

YUANHANG ZHANG

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Education

Shanghai Jiao Tong University

Sept. 2019 – Jun. 2023

Major: Automation, Major GPA: 88.5/100, Junior Year GPA: 90/100

Shanghai, China

Relevant Coursework: Robotics(93), Computer Vision(A+), Open Source Hardware Projects for Makers(94), Motion Control System(95), Modern Control Theory(98), Linear Algebra(97), Probability and Statistics(100)

Publications

Zhang Y, Wang H, Ren Z. “Multi-Agent Combinatorial Path Finding with Heterogeneous Task Duration”, IEEE Transactions on Automation Science and Engineering (T-ASE 2024), under review. [arXiv](#)

Research Experiences

Multi-Agent Combinatorial Path Finding with Heterogeneous Task Duration

Aug. 2023 – Present

Summer Research Intern, Advisor: Dr. Zhongqiang Ren from CMU, the U.S.

- Proposed two conflict-based methods—CBSS-TPG and CBSS-D to solve the multiagent combinatorial path finding problem with target duration (MCPF-D, an unexplored multiagent path finding problem).
- In CBSS-TPG, designed a post-process to generate a conflict-free path execution schedule with task duration.
- In CBSS-D, refined CBSS to guarantee solution optimality through taking task duration into sequence planning and improved searching efficiency by adopting new splitting rule while resolving conflicts.

Perception-constrained Visual Servoing Based NMPC for Quadrotor Flight

Mar. 2023 – Jun. 2023

Undergraduate Thesis(A, top 3%) Advisor: Prof. Hesheng Wang from SJTU, China

- Proposed a NMPC approach with quadrotor dynamics, incorporating visual constraints to address the Perception-Constrain problem in Image-Based Visual Servo Control (IBVS) for autonomous flight.
- Evaluated scheme's robustness through precise position tracking and smooth traversal of multiple rings in simulations and physical experiments.

Federated Learning of Face Recognition on Mobile Devices

Apr. 2020 – Sept. 2021

Participation in Research Program(PRP) Advisor: Prof. Fan Wu from SJTU, China

- Implemented facial recognition models on each mobile device and partitioned facial data for local training.
- Shared only model updates among edge devices and iteratively refined the global model with Federated Averaging.
- Deployed the refined federated facial recognition model on multiple mobile robots for Gosuncn Technology.

Selected Projects

Drone Racing: Autonomous UAV Flight Traversing Multiple Rings | Leader

Sept. 2022 – Nov. 2022

National Third Prize(Top 10%) in UAV Intelligent Perception Technology Competition

- Implemented SE(3) controller for quadrotor control within the PX4-Autopilot environment.
- Utilized RAPIDDS to generate optimized and collision-free trajectories for quadrotor navigation.
- Deployed YOLOv5 with TensorRT to accelerate object detection and implemented P3P for pose estimation.

'AutoMaster': Learning-Based Multi-Model Fusion for Autonomous Driving | Leader

Sept. 2021 – Jan. 2022

National Second Prize(Top 5%) in National University ICT Competition (Innovation Track)

- Designed a distributed algorithm for data collection and alignment from multiple edge devices via Socket.
- Utilized the MindSpore framework to implement model integration of target detection and controlling.
- Deployed the combined model in a vehicle and achieved automated lane tracking and traffic responding

Extracurricular/Leadership

[SJTU VEX Robotics Club](#)

Mar. 2020 – Jan. 2023

Program Team Leader

Shanghai Jiao Tong University

- Managed a team of 20+ undergraduates from 5+ different majors to develop algorithms for custom vehicle applications, and as the core member, won 3 national/international champions.
 - * **2021 National VEX Robotics Elite Competition:** Tournament Champions(VEXU/VRC/VAIC); Robot Skills Champion(VEXU/VRC)(break world record)
 - * **2021 VEX Robotics Competition Asian Open:** Tournament Champions VEXU; Excellence Award
 - * **2021 VEX Robotics Competition China Final:** Tournament Champions VEXU; Excellence Award
- Led the development of SJTU VEX's AI automation system, including in-field localization, target tracking, and communication modules and presented our work to universities and IFI Chinese representatives.

Awards

- **Outstanding Graduate** in Shanghai Jiao Tong University
- **Merit Student** in Shanghai Jiao Tong University
- **Academic Progress Award** in Shanghai Jiao Tong University

Miscellaneous

Programming Languages: Python, C++, Matlab, Java

Tools/Frameworks: OpenCV, Pytorch, Tensorflow, Numpy, ROS, Gazebo, Airsim

Languages: Mandarin(native), English(TOEFL-107 R30 L27 S22 W28)