Yuxuan Nai

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Education

ZJU-UIUC Institute — Champaign, Illinois / Zhejiang, China
B.E in *Mechanical Engineering* — 09/2022 – Present
Zhejiang University, China — 09/2022 – 09/2024 & 09/2025 – 05/ 2026
B.E in *Mechanical Engineering* — GPA: 3.94/4.3
University of Illinois at Urbana-Champaign, U.S. — 09/2024 – 09/ 2025
B.E in *Mechanical Engineering* — GPA: 3.90/4.0

Research Interests

Deep Reinforcement Learning, Embodied AI, Robotic Manipulation, Robotics Perception, Legged Locomotion

Publications and Working Paper

* Indicates corresponding authors

- Beyond Robustness: Learning Unknown Dynamic Load Adaptation for Quadruped Locomotion on Rough Terrain
  Leixin Chang, **Yuxuan Nai**, Hua Chen*, Liangjing Yang*
  Accepted at *IEEE International Conference on Robotics and Automation (ICRA)*, 2025. [Project]
- Bilevel Optimization of Heli-Logging Assignment for a Quadrotor with Cable-Suspended Payload
  Yuxuan Nai, Ding Jiang, Sheng Cheng*, Naira Hovakimyam*
  Manuscript in preparation for submission to *IEEE Robotics and Automation Letters (RAL)*, 2025.

Research

Learning Based Stable Pose Selection of Tactile Manipulation — RoboTouch Lab, UIUC
Advisor: Prof. Hua Chen Prof. Wenzhen Yuan — 04/2025 – Present
- Realized stable pose selection via a tactile-feedback-driven learning-based planner.
- Enabled stability identification of poses by training a classification policy.

Navigation planner in Legged Locomotion — Physical Intelligence Lab, ZJU-UIUC
Advisor: Prof. Hua Chen — 03/2025 – Present
- Enabled action-level decision-making by constructing a navigation planning framework.
- Realized blind locomotion via a navigation-planner-guided trained policy.

Bilevel Optimization of Quadrotor Payload System — AVIATE Center, UIUC
Advisor: Dr. Sheng Cheng (Postdoctoral Fellow), Prof. Naira Hovakimyan — 10/2024 – Present
- Developed minimum-snap trajectory with flatness for smooth transitions between taut and slack cable states.
- Improved trajectory fidelity to real maneuvers via bilevel optimization of release parameters.
- Validated control strategies through simulation testing on the ROS platform.

RL for Legged Unknown Dynamic Load Adaptation — Physical Intelligence Lab, ZJU-UIUC
Advisor: Prof. Hua Chen, Prof. Liangjing Yang — 05/2024 – 07/2024
- Facilitated blind walking by proposing a teacher-student reinforcement learning framework.
- Enabled reliable quadruped locomotion under unknown dynamic payloads using proprioceptive feedback only.
- Validated through MuJoCo simulations and achieved successful Sim2Real transfer.

Reaction-Based Motion Planning with Deep Reinforcement Learning — ZJU-UIUC
Project Reproduction — 02/2024 – 03/2024
- Reproduced a project integrating APF with DDPG to mitigate local minima issues.
- Developed advanced motion planning leveraging DDPG's continuous actions.
- Validated approach in ROS Gazebo simulations, achieving robust navigation with dynamic obstacles.

Unmanned Mining Truck Route Planning Academic Training SRTP, ZJU
Advisor: Prof. Jian Chen 05/2023 – 05/2024

- Simplified route planning for unmanned mining trucks, overcoming traditional method limitations.
- Developed a two-step strategy: front-end path planning and back-end trajectory optimization.
- Used Hard-Constraints and Minimum-Snap to ensure safe, dynamically feasible paths.

Honors and Awards

Second Prize, Zhejiang University Scholarship 10/2024
Gold Medal, Award on Zhejiang International College Student Innovation Competition 07/2024
Silver Medal, Award on *Challenge Cup* Contest of Zhejiang Province 05/2024
First Prize, Award on The 16th *Dandelion* Entrepreneurship Contest of Zhejiang University 03/2024
Third Prize, Award on *Concrete Canoe Design Competition* of Zhejiang University 06/2023
Second Prize, Award on *Undergraduate Structural Design Competition* of Zhejiang University 05/2023

Leadership

SRTP Program Leader 05/2023 – 05/2024, ZJU

- Led an undergraduate research team focused on autonomous path planning for unmanned vehicles.

Summer Research Program Leader 05/2023 – 08/2023, ZJU

- Led an undergraduate team researching path planning integrated with reinforcement learning.

Photography Club Leader 08/2023 – 08/2024, ZJU-UIUC

- Found a photography club at ZJU-UIUC and ran the club as a leader.

Academic Collaborators

- ZJU-UIUC: Prof. Liangjing Yang, Prof. Hua Chen
- UIUC: Prof. Naira Hovakimyan, Prof. Wenzhen Yuan, Dr. Sheng Cheng (Postdoctoral Fellow)

Skills

Programming	Python, C++
Advanced Control	LQR, MPC, Kalman Filter
Design & Fabrication	Fusion360, AutoCAD, SolidWorks, 3D Printing
Simulation Tools	ROS, Gazebo, MuJoCo, IsaacGym
Others	LaTeX, Linux, Git