YIBO ZHOU

Chongqing University, Chongqing, 401135, P.R.China
(+86)182-1040-1945 | m18210401945@gmail.com
https://x-20020504.github.io

EDUCATION BACKGROUND

National Elite Institute of Engineering, Chongqing University, Chongqing, China *September 2020 - Present*

- B.E. in Robotic Engineering, GPA: 3.79/4.0 (WES)
- Core Courses: *Mathematics and Physics* (97), *Linear Algebra* (96), *Ergonomics* (95), *Circuit Design and Application* (92), *Foundation of Robots* (91), *Theory of Machines and Mechanisms* (91), *Product Design* (91), *Signals and Systems* (90), *Numerical Analysis in Engineering* (90), *Principle of Automatic Control* (88), *Software Design* (86)

RESEARCH EXPERIENCE

Quadruped Blind Guiding Robot, Hangzhou, China *July 2022 – March 2023*

Supervisor: Dr. Donglin Wang, PI at the School of Engineering, Westlake University

- Proposed an optimized guiding system to cope with the effect brightened by unique outliers among users.
- Collected a multimodal dataset that records the human-robot interactions over 20 hours.
- Compared the performance of the sequential predictive models (Transformer etc.) to the dynamics models.
- Designed MPC-based motion planners with neural networks, enhancing the robustness of the planning system.
- Y. Zhou, D. Cui, X. Dong, Z. Wei, Z. Wei, and D. Wang. "BVIP Guiding System with Adaptability to Individual Differences," *arXiv preprint, arXiv:2304.07494, 2023.*

Unmanned Campus Navigation Car, Chongqing, China *May 2022 – May 2023*

Supervisor: Prof. Dr. Fuqiang Gu, College of Computer Science, CQU

- Constructed the point cloud map of the campus with LiDAR, annotating the semantic information with the camera.
- Fused the localization data from LiDAR and GNSS for precise positioning outdoors.
- Deployed Dijkstra's algorithm to plan the global path to prevent obstacles in the constructed grid map.
- Utilized MPC-based local planning algorithm to plan the real-time obstacle avoidance velocities for the chassis.

Vision-Servo Underwater Gripping Robot, Chongqing, China *June 2021 – December 2022*

Supervisor: Prof. Dr. Jun Luo, College of Mechanical and Vehicle Engineering, CQU

- Constructed an electrical system to step down high-voltage input power, which was then distributed to actuators.
- Developed the motion control system, which utilized the dual-loop PID control algorithm with STM32.
- Conducted the object detection algorithm based on YOLOv5 with Google's dataset for vision-servo gripping.
- Participated in the innovative quadcopter-style mechanical system design, which assembled a shape-adaptive gripper.
- Participated in CFD simulations for optimizing the robot's shape, reducing the fluid resistance.

Vision-Servo Agricultural Quadcopter, Chongqing, China *July 2021 – November 2021*

Supervisor: Assoc. Prof. Dr. Zhen Wei, College of Aerospace Engineering, CQU

- Developed the PID-based flight controller using the TI TM4C123G microcontroller as the core processor.
- Designed a 3-DoF gimbal with SOLIDWORKS and controlled a laser transmitter for target shooting using Arduino.
- Utilized OpenCV to recognize and allow the drone to track features such as color blocks and shapes.

Gomoku Game based on Reinforcement Learning, Chongqing, China *April 2021 – June 2021*

Supervisor: Assoc. Prof. Dr. Ji Liu, College of Computer Science, CQU

- Built the neural network with PyTorch, and trained by Amazon Web Services (AWS) with Jupyter Notebook.
- Designed GUI for the Gomoku game with Pygame, with several entertaining settings added.
- Designed appropriate rewards for the DQN, enabling the Action-Value Function to output optimal actions for states.

Electronic Clock based on FPGA *January 2021 – February 2021*

Supervisor: Prof. Dr. Zheng Zeng, School of Electrical Engineering, CQU

- Developed an electronic clock based on Altera Cyclone using Verilog HDL in Quartus Prime.
- Divided the crystal oscillator signal from 50MHz to 100Hz, achieving the centisecond-level timing precision.
- Designed modules for button-based interaction and display functionality.

ECG (Electrocardiogram) Monitor *November 2022 – February 2023*

Supervisor: Prof. Dr. Rui Ling, School of Automation, CQU

- Developed an ECG Monitor, enabling it to analyze the user's heart rate with a relative error of less than 5%.
- Sampled the user's ECG signal using a 24-bit ADC and displayed the filtered signal to the screen using SPI.
- Utilized Fast Fourier Transform on the raw signal and used an FIR filter to eliminate noises.

Ergonomics workspace design for a remote-control system *April 2022 – June 2022*

Supervisor: Prof. Dr. Jia Zhou, School of Management Science and Real Estate, CQU

- Built the simulation environment using Unity, allowing a tower crane to be controlled by an operator console.
- Designed an application interface adhering to user interaction conventions, enabling users to control remote devices.
- Designed an ergonomic chair according to the national standards, with simulations to assess the ergonomic comfort.

PCB Design for the Robot Vacuum *October 2022 – February 2023*

Supervisor: Prof. Dr. Zhiyong Huang, School of Microelectronics and Communication Engineering, CQU

- Designed the circuits based on the STM32F407EVT6 chip, enabling it to receive sensors' data and control actuators.
- Designed the motor drive circuit to utilize closed-loop current control to control DC motors with encoders.
- Designed the power management circuit to enable battery charging and stable power outputs.

ENTREPRENEURIAL PROJECT

Food Prep Robot, Chongqing, China *June 2023 – Present*

Co-founder; Industrial Innovation Park

- Designed a robot with a bionic mechanical arm to automate food preparation.
- Researched the market thoroughly, confirming the market demand, and defining the product's specific features.
- Designed the motion planning system with vision-servo for the 5-DoF mechanical arm to handle various ingredients.
- Awarded a seed funding of $70,000.

AWARDS

- Chongqing University Outstanding Student (Top 5%). *December 2021*
- Chongqing University Comprehensive Scholarship (Top 11%). *May 2021*
- Chongqing University Comprehensive Scholarship (Top 20%). *April 2022*
- National Innovation Training Project - National Excellent Project Award. (Top 10%). *December 2022*
- National Undergraduate Electronics Design Contest, First Prize of Chongqing Province (Rank 3). *January 2022*
- USA Mathematical Contest in Modeling, Honorable Mention. (Top 32% in 2023). *May 2023*
- Chongqing University Electronics Skills Competition, First Prize (Rank 1). *September 2021*
- The 4th Chongqing University Innovation Winter Camp - First Prize (Rank 1). *March 2021*

SKILLS

Language: Chinese (Native), English (Fluent, IELTS: 7.0)

Programming: C (Microcontrollers), C++ (Ubuntu), Python (Machine Learning), MATLAB (Robot Simulation)

Platforms: PyTorch (Machine Learning), STM32 (Microcontrollers), Arduino (Microcontrollers), ROS, Ubuntu (Linux), Webots (Robot Simulation), Gazebo (Robot Simulation), SOLIDWORKS (3D CAD), Fusion 360 (3D CAD), Altium Designer (PCB Design), Ansys (Engineering Simulation)