

Liangji He

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EDUCATION

Shenzhen University

M.S. IN CONTROL ENGINEERING AND SCIENCE

Shenzhen, China

Sep. 2025 – Present

Hunan University of Science and Technology

B.S. IN ROBOTICS ENGINEERING

Xiangtan, China

Sep. 2021 – Jun. 2025

Outstanding Graduate Thesis: "Design of an Intelligent Home Security System Based on Edge Computing."

RESEARCH INTERESTS

My research interests lie in the intersection of TinyML, computer vision, anomaly detection, AI agents, and cognitive neuroscience. I am passionate about building intelligent systems that operate efficiently on resource-constrained edge devices, with applications in smart home security, audio intelligence, and semantic understanding.

HONORS AND AWARDS

2025	Outstanding Graduate Thesis, Hunan University of Science and Technology.
2024	Outstanding Communist Youth League Member, HNUST.
2023	Outstanding Communist Youth League Cadre, HNUST.
2022	University Scholarship, HNUST (Top 40%).

PUBLICATIONS (* EQUAL CONTRIBUTION)

In Preparation

[P1] Learning Discriminative Representations to Mitigate Class Confusion in Class-Incremental Semantic Segmentation.

Weixiang Liu, Pan Yang, Liangji He, Deyu Zeng, Saeed Iqbal, Zongze Wu, Xiaopin Zhong.
Pattern Recognition (PR) (In preparation)

RESEARCH EXPERIENCE

Shenzhen University

Shenzhen, China

M.S. STUDENT, ADVISED BY Weixiang Liu

Sep. 2025 – Present

- Research Topic: Computer vision, anomaly detection, AI agents.
- Collaborating on LDRMCC: proposing NRKD, SPCE, and NVPL components to address class confusion and feature bias in CISS.
- Conducting experiments on Pascal VOC 2012 and ADE20K benchmarks.

Hunan University of Science and Technology

Xiangtan, China

UNDERGRADUATE RESEARCHER

Sep. 2023 – Jun. 2025

- Research Topic: Edge computing for smart home security using on-device audio intelligence.
- Designed ESP32-S3 based edge node with MFE feature extraction and lightweight 1D-CNN for real-time sound classification.
- Built end-to-end system with MQTT + Home Assistant for hierarchical automation (alarm, smart lock, notifications).
- Achieved 97.1% validation accuracy, <20ms inference latency, 96% emergency alarm accuracy.

PROJECT PORTFOLIO

Pet Sound Detection System

Online (Hackster.io)

INDEPENDENT DEVELOPER [Hackster] [eetree]

Jan. 2024 – Mar. 2024

- Built an on-device KWS system for pet vocalization detection on Seeed XIAO ESP32S3 Sense.
- Deployed lightweight CNN for real-time classification of dog barks, whines, and ambient sounds.
- Integrated MQTT + Home Assistant for closed-loop smart home response (music, voice alerts).
- Part of the 2024 eetree.cn Winter Lab Program.

Industrial Defect Detection with Delta Robot

Xiangtan, China

VISION ALGORITHM DEVELOPER

Mar. 2023 – Jun. 2023

- Developed OpenCV-based defect detection pipeline using Hikvision 2D industrial camera.
- Implemented C++ image processing algorithms achieving >95% recognition accuracy.
- Integrated with Delta robot for automated pick-and-place sorting of defective workpieces.

Smart IoT Elevator System

Xiangtan, China

PROJECT LEAD

Sep. 2022 – Dec. 2022

- Designed and built STM32 + ESP8266 based smart elevator for university Electronic Design Competition.
- Integrated weather display, real-time clock, and IoT connectivity.
- Independently completed system architecture, hardware selection, and software development.

SKILLS

Programming Python, C/C++, Embedded C, MicroPython, LaTeX

Frameworks PyTorch, TensorFlow, OpenCV, MQTT, Home Assistant, ESP-IDF

Platforms ESP32/ESP32-S3, STM32, Raspberry Pi, Linux, Arduino

Tools Git, Docker, MQTT Broker, KiCad/立创EDA, VS Code