

# Qi Haoran

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## EDUCATION

**Beijing University of Chemical Technology**

Beijing, China

Bachelor of Engineering in Automation

Sep. 2022 - Jun. 2026 (Expected)

- **Average Overall Score: 88.05/100**
- **Core Courses:** Signals and Systems (93), Linear Algebra (92), Embedded System Design (A), Digital Image Processing (A), Modern Control Theory (88)
- **Honors:** People's Scholarship for Academic Excellence (Second Prize, 2025 & 2023; Third Prize, 2024)

## RESEARCH & PUBLICATIONS

**First Author** | Vision-based Solution Concentration Monitoring System

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.
- Engineered and deployed a system on a Raspberry Pi using OpenCV, establishing a regression model between solution color (HSV) and concentration with a correlation coefficient ( $R^2$ ) exceeding 0.99.
- Designed a custom 3D-printed black-box and disabled camera auto-white-balance to eliminate light interference, ensuring data integrity and measurement repeatability.

**Co-author** | Intelligent Bird Recognition for River Ecosystems

Jul. 2024 - Sep. 2025

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

- Co-architected 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 by 2.57%** while simultaneously **reducing model parameters by 20%**, making it ideal for edge device deployment.
- Implemented robust data augmentation techniques to handle environmental interference, contributing to the system's final operational **accuracy of nearly 80%** for the Beijing Water Authority.

## KEY PROJECTS & COMPETITION AWARDS

**Modeling & Programming Lead** | Tourism Prediction Model

May 2025

"Shuwei Cup" University Student Mathematical Modeling Challenge, **National Second Prize**

- Architected and fused multiple machine learning models (Random Forest, XGBoost) to predict regional weather phenomena based on 20 years of meteorological data.
- Modeled and validated a Growing Degree Days (GDD) model to forecast plant flowering periods, providing quantitative predictions for ecological and tourism applications.

**Team Captain** | Vision-guided Hand Rehabilitation System (Conceptual Design)

Apr. 2025

China Robotics and Artificial Intelligence Competition, **National Third Prize**

- Conceptualized a novel system integrating computer vision for gesture recognition with force-feedback gloves for personalized post-stroke rehabilitation.
- Designed the system architecture, proposing a "Cloud + Edge" framework to balance real-time response with complex data analysis.

**Team Captain** | Raicom Robot Developer Competition

Oct. 2024

Quadruped Robot Collaborative Challenge, **National Second Prize**

- Spearheaded the team in developing ROS-based packages for autonomous navigation, object manipulation, and AI-powered perception on a quadruped robot.
- Engineered a "position-then-detect" strategy to overcome Raspberry Pi's hardware limitations, processing single frames to bypass real-time video latency.
- Trained and deployed a YOLOv8 model achieving **91.5% accuracy** by creating a targeted, augmented dataset for animal identification under variable lighting.

**Core Member** | Monocular Vision Measurement Device

*Jul. 2025*

*National Undergraduate Electronic Design Contest, **Second Prize (Beijing Region)***

- Engineered an embedded vision system on an **STM32F407** core to measure object distance and size using a single camera, achieving distance error  $< \pm 2\text{cm}$  and size error  $< \pm 0.5\text{cm}$ .
- Implemented a non-linear fitting model for distance calibration and applied perspective transformation to correct image distortion, improving measurement accuracy.
- Integrated a lightweight YOLOv5s model for robust object detection in complex scenarios, showcasing embedded AI application skills.

**Team Member** | Intelligent Monitoring System for Industrial Centrifuges

*Jul. 2025*

*“China International College Students’ Innovation Competition”, **Second Prize (Beijing Region)***

- Owned the functional development and data analysis for the monitoring subsystem within a complex project targeted at the nuclear sector.
- Delivered critical code modules ensuring the stability of the multi-sensor data stream for fault diagnosis and vibration suppression.

**Team Captain** | Industrial Network Design for Smart Factory

*Aug. 2024*

*“Siemens Cup” China Intelligent Manufacturing Challenge, **First Prize (North China Region)***

- Led a team to design and deploy a complete industrial network, defining the IP schema, VLAN segmentation, and firewall policies.
- Configured and commissioned the entire system, programming Siemens S7 PLCs and industrial switches via TIA Portal to ensure robust communication.

**Team Member** | iCAN Innovation Contest, **Third Prize (Beijing Region)**

*Nov. 2024*

**Team Member** | RoboCup China Open, **First Prize (University Level)**

*Dec. 2024*

## INTERNSHIP EXPERIENCE

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**Electronic Controls Intern** | Shenzhen Jowin Energy Technology Co., Ltd.

*Jul. 2025 – Present*

- Designing the PCB layout for the control board of an “Automatic Sewage and Scale Removal Controller” using Altium Designer.
- Developing initial firmware in C for a 51 MCU to manage timed control logic for discharge and descaling cycles based on sensor inputs.
- Contributing to the electronic control solution for a new commercial energy-saving product, from schematic design to preliminary code implementation.

**Testing Intern** | Guangzhou Dapsen Intelligent Equipment Co., Ltd.

*Jul. 2024 – Aug. 2024*

- Systematically diagnosed critical failure points in a plastic bottle inspection line’s assembly and sensor calibration processes.
- Engineered a revised debugging workflow adopted by the team, **reducing equipment setup time by an estimated 15%**.

## TECHNICAL SKILLS

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**Programming & AI/ML:** Python, C, ROS, MATLAB, OpenCV, PyTorch, YOLO

**Control & Automation:** Siemens S7-1200/S7-300 PLC, TIA Portal, DCS (SUPCON), MATLAB/Simulink, Industrial Network Design

**Embedded Systems & Hardware:** Raspberry Pi, Arduino, STM32, 51 MCU, Altium Designer, Proteus

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