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**)

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.

Publications

Zhang Y, Wang H, Ren Z. "Multi-Agent Combinatorial Path Finding with Heterogeneous Task Duration", submitted to IEEE Transactions on Automation Science and Engineering (**T-ASE**). arXiv

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

'HarClass': A Smart Classroom Solution Based on Distributed System | Leader **Jun. 2022 – Sep. 2022**
*National First Prize & Harmony Innovation Award(**Top 1%**) in National University IOT Design Competition*

- Designed the 'HarClass', an App for modern smart classrooms, utilizing the distributed features of HarmonyOS.
- Leveraged BearPi for environment monitoring and formulated custom communication protocols for cloud connectivity.

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: C++, Python, Matlab, Java
Tools/Frameworks: OpenCV, Pytorch, Tensorflow, Numpy, ROS, Gazebo, Airsim
Languages: Mandarin(native), English(TOEFL-107 R30 L27 S22 W28)