

YUANHANG ZHANG

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EDUCATION

Carnegie Mellon University - School of Computer Science

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

Honor: Outstanding Graduate (3%), Merit Student (3%)

RESEARCH EXPERIENCE

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 mobile manipulator composed of a omni-wheeled base, a 6-DoF arm, and a 12-DoF dexterous hand, to catch diverse objects randomly thrown by humans with agility, accuracy and generalization.
- Proposed two-stage Reinforcement Learning framework to efficiently train a whole-control policy for our robot.
- Bridged the sim2real gap and deployed the policy trained in Mujoco onto the real robot in a zero-shot manner.

Multi-Agent Combinatorial Path Finding with Heterogeneous Task Duration

Aug. 2023 – Present

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 an NMPC approach with combined quadrotor and visual feature dynamics, incorporating visual constraints to address the perception-aware problem in Image-Based Visual Servo Control (IBVS) for autonomous flight.
- Evaluated approach's robustness through precise position tracking and smooth traversal of multiple rings in Gazebo simulations and real drone experiments.

Federated Learning of Face Recognition on Mobile Devices

Apr. 2020 – Sept. 2021

Undergraduate Research Program, 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

Zero-Shot Acrobatical Drone Flight with Imitation Learning | C++,Python

Nov. 2023 – Present

Personal Project

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

Drone Racing: Autonomous UAV Flight Traversing Multiple Rings | Python,C++

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 | Python

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 Cloud-Based Distributed System for Smart Classrooms | Java, Python

Jun. 2022 – Sep. 2022

National First Prize & Innovation Award (Top 1%) in National University IOT Design Competition

- Designed the 'HarClass', an app for modern smart classrooms, utilizing the distributed features of the Harmony Operation System to achieve convenient and efficient interaction between teachers and students.
- Utilized distributed database to store class data and analyze class performance using the clustering algorithm.

PUBLICATIONS

- [1] **Y. Zhang***, T. Liang*, Z. Chen, Y. Ze, H. Xu. “Catch It! Learning to Catch in Flight with Mobile Dexterous Hands”. In submission for ICRA 2025 [[Website](#)][[arXiv](#)][[Code](#)].
- [2] **Y. Zhang**, X. Wu, H. Wang, Z. Ren. “Multi-Agent Combinatorial Path Finding with Heterogeneous Task Duration”. In submission for ICRA 2025 [[arXiv](#)][[Code](#)].
- [3] Y. Tian, S. Cheng, T. Wei, T. Zhou, **Y. Zhang**, Z. Liu, Z. Yuan, H. Xu. “ViTaS: Visual Tactile Soft Fusion Contrastive Learning for Reinforcement Learning”. In submission for ICLR 2025.

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**)
 - * **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.

SKILLS

Programming Languages: Python, C++, C, Matlab, Java, HTML/CSS

Tools/Frameworks: Pytorch, Jax, Casadi, Acados, ROS, Mujoco, IsaacGym, Gazebo, Airsim

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