

# Zhuoyuan (Joey) YU

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

## EDUCATION

<b>National University of Singapore</b>	<b>GPA: 5.0 / 5.0</b>	<i>Singapore</i>
Major: M.Eng. in Mechanical Engineering (By Research), <i>Department of Mechanical Engineering</i>		<i>08/2023-Present</i>
<ul style="list-style-type: none"><li><b>Core Courses:</b> Linear Systems, Autonomous Mobile Robotics, Advanced Robotics</li><li>Research focus: Robotics, Multi-agent Deep Reinforcement Learning, Control</li><li>Master thesis: Multi-agent Reliable Navigation in Dynamical Environments</li></ul>		
<b>Northwestern Polytechnical University</b>	<b>GPA: 83.1%</b>	<i>Xi'an China</i>
Major: B.Eng. in Aircraft Design and Engineering, <i>School of Aeronautics</i>		<i>09/2019-07/2023</i>
<ul style="list-style-type: none"><li><b>Scholarship:</b> Second Prize Scholarship      Excellent Student Leader</li><li><b>Core Courses:</b> Aerodynamics, Automatic Control Theory, Mathematics Analysis, Linear Algebra</li><li>NPU School of Aeronautics Student Union   <b>President</b> <i>04/2021-06/2022</i></li><li>International Internet+ College Students Innovation and Entrepreneurship Competition <i>National Gold Award</i></li><li>“Huamo Cup” National College Students Flight Simulation Championship <i>National Third Prize</i></li></ul>		

## RESEARCH EXPERIENCE

- **Multi-Agent Path Finding Based on Deep Reinforcement Learning** *05/2024-Present*  
[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-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, Reinforcement Learning [[arXiv](#)]

## 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