Shuyang Shi

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EDUCATION

School of Mechanical Engineering, Shanghai Jiao Tong University (SJTU)   Sep. 2019 – June. 2023 (Expected)

- Bachelor of Mechanical Engineering. **Overall GPA: 3.84/4.3, Ranking: 6/163**
- Research Interests: Control, Multi-Agent Systems, UAV, Planning

PUBLICATIONS

[1] **Shi, Shuyang,** Yuzhu Li, and Wei Dong. "RISE-Based Adaptive Control with Mass-Inertia Parameter Estimation for Aerial Transportation of Multi-Rotor UAVs." *arXiv preprint arXiv:2209.08209* (2022).

[2] Shan, H., Chen, G., **Shi, S.**, Qin, Z. W. M., & Dong, W. (2021, November). Dragon Rider-An Integrated Unmanned Quadruped-Hexarotor System for Flight-Impeded Area Exploration. In *2021 27th International Conference on Mechatronics and Machine Vision in Practice (M2VIP)* (pp. 411-416). IEEE.

PROFESSIONAL EXPERIENCE

- IEEE RA-L, ICRA 2023 reviewer

REASEARCH EXPERIENCE

Efficient Large-Scale Collective Behavior Manipulation | Research Assistant and Project Leader   June 2022 - present

Advisor: Rui Liu, Assistant Professor of College of Aeronautics and Engineering, Kent State University

- Proposed a social network-informed distributed manipulation method to obtain collective behaviors with semantic meanings.
- Designed a dynamic election paradigm to find critical agents in a crowd and improve control efficiency.

Adaptive Control of UAVs with Parameter Estimation [1] | Research Assistant and Project Leader   Oct. 2021 - May 2022

Advisor: Wei Dong, Associate Professor of Robotics Institute, SJTU

- Proposed an adaptive control method with mass-inertia estimation and disturbance rejection for aerial transportation tasks of multi-rotor UAVs.
- Exploited the RISE robust compensation term and filter operations to improve the convergence performance of the control.
- Evaluated the proposed method numerically in MATLAB and conducted a simulation in ROS gazebo.

Design of an Integrated Unmanned Quadruped-Hexarotor System [2]   Mar. 2021 - Sep. 2021

Advisor: Wei Dong, Associate Professor of Robotics Institute, SJTU

- Designed a hexarotor UAV capable of grasping and transporting a quadruped robot through an adaptive docking structure.
- Developed a vision-based approach for the quadruped robot to detect and localize the hexarotor with yolo-v3 and QR-Code.
- Realized computing resource sharing between the hexarotor and quadruped during flight via the serial communication function of the docking structure.

A Wave Energy Capture Robot Based on Foldable Wings   Oct. 2020 - Oct. 2021

Advisor: WeiXing Chen, Assistant Professor of School of Mechanical Engineering, SJTU

- Designed an autonomous underwater vehicle with wave energy capture ability based on foldable wings.
- Established the body dynamics model based on the Lagrange formulation to analyze energy capture efficiency; conducted simulations in MATLAB Simulink.

SELECTED PROJECTS

Navigation for UR-10 Manipulator | Project Leader   Apr. 2022 - June 2022

- Implemented the inverse kinematic and dynamic methods of UR-10 manipulators.
- Designed an artificial potential field algorithm that featured self-collision avoidance for path planning.
- Developed a trajectory planning using cubic splines based on dynamic programming.

Path Planning for Mobile Robots | Project Leader   Feb. 2021 - May 2021

- Implemented the A* algorithm in ROS C++/Python and smoothed out the path based on the Floyd algorithm.
- Developed an interactive interface in Rviz to compare the effectiveness of the implementation between C++ and Python.

AWARDS

- Shanghai General Motors Wuling Scholarship **(Top 20%)**   2021
- Meritorious Winner of 2021 Mathematical Contest in Modeling **(Top 7%)**   2021

SKILLS

- **Programming Languages:** Proficient in C/C++, MATLAB, Python
- **Software:** Solidworks, ROS