

YUBIN WANG

Robotics and Autonomous Systems Thrust, HKUST(GZ), China

Electrical and Computer Engineering, KAUST, Saudi Arabia

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Education

The Hong Kong University of Science and Technology (Guangzhou) Sep. 2022 – Present
Mphil Student in Robotics, advised by Jun Ma China

King Abdullah University of Science and Technology Jul. 2021 – Present
Visiting Student in ECE, advised by Yehia Massoud and Meriem T. Laleg Saudi Arabia

Northeastern University Sep. 2018 – Jun. 2022
Bachelor of Engineering in Automation, advised by Fei Chen, GPA: 89.7/100 China

Publications

- **Yubin Wang**, Karnika Biswas, Liwen Zhang, Hakim Ghazzai and Yehia Massoud. "3D Autonomous Navigation of UAVs: An Energy-Efficient and Collision-Free Deep Reinforcement Learning Approach." *2022 IEEE Asia Pacific Conference on Circuits and Systems (APCCAS)*. **Submitted.**
- **Yubin Wang**, Yasmine Marani and Taous Meriem Laleg Kirati. "A Deep-Learning-Based Observer for State Estimation of Direct Contact Membrane Distillation System Modeled by Differential Algebraic Equations." *2022 IEEE Conference on Control Technology and Applications (CCTA)*. **Accepted for oral presentation.**

Experience

Innovative Technologies Laboratories, KAUST Saudi Arabia
Visiting Student, advised by Yehia Massoud Mar. 2022 – Present

- 3DAN was submitted to *APCCAS'22*

Estimation, Modeling and Analysis Group, KAUST Saudi Arabia
Visiting Student, advised by Meriem T. Laleg Jul. 2021 – Feb. 2022

- DeepDCMD was accepted to *CCTA'22* for oral presentation

Multi-Agent Robotic Motion Lab, National University of Singapore Singapore
Research Intern, advised by Guillaume Sartoretti Mar. 2021 – Jul. 2021

- Developed a decentralized multi-agent reinforcement learning benchmark-testing platform based on OpenAI multiple particles environment.
- Implemented reinforcement learning methods to solve multi-evader-multi-pursuer game problems and the experimental result on my personal web
- Created a swarm-intelligence based policy to optimize the global collaboration in multi-agent informative path planning.

the Department of Automation, Northeastern University China
Teaching Assistant Mar. 2021 – Jun. 2021

- Teaching Assistant of advanced undergraduate course, *Nonlinear Systems*.

Autonomous Networks and Control Lab, Northeastern University China
Research Assistant, advised by Fei Chen Oct. 2018 – Feb. 2021

- the project, *distributed multi-robot exploration and source localization* was supported by Hebei Provincial Department of Sci&Tech with funding.
- Conducted the projects, *multi-robot source hunting*, *multi-UAV formation Control* and sub-project *multi-robot point-to-point transition with collision avoidance*

Selected Projects

3D Autonomous Navigation of UAVs via Deep Reinforcement Learning | KAUST Mar. 2022

- Proposed a novel deep reinforcement learning-based architecture for planning energy-efficient and collision-free paths for a quadrotor UAV, using a unique combination of remaining flight distance and local knowledge of energy expenditure to compute an optimized route, with the key element - Attention-based neural network based on the partial knowledge of the environment.

Learning-Based Observer for Differential-Algebraic System | KAUST Jul. 2021

- Proposed a learning-based observer to estimate future states with the knowledge of initial state and a sequence of output and obtained ideal estimation results after applying the above observer to Direct Contact Membrane Distillation (DCMD) systems.

Multi-Robot Pursuit Game via Multi-Agent Reinforcement Learning | NUS Mar. 2021

- Formed dynamic cage with pursuers to ensure learning -trained evader cannot escape utilizing attention-based Multi-Agent-Actor-Critic algorithm with agents broadcasting communications on testbed I previously developed.

Multi-Robot Exploration and Source Hunting | NEU

Sep. 2020

- Proposed a scalar-based distributed multi-agent source hunting algorithm, verified convergence and robustness via simulation and then accessed elegant exploration formation and precise estimation after transplanting algorithm to multi-robot-exploration testbed with ultra-wide-band source sensor.
- Built experimental platform including Turtlebot3 UGV, Optitrack external global localization systems, which supports my sub-project *multi-robot point-to-point transition with collision avoidance* with implementing artificial potential field, navigation vector field, decentralized online model predictive control algorithm to avoid collision and ensure safe transitions.

Multi-UAV Formation Flight | NEU

Oct. 2018

- Controlled multi-UAV to complete formation transitions on Crazyflie2.0 testbed with radio link communication and point-cloud mocap.

Technical Skills

Languages: Python, C/C++, MATLAB, Julia, Bash, Latex

Machine Learning: Torch, TensorFlow, wandb

Others: Conda, Linux, ROS/ROS2, Gazebo, HTML/CSS, Git, SolidWorks, Optitrack

Honors, Awards and Service

- HKUST(GZ) Fellowship
- KAUST Visting Student Fellowship
- Reviewer for *CCC2020* and *PLOS ONE*
- School Scholarships (Year 1, Year 2 and Year 3)
- Honorable Mention, MCM/ICM - Feb. 2021
- Distinguish Project Funding, Provincial Department of Sci&Tech - Mar. 2021