Zexian Ji

jizexian0107@foxmail.com · (+86) 15268733211

.

Education

Harbin Engineering University (HEU), Harbin, China 2020 – Present

*i*n Mechanical Design Manufacturing and Automation, expected July 2024

Research Interests

Perception and Planning of Robots
Cable-Driven Manipulators
Reinforcement Learning

Competition/Project Experience

RoboMaster2021 Robot Team 'Winds of Dream' 2020.9 – 2021.8

Embedded Engineer

- Design and implementation of embedded and control systems for a robot
- Develop a dual-axis gimbal state feedback control system based on fuzzy PID control

RoboMaster2022 Robot Team 'Nooploop Winds of Dream' Autonomous Robot 2021.9 – 2022.8

Embedded Engineer

- Design and implementation of embedded and control systems for an autonomous robot
- Design an extended Kalman filter that fuses wheel odom and imu information to estimate the accurate positioning for the robot on a one-dimensional track

Algorithm Engineer [Web] [Code]

- Design an auto aiming system based on OpenCV and Kalman filter involving visual recognition and position solving, target motion estimation and prediction, dual-axis gimbal attitude estimation and control
- Utilize FNN to achieve digit recognition with high accuracy, avoiding misidentification of targets

RoboMaster2023 Robot Team 'Winds of Dream' Autonomous Robot 2022.9 – 2023.8

Embedded Engineer [Code]

- Develop a dual-axis gimbal state feedback control system based on system identification and linear quadratic regulator control, achieving nice rapidity and accuracy
- Design a decision-making system based on finite state machine which enables an autonomous robot to switch between behaviours

Algorithm Engineer [Web] [Code]

- Utilize IPPE algorithm to obtain 6D pose of targets and design an Extended Kalman filter to obtain a comprehensive state observer to achieve high accuracy tracking of rotating targets
- Utilize move-base package and TEB planner to implement global and local path planning based on ROS

7-DOF Cable-Driven Manipulator 2023.9 – Present

Structural Engineerr&Algorithm Engineer [Web1] [Web2] [Code]

- Design the structure of cable driven manipulator, reducing joint coupling and increasing workspace
- Utilize D-H Matrix, DLS and GPM methods, completing forward and inverse kinematic solution, including constrained kinematic redundancy problems such as joint limits and singularity

Paper

Design of target recognition tracking and attack system based on Kalman filter Journal of Ordnance Equipment Engineering 2022.11

Honors and Awards

1^{st} *Prize*,Award on Harbin Engineering University Scholarship	2021
3^{rd} *Prize*,Award on Harbin Engineering University Scholarship	2022
2^{nd} *Prize*,Award on RoboMaster University Championship 2021 Northern Regional	May 2021
2^{nd} *Prize*,Award on RoboMaster University Championship 2021 National Final	Aug. 2021
Championship,Award on RoboMaster University Championship 2021 Eastern Regional	Jun. 2022
1^{st} *Prize*,Award on RoboMaster University Championship 2022 National Final	Aug. 2022
second Place,Award on RoboMaster University Championship 2023 Northern Regional	Jun. 2023
2^{nd} *Prize*,Award on RoboMaster University Championship 2023 National Final	Aug. 2023

Skills

- Extensive project experience on Linux platform, including development based on OpenCV, ROS
- Extensive project experience with microprocessor, including peripherals such as can, spi, uart
- Solid foundation in mathematics, mastery of numerical calculations and their code implementations
- Programming Languages: C, C++, Python
- Applications: Matlab, Git, Latex, Solidworks, Markdown

Work Practice

Student Union Publicity Department 2021.9 – 2022.7

Vice President

- Design and implement publicity campaigns for student events
- Design promotional posters, edit event videos and coordinate with other departments
- Organize interviews, talk to outstanding students or teachers and compile the interviews into articles

RoboMaster2023 Robot Team 'Winds of Dream' 2022.9 – 2023.8

Project Management

- Manage and coordinate the scheduling of work and tasks for the technical and project teams
- Determine the functional requirements and technological direction of the robot, assessment of the technical difficulties and formulation of technical specifications

Specialised Course Grades

Linear Algebra and Analytic Geometry	97
Engineering Mathematical Analysis	99
Mechanics of Material	94
Engineering Fluid Mechanics	89
Principle and Application of Embedded Microprocessor	85
Computational method	94
Mechanical Control Engineering	88

Miscellaneous

- GitHub https://github.com/Go2SchooI
- Personal Page https://go2schooi.github.io
- Languages: English - Fluent- Ielts Score 6.5. Chinese - Native speaker