, Lightweight communications and marshalling (LCM), UDP