Mr. Hanlin CAI

D.O.B. Nov. 01, 2002 | Tel: (+86) 15905925789 | **hanlin.cai@ieee.org** | **https://caihanlin.com**
Building 7, Golden Garden, Quanzhou City, Fujian Province, China (362700)

OVERVIEW

As a highly motivated and collaborative student majoring in engineering, I have a strong interest in the industrial automation and artificial intelligence. During undergraduate studies, I have gained valuable experience in sensor design, system modelling, and machine learning. This entails completing a six-month industrial internship, publishing three peer-reviewed papers, and securing five awards at the national level in competitions.

EDUCATION

Fuzhou University (FZU) (China-Ireland Cooperative Program) ***Sep. 2020 – Jun. 2024***

Bachelor of Engineering in Automation (Taught in English)

- Current GPA: 3.81/4.00 (Top 8%), Average Score: 88.38

National University of Ireland, Maynooth (MU) ***Sep. 2020 – Jun. 2024***

Bachelor of Science in Robotics and Intelligent Devices (Combined Degrees)

- Expect to achieve First Class Honours (Third-year score: 88.7 | Ranking: **1/52**)

Main Courses: Control System Design, Software Engineering, Operating System, Digital System, Real-time and Embedded System, Robotics and Automation, Algorithms and Data Structures, Machine Learning

- **Course Projects:** Industrial Internship Experience (97/100), Signals & Systems Integration Project (92/100)
- **Scholarships:** FEPG Scholarship **(Highest Award at FZU, Top 0.5%)**, XiamenAir Scholarship **(Top 1%)**, Best Academic Performance Award at MU (Top 2%), First Prize Scholarship at FZU (Top 2%, Three Times)

RESEARCH EXPERIENCE

Embedded Development Intern, Huading Intelligent Manufacturing Technology Co. LTD., Fujian, China

Mentors: SN.ENGR Yuxiong Xia and Dr. Dan Chen ***Jan. 2023 – June 2023***

Outline:

- Successfully tackled the complexities of instrument inspection with intricate industrial environments by devising an intelligent inspection system leveraging IoT devices, quadruped robots and cloud computing.

Key Responsibilities:

- Implemented real-time data collection of sensor modules using ESP32; Integrated machine control with visual algorithms to empower quadruped robots to extract and analyse images of industrial instruments.

Achievement:

- Won the **Best Technology Award** in the 2023 China National Youth Science Innovation Project Competition.

Research Assistant, Laboratory of Industrial Automation Control Technology and Information Processing

Supervisors: Prof. Zhezhuang Xu and Dr. Yuan Meng ***Oct. 2022 – Present***

Outline:

- Addressed the security vulnerabilities and susceptibility to attacks in Bluetooth Low Energy Networks utilising a hybrid attack detection mechanism based on physical features and machine learning.

Key Responsibilities:

- Established a BLE experimental platform, collected datasets using BLE Sniffer, nRF Connect and Wireshark.
- Developed an attack detection algorithm based on temporal convolutional network, text-CNN and SVM.

Achievement:

- Secured a research grant over $3000; Authored a research paper and submitted to **AAAI 2024** conference.

Visiting Student, Cambridge Centre for the Integration of Science, Technology and Culture (CCISTC)

Supervisor: Prof. Pietro Liò ***June 2022 – Dec. 2022***

Outline:

- Resolved the challenge of detecting multiple-mix-attacks within IoT networks by developing a detection framework that integrates reconstruction and classification learning approaches.

Key Responsibilities:

- Developed a multiple-mix-attacks detection algorithm based on LSTM model and random forest algorithm.

Achievement:

- Research report achieved a ranking within top 5%; Won an outstanding oversea visiting scholarship ($2400).

PUBLICATIONS

[1] Hanlin Cai, Zhezhuang Xu. **"Securing Billion Bluetooth Devices leveraging Learning-based Technique".** *The 38th Annual AAAI Conference on Artificial Intelligence. Undergraduate Consortium, 2024.*

[2] Hanlin Cai, Zheng Li, Jiaqi Hu, Wei Hong Lim, Sew Sun Tiang, Mastaneh Mokayef, Chin Hong Wong. **"Optimising Traffic Sign Detection System Using Deep Residual Neural Networks Combined with Analytic Hierarchy Process Model".** *The 28th International Conference on Artificial Life and Robotics. Recommended for expanding publication in the Journal of Advances in Artificial Life Robotics, 2023.*

[3] Hanlin Cai, Jiaqi Hu, Zheng Li, Wei Hong Lim, Mastaneh Mokayef, Chin Hong Wong. **"An IoT Garbage Monitoring System for Effective Garbage Management".** *The 4th International Conference on Computer Engineering, Network, and Intelligent Multimedia (IEEE CENIM), 2022.*

[4] Hanlin Cai, Jiacheng Huang, Yuchen Fang, Shuying Liu, Wenzhuo Fan, Chen Dan, Zhezhuang Xu. **"Detecting Multiple-mix-attack in IoT Networks through Reconstruction and Classification Machine Learning Techniques".** *IEEE Sensors Journal. Under Review, 2024.*

AWARDS & HONOURS

AAAI 2024 Undergraduate Scholars (Only 12 students are selected around the world) *Dec. 2023*
Finalist of China International Internet+ Innovation and Entrepreneurship Competition (**Top 3%**) *Oct. 2023*
Best Technology Award in China National Youth Science Innovation Project Competition (**Top 1%**) *Aug. 2023*
Second Prize in National Collegiate Internet of Things Technology and Application Competition *Aug. 2023*
Finalist Award in International Mathematical Contest in Modeling (**Top 1%** of all 20508 paper) *May 2023*
First Prize in China Contemporary Undergraduate Mathematical Contest in Modeling (Top 5%) *Dec. 2022*
Third Prize in Chinese National College Student Computer Design Competition *Aug. 2022*
Outstanding volunteer in the 44th Session of the World Heritage Committee *July 2021*

SKILLS & SPECIALTY

Language Skills: English (Fluent), Mandarin (Native), Hokkien (Native)
Programming: Python, MATLAB, Java, C++, HTML, CSS, JavaScript, Bash, Markdown, LaTeX
Specialty: Swimming (Reached Chinese national second-level swimming athlete standard; **Championship** of 100-meter freestyle swimming competition of Fuzhou University in *June 2022*)

LEADERSHIP

Department of Volunteer Work, Youth League Committee of Fuzhou University
Deputy President (Mentor: Dr. Yixuan Hu) ***Sep. 2021 – Sep. 2022***

- **Outline:** Managed the planning, operation, and publicity of volunteer service work, and helped mentors to promote the improvement, digitisation and intelligence of volunteer service management.
- **Key Responsibilities:** Organised 39 activities (19 volunteer activities for epidemic prevention and control, 12 for community service, and 8 for environmental protection) with over 890 participants in related activities.
- **Achievement:** Responsible for the publicity work of 17 volunteer activities, with a total of more than 240,000 page views, covering more than 40,000 people. Personal volunteer service time exceeded 240 hours.