HE ZHIXIN

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EDUCATION BACKGROUND

University of Electronic Science and Technology of China *Sept. 2022 to Jul. 2026*
*Glasgow College, jointly held with the **University of Glasgow***

- B.Eng. in Electronic Information Engineering from UESTC.
- B.Eng. in Electrical and Electronics Engineering from UofG.
- Cumulative GPA**: 3.83/4.0**
- Major courses: Signals and Systems, Digital Signal Processing, Embedded Processors, Power Electronics, Fundamentals of Analog Circuits, Dynamic Control.
- Skills: Proficient in MATLAB, Python, Verilog, C Language, LTSpice, Altium Designer.

RESEARCH EXPERIENCE

Emotion-Aware Interactive Installation for Children with Autism *Apr to Sep. 2025*
Supervisor: Prof. Min Peng, UESTC *Chengdu, Sichuan, China*

- Designed and implemented an emotion-responsive interactive system inspired by suns drawn by children with autism, integrating embedded sensors, computer vision, and LED-based visual feedback to enhance the emotional engagement of the audience.
- Developed a facial emotion recognition module in Python using real-time image processing and a lightweight convolutional neural network (CNN), achieving over 85% accuracy in identifying positive emotional expressions.
- Designed an ESP32-based microcontroller system with network communication capability, constructing a dual-channel WS2812B LED control system that translated detected emotional states into dynamically programmed (PWM-controlled) "sun" LED units.
- Exhibited work at Luozhongli Art Museum (Chongqing) and Tianfu Art Museum (Chengdu) to advocate for children with autism; the project was featured by major media, including *People's Daily* and *Xinhua News Agency*.

IoT-Based Environmental Monitoring System *May to Aug. 2024*
Supervisor: Dr. Ahmad Taha, University of Glasgow *Glasgow, Scotland, UK*

- Developed an advanced embedded system capable of measuring various environmental parameters such as energy consumption, temperature, humidity, and occupancy.
- Designed a hybrid data transmission method combining LoRaWAN for long-range communication and Wi-Fi for short distances; the system prioritized LoRaWAN to improve energy efficiency by approximately 25%, with Wi-Fi as a backup, successfully transmitting data with only 2.3 seconds of latency.
- Tested the system and achieved a data accuracy rate of 98.7%, with data stored in a time-series database and visualized via open-source tools Node-Red.

Application Research of Multi-Perception Wearable Device *June. 2023 to May. 2024*
Supervisor: Prof. Bin Gao, UESTC *Chengdu, Sichuan, China*

- Developed the Audio Thread within the RT-Thread framework to manage real-time audio acquisition via the WM8978 chip, using thread scheduling and global flag control to coordinate DSP data flow.
- Built the RT-Thread audio-acquisition module on WM8978 and implemented a ping-pong buffer pipeline, improving continuous-recording stability by 3.2%.
- Develop DSP-based algorithms for quantitative analysis of recorded speech, extracting key acoustic features including energy, spectral entropy, brightness, and resonance peaks for later pattern analysis.

PROJECT EXPERIENCE

Leader–Team design project–Design of a drone to complete various tasks *Jan to June. 2025*

- Developed an STM32F407-based quadrotor control system integrating BM088, SPL06-001, and AK88975 sensors, with PID-based motor control and optical flow feedback in a closed-loop configuration, achieving precise attitude stabilization and 90% autonomous takeoff and landing success.
- Developed the flight controller with polling-based task scheduling and UART communication to modules.
- Deployed proximity detection to enable the drone to detect walls and avoid obstacles accurately: the sensors measured distances by emitting sound waves and detecting their reflected signal.
- Integrated a lightweight servo-driven robotic arm and OpenMV-H7-PLUS cameras for small-object detection and autonomous grasping, achieving a 74.9% success rate during prototype testing and identifying key improvements for future optimization.

The optimization of the Genetic Algorithm *Oct to Dec. 2024*

- Tuned Genetic Algorithm (GA) parameters for balanced efficiency, initialized a random population, and

ran 500 evolutionary generations with fitness evaluation, selection, crossover, and mutation.
- Performed 20 independent runs, tracked the best objective values, and used the median curve to assess convergence.
- Visualized convergence trends and applied vectorized constraints/objective functions to solve the G9 problem, substantially improving runtime efficiency by approximately 5%.

Leader - Exhibition at the Tianfu Art Museum in Chengdu City *Apr to Oct. 2024*
- Used the 'grinding wheel' as the interactive medium, taking the homophone of 'grinding work' to design a work for exhibition, which explores the relationship between 'light, labor, and feedback'; the upper light symbolizes "value and hope", the central grinding wheel serves as the audience interaction platform, and the lower LED screen presents real-time feedback.
- Integrated a 2804 brushless DC motor with an AS5600 magnetic encoder to capture real-time angle and speed, sending the data to a microcontroller for Python-based area recognition.
- Delivered commands to the control card via Modbus RTU, which triggered LED animation changes through the HJ212 protocol, enabling real-time visual feedback as the audience pushed the wheel.

Design of pedestrian navigation system based on RISC-V architecture *Apr to Sep. 2023*
- Utilized RISC-V vector instructions to analyze and vectorize the pedestrian navigation system (PNS) algorithm to improve computational efficiency.
- Designed and implemented a low-power RISC-V processor optimized for floating-point and vector calculations and completed the optimized deployment on the Hummingbird E203 SoC, which reduced power consumption by 8.3%.
- Constructed a customized RISC-V SoC architecture with multiple clock domains, storage subsystem, and vector co-processor to enhance the real-time performance of the system.
- Conducted RTL simulation and FPGA verification, comparing power consumption and resource use of five RISC-V processors, highlighting the performance advantages of the customized core.

TEACHING ASSISTANT EXPERIENCE

Glasgow College UESTC, Teaching Assistant (TA) *Sep.2025 to Present*

Course Number: UESTC3002; Course Title: Electronic Devices
- Served over 390 students in the Glasgow College by managing and distributing Lab equipment and made real-time Excel sheets to support instructors in checking the class attendance.
- Answered students' lab questions, such as the BJT operation principles and efficient SPICE usage.

EXTRACURRICULAR ACTIVIIES

Program Coordinator - Hand-in-Hand Program for Children with Autism *Jan.2023 to Present*
- Volunteered weekly at Rehabilitation Center for Children with Disabilities to accompany children with autism in daily activities such as sports and art classes, contributing over 312 hours of service.
- Collaborated closely with teachers to guide children through tasks, often holding their hands to help them remain calm, focused, and engaged.
- Coordinated with medical professionals, conducted training sessions for nearly 30 volunteers, and expanded the team from 30 to 60 members.

Founder of the Green Land Psychology Club *Sep. 2022 to Jun. 2024*
- Founded the club inspired by the concept of art therapy to help students alleviate anxiety.
- Created a supportive environment for students to relax and express their feelings through artistic activities such as tree hugging and pixel painting.
- Led 30 members divided into three teams to organize 10 psychological relief events each term, benefiting over 300 students.

United Nations Short-Term Project *Jul to Aug. 2023*
- Learned the importance of Good Health and Well-being, Energy Sustainability, etc.
- Researched the emphasis on the importance of SDG3 from the perspective of leukemia.

HONORS AND AWARDS

- China National Scholarship in 2025 (for top 4%).
- Outstanding Academic Performance Scholarship in 2025 (for top 1%)
- University of Glasgow 2024 Best Summer Hardware Project Award.
- Second Place in Women's Singles 2023, UESTC Badminton Tournament.
- Champion; UESTC Inter-School Photography Contest 2023.