Jingyi HUANG

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EDUCATION

Beihang University Sept. 2020 - now
Master student in Control Science and Engineering *Advisor: Prof. Liang HAN*

INSA Toulouse Sept. 2019 - Jan. 2020
Exchange student, Ingénierie des Matériaux, Composants et Systèmes

Beihang University Sept. 2016 - Jun. 2020
Bachelor of Information and Computer Science, École centrale de Pékin

RESEARCH INTERESTS

My research includes formation control of Unmanned Aerial Vehicles (UAVs), path planning problems, and artificial intelligence applications in UAVs' decision-making and planning.

PUBLICATION

Paper

1. **[CAC'23]** Huang, Jingyi and Tan, Qingke and Ma, Jiming and Han, Liang, "Path Planning Method Using Dyna-Q Algorithm under Complex Urban Environment", *Chinese Automation Congress (CAC)*, 2022. [pdf]

RESEARCH EXPERIENCES

Star Lab, Beihang University *Beijing & Hangzhou, China*

Multi-Agent Decision Control Model for Information Gathering Task Apr. 2023 - Sept. 2023
Developper, Collision Avoidance part *Advisor: Prof. Liang HAN*

- **Aim:** Develop a collision avoidance algorithm for multi-agent, avoid restricted zones and prevent collisions between agents in a given region.
- **Method:** Employ the method of artificial potential fields(APF) for collision avoidance among agents. Employ OpenCV to discretize the map into grids in the avoidance zone. Utilize the A* algorithm to compute the collision-free path. In scenarios requiring simultaneous obstacle avoidance and collision evasion, determine the repulsive forces of the agents and the avoidance zone and apply APF.
- **Achievement:** This research is part of our team's participation in the 18th "Challenge Cup Jie Bang Gua Shuai" National College Student Curricular Academic Science and Technology Works Competition. And we got the Grand Prize!

Path Planning Method Using Dyna-Q Algorithm Aug. 2022 - Sept. 2022
Researcher *Advisor: Prof. Liang HAN*

- **Aim:** Do simulation on a new simulation platform and test Dyna-Q based path planning algorithme.
- **Methods:** Use Dyna-Q to plan paths in a priori map. Employ potential field method and PID control for the autonomous vehicle to follow the designated line. Use PID control for the UAV to track the autonomous vehicle.

Development of a 3D Simulator for Swarm Robots May. 2022 - Aug. 2022
Developper, UGV part *Advisor: Prof. Liang HAN*

- **Aim:** Develop the UGV(Unmanned Ground Vehicle) model so that the self-developed simulator can conduct heterogeneous swarms simulation.
- **Methods:** Implement the modular simulation for UGVs, including *path follower*, *autopilot*, and *dynamics*. Dynamics include a dynamic bicycle model with nonlinear tire force laws. Autopilot includes a PID controller to let the UGV achieve desired speed and heading angle. Path follower includes a vector field to guide the UGV to the desired path.
- **Achievement:** This UGV part supported the development of **Potato**.

Academic Projects, Beihang University — *Beijing, China*

LEGO Mecanum Wheel Car Path Following Control — Dec. 2021 - Jan. 2022
PID Coding, Course Project of Automatic Control — *Advisor: Prof. Jiming MA*

- Given many waypoints, design a PID controller to enable a LEGO car to navigate through the waypoints and reach the destination as quickly as possible. The final assessment will evaluate the completion time and accuracy.
- Total time is 3min 1sec and got 86/100 in this course.

Teaching Assistant, Beihang University — *Beijing, China*

Research Class – Planning Control Simulation and Experiments — Feb. 2023 - Nov. 2023
Simulation and Experimental Teaching — *Beijing, China*

- **Teaching Content:** Do control and planning simulation using simulation platform **Potato** developed by our lab. Use A star as the front-end of path planning while on back-end optimization. Use PID control. Use UWB device for localization.
- **Results:** Students completed a complex navigation task while avoiding all the given static obstacles in a given area, both in the simulation platform and in the real set (UWB, Tello, RM EP).

SKILL SUMMARY

Languages: Chinese (Mother Tongue), English (IELTS Academic 7.0), French (TCF B1)
Coding: AI Prompt, Python, MATLAB, Git, LaTeX, Java (a little)
Hobbies: Photography [homepage], Badminton, Genshin Impart

HONORS AND AWARDS

Grand Prize of Challenge Cup "Jie Bang Gua Shuai"	2023
Beihang Academic Scholarship	2021 ∼ 2022
Beihang Freshman Scholarship	2020
China Scholarship Council (CSC) scholarship	2019