YuanHang Zhang

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Education

Carnegie Mellon University (CMU) **Aug. 2024 – Present**
***Degree**: Master, **Major**: Robotic Systems and Development* *Pittsburgh, the U.S.*

Shanghai Jiao Tong University (SJTU) **Sep. 2019 – Jun. 2023**
***Degree**: Bachelor, **Major**: Automation, **Major GPA**: 88.5/100* *Shanghai, China*

Publications

Zhang Y, Liang T, Chen Z, Ze Y, Xu H. "Catch It! Learning to Catch in Flight with Mobile Dexterous Hands", under review (arXiv).
Zhang Y, Wu X, Wang H, Ren Z. "Multi-Agent Combinatorial Path Finding with Heterogeneous Task Duration", under review (arXiv). The extended abstract accepted by International Symposium on Combinatorial Search 2024.

Research Projects

Learning to Catch Objects in Flight with Mobile Dexterous Hands **Feb. 2024 – Sep. 2024**
Research Assistant, Advisor: Prof. Huazhe Xu from Tsinghua University, China

- Constructed a omni-mobile manipulator composed of a mobile base, a 6-DoF arm, and a 12-DoF dexterous hand, to catch diverse objects randomly thrown by humans.
- Proposed a two-stage Reinforcement Learning framework to efficiently train a whole-control policy for the catching task.
- Deployed the catching policy trained in simulation onto the real robot in a zero-shot manner.

Multi-Agent Combinatorial Path Finding with Heterogeneous Task Duration **Aug. 2023 – Nov. 2023**
Research Intern (Remote), Advisor: Prof. Richard Ren from SJTU, China

- Proposed CBSS-TPG and CBSS-D to solve an unexplored multi-agent path finding problem with task duration.
- 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 Nonlinear Model Predictive Control (NMPC) method incorporating quadrotor and visual feature dynamics.
- Addressed perception-aware problems in Image-Based Visual Servo Control (IBVS) by adding visual feature constraints.
- Evaluated the control algorithm through traversal of multiple rings in Gazebo simulations and real drone experiments.

Zero-Shot Acrobatical Drone Flight with Imitation Learning **Nov. 2023 – Dec. 2023**
Course Project

- Utilized iterative imitation learning to train an acrobatic drone controller in simulation from a privileged MPC expert.
- Leveraged abstraction to represent visual features and bridged the gap between simulation and reality.

Extracurricular & Leadership

SJTU VEX Robotics Club **Mar. 2020 – Jan. 2023**
Programming 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**)
- Led the development of SJTU VEX's automation system, including localization, target tracking, and communication

Honors & Awards

- **Outstanding Graduate (5%)** in SJTU, 2023
- **Merit Student (3%)** in SJTU, 2022
- **Academic Progress Scholarship** in SJTU, 2021
- **Excellent Academic Scholarship** in SJTU, 2021

Miscellaneous

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