

EDUCATION

- **Beihang University** Sept. 2021 - Jun. 2024 (expected)
M. Sc. in Control Science and Engineering, GPA: 90.3/100 Advisor: *Prof. Xiwang Dong*
- **Technical University of Denmark** Aug. 2019 - Sept. 2019
Visiting student at the summer school Department of Applied Mathematics and Computer Science
- **Beihang University** Sept. 2017 - Jun. 2021
B. Eng. of Automation (outstanding graduate award), GPA: 88.5/100

RESEARCH INTERESTS

I am passionate about exploring optimization and machine learning, from the foundational principles and algorithmic design to their practical applications in robotics and autonomous systems.

PUBLICATIONS

Google Scholar Profile: <https://scholar.google.com/citations?user=aGfxYDYAAAAJ>

1. Y. Chen, J. Li, W. Qin, Y. Hua, X. Dong, and Q. Li, “**Learning-Initialized Trajectory Planning in Unknown Environments**”, *arXiv preprint*, arXiv:2309.10683, September 2023. [video]
[Featured] We introduce the Learning-Initialized Trajectory Planner (LIT-Planner), a novel approach that guides optimization with a neural network providing initial values. Our method enjoys both time-efficiency and explainability.
2. Y. Chen and L. Wang, “**Adaptively Dynamic RRT*-Connect: Path Planning for UAVs Against Dynamic Obstacles**”, *2022 7th International Conference on Automation, Control and Robotics Engineering (CACRE)*, pp. 1-7, July 2022. [slides]
3. H. Chang*, Y. Chen*, B. Zhang, and D. Doermann, “**Multi-UAV Mobile Edge Computing and Path Planning Platform Based on Reinforcement Learning**”. *IEEE Transactions on Emerging Topics in Computational Intelligence*, vol. 6, no. 3, pp. 489-498, June 2021. (* equal contribution)

MASTER’S THESIS

- **Cooperative Online Trajectory Planning for Autonomous Aerial Robotic Swarm** Nov. 2022 - Present
Master’s Thesis | Expected completion time: May 2024 Advisor: *Prof. Xiwang Dong*
 - **Scope:** (1) Autonomy: Onboard perception, planning, and control. (2) Online: Real-time computing. (3) Cooperation: Multiple drones to perform cooperative tasks, such as search and rescue.
 - **Roadmap:** (1) By Sept. 2023, achieve reliable autonomous flight of a single drone in unknown environments. (2) By May 2024, achieve cooperative flight of a swarm of drones for some specific tasks.
 - **Progress:** Accomplished the first waypoint in Sept. 2023 with the paper “Learning-Initialized Trajectory Planning in Unknown Environments”.

HONORS AND AWARDS

- Outstanding Postgraduate Student Award (ten persons per year) from Beijing Association of Automation 2022
- Best Presenter Award from [CACRE](#) 2022 committee 2022
- Outstanding Graduate Award from Beihang University 2021
- Merit Student Award from Beihang University 2017, 2018, 2019

ACADEMIC SERVICE

- Reviewer for IEEE Robotics and Automation Letters
- Reviewer for ICRA 2024

SKILLS SUMMARY

- **English:** GRE (Verbal 152, Quantitative 170, AW 3.5), TOEFL iBT 105 (Reading 30, Listening 27, Speaking 22, Writing 26)
- **Programming:** Python, MATLAB, C/C++, LaTeX
- **Software:** ROS, Gazebo, AirSim, PX4, PyTorch, TensorFlow, OpenCV, Simulink, SolidWorks, AutoCAD
- **Hardware:** NVIDIA Jetson, Pixhawk, Motion Capture System, UWB
- **Hobbies:** Long-Distance Running (Half Marathon PB 1:40:13), Hiking, Cycling, Table Tennis, Snowboarding

RESEARCH PROJECTS

- **Aeriva: A Mini Autonomous Quadrotor Platform** Mar. 2023 - Aug. 2023
 - *Individual work*
 - **Accomplishments:** Designed and assembled a mini autonomous quadrotor platform 'Aeriva' from scratch. Configured up-to-date hardware and solved a series of engineering problems across the perception, planning, and control stack.
 - **Features:** (1) Agile and safe: Aeriva is built upon a 3.5-inch cinewhoop frame with Kakute H7 mini flight controller, with a thrust-to-weight ratio of 4.0, making it exceptionally agile, compact, and safe. (2) High computing performance: Aeriva is equipped with NVIDIA Jetson Orin NX, facilitating it with strong onboard computing capabilities.
 - **Highlights:** This platform has supported my featured publication and the championship in the 2023 Huashan UAV challenge.
- **2023 Huashan UAV Challenge - Champion** May 2023 - Jun. 2023
 - *Team work | Leader of a six-person team* *Ranked the first place in this national-level competition*
 - **Challenge:** This competition requires two autonomous drones to bypass a threat area in the field and reach a target point simultaneously. All positions are provided by UWB.
 - **Solutions:** Developed a cooperative trajectory planning and tracking algorithm for dual drones. Contributed to the system architecture of the drones, including the hardware and software. Provided a framework to achieve UWB positioning, communication between the drones and the ground station, trajectory planning, and tracking control based on ROS and PX4.
 - **Highlights:** Ranked first place in this competition. The achievements were presented in the 2023 Beihang Technology Exhibition.
- **SLAM Practice on Unmanned Ground Vehicles** Oct. 2021 - Dec. 2021 & Mar. 2022 - May 2022
 - *Individual work*
 - **Accomplishments:** (1) Implemented G-mapping on a TurtleBot. (2) Implemented Gmapping and RTAB-Map on an Ackerman mini vehicle. Besides, implemented a motion planning algorithm based on Dijkstra with TEB planner to navigate it through obstacles.
- **Modeling and Simulation for Quadcopter** Mar. 2022 - Apr. 2022
 - *Individual work* *Course project: The Modeling and Simulation For Quadcopter*
 - **Accomplishments:** Modeled and simulated quadcopters in MATLAB and Simulink. Implemented functions including position control, path following, and formation flight.
- **Application of Machine Learning in Medical Image Classification** Mar. 2020 - May 2020
 - *Team work | Leader of a three-person team* *Course project: Pattern Recognition*
 - **Aim:** Use machine learning approaches to help preliminary diagnosis of chest radiographs: classify radiographs into 3 classes – COVID, normal, and viral pneumonia with the highest possible accuracy.
 - **Solution:** Used transfer learning to train several models including ResNet, DenseNet, InceptionResNet, etc. on a labeled training set. Used stacking to ensemble these models to build a stronger model.
 - **Highlights:** Achieved accuracy of more than 0.98. Especially, the model achieved almost 100% precision in the COVID class. Released the solution on Kaggle. This project got full marks in the course.
- **2018 Beihang Robot Competition - 4th Place** Oct. 2018 - Dec. 2018
 - *Team work | Responsible for mechanical design and assembly* *Ranked the 4th place in this college-level competition*
 - **Challenge:** This competition requires participants to build a robot with the following functions: line tracking, obstacle avoidance, object grabbing, and Bluetooth remote control.
 - **Solutions:** Built a multifunctional wheeled robot from scratch: Used Arduino as the computer. Incorporated infrared modules and ultrasonic modules for line tracking and obstacle avoidance in a reactive manner. Made a cylinder with a rubber band that can take objects in. Achieved remote control via the Bluetooth module and an Android Application.
 - **Highlights:** Ranked the 4th place in the final. The robot was exhibited at the School of Mechanical Engineering for its mechanical design.