Zhuoyuan (Joey) YU

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

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-Present*

- **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: 84%	*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-Present*

  [Agency for Science, Technology and Research] | *Supervisor: Guo Hongliang*
  - 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-Present*

  [NUS ME Control and Mechatronics Labs] | *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*
  - Navigate the robot to the designated location and specify the pattern integrating vision recognition.
- ➢ • 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)

Multi-Robot Reliable Navigation in Uncertain Topological Environments with Graph Attention Network	*Under Review*
Related: Multi-agent System, Graph Neural Networks, Deep Reinforcement Learning	

SKILLS

Programming Language: Python (Proficient), MATLAB (Proficient), C++ (Intermediate), Arduino (Beginner)

Robotics Related: ROS1 (Intermediate), Gazebo (Beginner), SolidWorks (Proficient), Catia (Intermediate)

Others: Latex, Tableau, Visio, Origin, Adobe Premiere Pro, SPSS, Photography