NAIAN TAO

New York | tao.naian@columbia.edu | (313) 288 5352 | linkedin.com/in/naian-tao

EDUCATION

Beijing University of Chemical Technology — Beijing, CN
BS in Mechanical Design, Manufacturing and Automation, GPA: 3.62/4.33 — Sept 2020 – Jun 2024
Courses: Program Design, Automatic Control Design, Artificial Intelligence

University of Detroit Mercy — Detroit, MI, US
BS in Mechatronics, Robotics, and Automation Engineering, GPA: 3.81/4.00 — Aug 2023 – Jun 2024
Courses: Robotics, Computational Intelligence Technique, Mechatronics Modeling & Simul

Columbia University — New York, NY, US
MS in Mechanical Engineering (Robotics Track), GPA: — /4.00 — Aug 2024 – Dec 2025

RESEARCH & ACADEMIC EXPERIENCE

University of Detroit Mercy — Detroit, MI, US
Robotics Senior Project — Jan 2024 – May 2024

- Designed an assistant robot system to help elderly individuals, combining mobile robots, computer vision, and a robotic manipulator.
- Modeled the *ReactorX-200* robotic arm and developed an app in *Matlab* to simulate both forward and inverse kinematics of the robotic arm. Finally, applied the algorithm to the real robotic arm for verification and used the program to control the arm.
- Trained dataset using *YOLOv8* and combined it with *Kinect V2* point cloud data to achieve target object localization.
- Performed camera calibration and hand-eye calibration between the robotic arm and the camera, significantly improving the grasping accuracy.
- Implemented navigation functionality using the *A** algorithm for global path planning and the *DWA* algorithm for local path planning.

Tsinghua University Intelligent Connected Vehicle Research Group — Beijing, China
Intern — Feb 2023 – May 2023

- Developed a system integrating electric truck fleet scheduling and battery swapping optimization with cloud control, enhancing efficiency and reducing energy waste. In simulation experiments, using this algorithm saves 15% more energy and 9% more cost compared to the *Cruise Control (CC)* method.
- Created a *Predictive Cruise Control (PCC)* for cruise control in electric trucks. Factored in road slope information and used the *Dynamic Programming (DP)* algorithm to generate efficient speed sequences, reduce energy consumption, and enhance energy regenerative capabilities.
- Implemented cloud control for real-time fleet, environment, and infrastructure connectivity, improving adaptive driving with dynamic traffic data by using the *Genetic Algorithm (GA)*.
- Co-authored a patent on *Battery Swapping Rhythm Planning and Predictive Cruise Control Method for Electric Heavy Truck Fleets* (Patent Number: CN117002500A).

2022 RoboCup China Open ROBOCUP@HOME — Beijing, China
Team Leader — Aug 2022 – Nov 2022

- Lead the team to achieve National First Prize.
- Used the *Grasp Pose Detection (GPD)* package to detect 6-DOF grasp poses for a 2-finger robot hand in 3D point clouds, enabling the grasping of objects in various orientations.
- Designed and executed a comprehensive algorithm combining object recognition with object grasping.
- Successfully developed and implemented a unique robotic door-opening solution to complete the challenging task — the only team that completed this task.
- Innovatively combined precise base positioning and mechanical arm path planning, significantly reducing computation time,

SKILLS

Language: *C++*, *C*, *Python*, *Matlab*

Technical: *ROS*, Robot Manipulator, Navigation, Cloud-Based Vehicle Control, Mathematical Modeling, *SolidWorks*