Zhuoyuan (Joey) YU

Email: yuzhuoyuan@u.nus.edu | Website | Tel: +65 88850740

Research interests: Robotics, Deep Reinforcement Learning, Multi-Agent Systems, Foundation Model

EDUCATION

National University of Singapore **GPA: 5.0 / 5.0** *Singapore*

Major: M.Eng. in Mechanical Engineering (By Research), *Department of Mechanical Engineering* *08/2023-03/2025*

- **Core Courses:** Linear Systems, Autonomous Mobile Robotics, Advanced Robotics
- Research focus: Robotics, Multi-agent Deep Reinforcement Learning, Control
- Master thesis: Multi-agent Reliable Navigation in Dynamical Environments

Northwestern Polytechnical University GPA: 83.1% *Xi'an China*

Major: B.Eng. in Aircraft Design and Engineering, *School of Aeronautics* *09/2019-07/2023*

- **Scholarship**: Second Prize Scholarship Excellent Student Leader
- **Core Courses**: Aerodynamics, Automatic Control Theory, Mathematics Analysis, Linear Algebra
- NPU School of Aeronautics Student Union | **President** *04/2021-06/2022*
- International Internet+ College Students Innovation and Entrepreneurship Competition *National Gold Award*
- "Huamo Cup" National College Students Flight Simulation Championship *National Third Prize*

RESEARCH EXPERIENCE

➢ **Multi-Agent Path Finding Based on Deep Reinforcement Learning** *05/2024-01/2025*

[Joint Program between NUS and A*STAR] | *Supervisor: Guo Hongliang and Chew Chee Meng*

- Improved the existing Node2Vec algorithm to handle the dynamic topological networks better.
- Utilized Graph Attention Networks to enhance the decision-making weights of dynamic edges.
- Integrated reinforcement learning for online training of the network.

Related: Python, Pytorch, ROS1, Multi-Agent Systems, Graph Attention Networks, Natural Language Processing

➢ **Design and Control of Manta Ray Robot (Bioinspired Underwater Robot)** *08/2023-03/2025*

[NUS ME Control and Mechatronics Lab] | *Supervisor: Chew Chee Meng*

- Designed a new type of buoyancy system and mass adjustment system for the Manta Ray robot.
- Improved original single-degree-of-freedom pectoral fin to dual-degree-of-freedom, enhancing controllability.
- Upgraded Arduino-based control system to include control of the buoyancy system and the pectoral fins.

Related: Python, Arduino, SolidWorks, Bioinspired Robotics

➢ **Quadcopter Overall Design and Trajectory Re-planning** *07/2020-09/2021*

[NPU Aircraft Design and Testing Technique Engineering Laboratory] | *Supervisor: Wang Ban*

- Designed and made a quadcopter unmanned aerial vehicle (UAV).
- Studied the trajectory re-planning and obstacle avoidance of UAVs.

Related: MATLAB, XFLR5, Catia, Aerodynamics

SELECTED PROJECTS *Project Website*

➢ Autonomous Mobile Robotics [GitHub] | *ROS1, Python, OpenCV* *01/2024-04/2024*

- Integrate vision recognition to navigate the robot in a simulation environment and search objects.

➢ Manipulator Simulation [GitHub] | *MATLAB, Kinematics* *03/2024-04/2024*

- Establish a robotic arm model, then use inverse kinematics to calculate the corresponding joint angles.

PUBLICATIONS (* corresponding author)

Yu Zhuoyuan., Guo, H*., Chew, C. M, Adiwahono, A. H., Chan, J., Tynn, B. S. W., & Yau, W. Y, "Multi-Robot Reliable Navigation in Uncertain Topological Environments with Graph Attention Networks," *IEEE Robotics and Automation Letters* (*2025*)

TECHNICAL SKILLS

Programming Language: Python, MATLAB, C/C++

Software: Pytorch, ROS1, Gazebo, SolidWorks, Catia, OpenCV, LaTeX, Git, Isaac Lab

Hardware: Arduino, Mechanical Design, 3D Printing