YUANHANG ZHANG

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Education

Shanghai Jiao Tong University   **Sept. 2019 – Jun. 2023**
*Major: Automation, **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

Multiagent Target Sequencing Path Finding with Heterogeneous Task Duration   **Aug. 2023 – Present**
Summer Intern Advisor: Dr. Zhongqiang Ren from CMU, the U.S.

- Proposed two conflict-based methods—CBSS-TPG and CBSS-D to solve the multiagent target sequencing path finding problem with target duration (MA-TS-PF, an unexplored multiagent path finding problem).
- Designed a post-process in CBSS-TPG to generate a conflict-free path execution schedule with task duration.
- Refined CBSS in CBSS-D 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 Project(A grade, 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, Ren Z. "Multiagent Target Sequencing Path Finding with Heterogeneous Task Duration," 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.
- Deployed YOLOv5 with TensorRT to accelerate object detection and implemented P3P for pose estimation.
- Utilized RAPIDDS to generate optimized and collision-free trajectories for quadrotor navigation.

'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

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.

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)