Zhihao Tian

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Education

Nanjing Institute of Technology *Nanjing, China*

B.Eng. in Mechanical and Electronic Engineering *Sep. 2020 - Jul. 2024*

Average Score: 83/100

Publications

- Mengke Zhang†, **Zhihao Tian**†, Chao Xu, Fei Gao, and Yanjun Cao. *"Efficient trajectory generation based on traversable planes in 3D complex architectural spaces."* IEEE International Conference on Robotics and Automation (Submitted to **ICRA 2025**)
- Chice Xuan†, Jiadong Lu†, **Zhihao Tian**, Jiacheng Li, Mengke Zhang, Hanbing Xie, Jianxiong Qiu, Chao Xu, and Yanjun Cao. *"Novel design of reconfigurable tracked robot with geometry-changing tracks."* IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS 2024**, Accepted)

Research Experience

FAST Lab(FIRE), Zhejiang University *Zhejiang, China*

Research Assistant, Advised by Prof. Yanjun Cao *Apr. 2023 - Present*

- **Autonomous Cross-Floor**: Utilized LIDAR to collect 3D point cloud data in complex artificial environments and extracted traversable planes for efficient trajectory generation, significantly reducing the complexity of the trajectory planning process. Deployed the trajectory generation algorithm on CubeTrackV2, achieving multi-floor autonomous navigation(ICRA 2025)
- **CubeTrackV2**: Developed the second generation of the reconfigurable tracked robot, performed kinematic analysis of the flipper, and used RecurDyn for finite element analysis to validate that the new design has lower shear stress and requires less energy consumption during deformation(IROS 2024)
- **CubeTrackV1**: Collaborated with colleagues to build the first version of a Tracked Robot with Geometry-Changing Tracks, including circuit setup and programming base motion control

All-Terrain Vehicle Lab, Nanjing Institute Of Technology *Nanjing, China*

Student, Advised by Prof. Guifang Qiao *Sep. 2020 - jul. 2024*

- Developed a mobile 4-DOF robotic arm, utilizing PaddleOCR to recognize key information on packages for logistics sorting
- Deployed YOLOv5 on a UGV to recognize crowds, implemented distributed computing using TCP/UDP, while simultaneously tracking paths and overcoming obstacles
- Developed an indoor autonomous navigation system for UGV based on ROS, while utilizing OpenCV for facial recognition
- Built a two-wheeled self-balancing robot, integrating STM32, IMU, Bluetooth, encoder

Honors & Awards

2022 **Second Prize**, RoboCom Robotics Developer Competition CAIR Safe-City *China*

2022 **Third Prize**, Chinese Collegiate Computing Competition Smart Logistics *China*

2022 **Third Prize**, Contemporary Undergraduate Mathematical Contest in Modeling *Jiangsu,China*

2021 **Second Prize**, RoboCup China Open Martial Arts Arena - Vision Challenge *China*

2021 **Second Prize**, 18th May Day Mathematical Contest In Modeling *Jiangsu,China*

2021 **Third Prize**, Scholarship At Nanjing Institute of Technology(Top 15%) *Nanjing,China*

Skills

Programing C/C++, python, ROS, Git, Matlab, LaTeX
Design Fusion 360, Recurdyn, Blender, Altium Designer, 3D Printing
Hardware Raspberry Pi, Jetson Nano, Stm32, Esp32, Arduino

Extracurricular Activity

COVID-19 Volunteer: Cooperate with local volunteers to conduct epidemic prevention inspections
Table Tennis Club: Won several internal matches, contributing to the overall team performance