Qi Haoran

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Education

Beijing University of Chemical Technology *Beijing, China*

Bachelor of Engineering in Automation ***Sep. 2022 - June 2026 (Expected)***

- **Average Overall Score: 88.03/100**
- **Core Courses:** Signals and Systems (**93**), Linear Algebra (**92**), Embedded System Design (**A**), Digital Image Processing (**A**)

Research & Publications

First Author | Solution Concentration Monitoring Device Design ***Apr. 2023 - Dec. 2023***

Published in *University Chemistry* (Peer-reviewed Journal, Hosted by Peking University)

- **Authored** a first-author paper (**DOI: 10.12461/PKU.DXHX202404036**) detailing a novel vision-based concentration detection device.
- **Architected** a vision-based system using a Raspberry Pi and OpenCV, establishing a linear model between solution color (HSV) and concentration based on the Lambert-Beer law to **achieve a 90% accuracy rate**.
- **Devised** a custom 3D-printed black-box environment and disabled camera auto-white-balance to eliminate light interference, ensuring data integrity and measurement repeatability.

Co-author | Intelligent Bird Recognition for River Ecosystems ***July 2024 - Sep. 2025***

Paper submitted to the *Chinese Journal of Applied Ecology* (A National Core Journal, CSCD Indexed, Under Review)

- **Co-developed** the YOLOv8-MAT-2H model by integrating MSBlock and ADown modules to enhance feature extraction for small, complex targets in ecological monitoring.
- **Optimized** the model to **improve mAP@0.5:0.95 from 0.704 to 0.722 (+2.57%)** while simultaneously **reducing model parameters by 20% and GFLOPS by 10%**, ideal for edge device deployment.
- **Spearheaded** strategies to handle environmental occlusions in real-world river settings, contributing directly to the system's final operational **accuracy of nearly 80%** for the Beijing Water Authority.

Research Member | Fiber Optic Biosensor for Tumor Marker Detection ***Jan. 2025 - Apr. 2025***

- **Contributed** to a project developing a fiber optic biosensor that **improved the detection limit by 15 times** compared to traditional ELISA technology.
- **Executed** data processing algorithm optimization and participated in sensor design and validation, helping to **reduce detection time from hours to just 5 minutes**.

Key Engineering & Competition Projects

Team Captain | "Siemens Cup" China Intelligent Manufacturing Challenge ***Aug. 2024***

Information & Networking Track, **1st Prize (North China Region)**

- **Led a team** to design and deploy a complete industrial network system for a simulated factory environment.
- **Architected** the network topology from abstract requirements, defining the IP schema, VLAN segmentation, and firewall access control policies.
- **Engineered and commissioned** the entire system, configuring Siemens S7 PLCs and industrial switches via TIA Portal to ensure robust, redundant communication.

Team Captain | Raicom Robot Developer Competition ***Oct. 2024***

Quadruped Robot Collaborative Challenge, **2nd Prize(National Final)**

- **Directed the team** and developed main functional packages using ROS for a quadruped robot to perform autonomous navigation, object manipulation, and animal recognition.
- **Engineered an innovative solution** to overcome hardware limitations of the Raspberry Pi by implementing a "position-then-detect" strategy, capturing and processing a single frame to bypass real-time video latency.
- **Trained and deployed a YOLOv8 model** that **achieved 98.8% accuracy** in identifying six types of animals under variable lighting conditions through targeted data augmentation.

Team Member | "China International College Students'Innovation Competition ***July 2025***

Project: An intelligent monitoring system for industrial centrifuges, **Provincial Semi-finalist**

- **Owned** the functional development and data analysis for the monitoring subsystem within a complex project targeted at the nuclear sector.
- **Delivered** critical code modules that ensured the stability and integrity of the multi-sensor data stream, foundational for the system's fault diagnosis and vibration suppression capabilities.

Internship Experience

Testing Intern | *Guangzhou Dapsen Intelligent Equipment Co., Ltd.* ***July 2024 – Aug. 2024***

- **Analyzed** a plastic bottle inspection line to identify critical failure points in the assembly and sensor calibration processes.
- **Engineered** a revised debugging workflow which was adopted by the team, **reducing setup time by an estimated 15%** and improving overall operational stability.

Honors & Awards

2nd Prize, "Shuwei Cup" University Student Mathematical Modeling Challenge (National) ***May 2025***

2nd Prize, Raicom Robot Developer Competition (National) ***Oct. 2024***

1st Prize, "Siemens Cup" China Intelligent Manufacturing Challenge (Regional | North China) ***Aug. 2024***

3rd Prize, iCAN Innovation and Entrepreneurship Competition (Regional | Beijing) ***Nov. 2024***

1st Prize, RoboCup China Family Group Project Competition (University Level) ***Dec. 2024***

2nd Prize, People's Scholarship (University Level) ***2023 & 2025***

3rd Prize, People's Scholarship (University Level) ***2024***

Technical Skills

Programming & AI: Python, C, ROS, MATLAB, OpenCV, PyTorch, YOLO, Pandas, SPSS

Control & Automation: Siemens S7-1200/S7-300 PLC, TIA Portal, DCS (Zhejiang SUPCON ECS-700), MATLAB/Simulink, Industrial Network Design (PROFINET, Redundancy, VLAN)

Embedded Systems & Hardware: Raspberry Pi, Arduino, STM32, PLC, Sensor Integration, EDA (Multisim, Proteus)

Software & Tools: Linux (Ubuntu), Git, VS Code, PyCharm, Wireshark, Jupyter Notebook