Zexian Ji

jizexian0107@foxmail.com · (+86) 15268733211

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Education

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

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

Research Interests

Autonomous Driving
Detection and Control of Robots
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 the 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 Control&Localization

- 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 Computer Vision

- Design an auto aiming system based on Kalman filter which involves visual recognition and position solving, target motion state estimation and prediction, and dual-axis gimbal attitude estimation and control
- Design a MLP 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 Control&Decision

- 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 Computer Vision&Navigation

- 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 target tracking
- Utilize move-base package and TEB planner to implement path planning for an autonomous robot based on ROS

Cable Driven 7-DOF Manipulator 2023.9 – Present

Structural Engineerr&Algorithm Engineer

- Design the structure of cable driven manipulator, reducing joint coupling and increasing workspace
- Utilize D-H Matrix and optimisation approach, completing the forward and inverse kinematics solution, including the transformation relationship between drive space, joint space and Cartesian space

Paper

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

Honors and Awards

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

Skills

- Extensive project experience with microprocessor, including peripherals such as can, spi, uart
- Extensive project experience on Linux platform, including development based on OpenCV, ROS
- Solid foundation in mathematics, mastery of numerical calculations and their code implementations
- Programming Languages: c, c++, Python
- Applications: MATLAB, GIT, LATEX, SOLIDWORKS

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