

# Quan Cao

Ho Chi Minh City, Vietnam | 📞 (+84) 911809557 | ✉️ Gmail ([quancao.work@gmail.com](mailto:quancao.work@gmail.com)) |  
🌐 Website (<https://trungquancao.io.vn/>) | 🌐 GitHub (<https://github.com/trungquancao>)

## SUMMARY

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Award-winning scholar with honors at the International Science and Engineering Fair (ISEF), Vietnam Science and Engineering Fair (ViSEF), and the National Informatics Olympiad. Passionate about mathematics, physics, and machine learning, with proven leadership in technical projects.

## EDUCATION

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2025 - present Bachelor's Degree at **Ho Chi Minh University of Science** GPA: NA  
2022 - 2025 High School Diploma at **Quang Tri Town High School** GPA: 9.43 (Grade 12)

## EXPERIENCE

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**Summer in Engineering and Applied Sciences (SEAS)** Jul 2025 - Aug 2025

*Participant (selected 43 out of 400 applicants nationwide)*

- Completed an intensive two-week full-day program on Artificial Intelligence and Applications (adapted from the MIT Computer Science undergraduate curriculum).
- Collaborated on a group project applying Machine Learning to flood forecasting in Central Vietnam and presented project findings at the conclusion of the program to mentors and peers.
- Worked directly with mentors from Harvard, MIT, CERN, Stony Brook University, Ericsson Research, UIUC, UC Irvine, VinAI, and other leading institutions.

## PROJECTS

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### Autonomous Wheelchair for Mobility and Communication Assistance for ALS Patients

*Team Project — Project Leader*

- Developed an autonomous wheelchair integrating YOLO11-based eye-tracking and polynomial regression for accurate 97.11% gaze-driven virtual mouse control.
- Engineered dual wheelchair modes—manual joystick emulation and autonomous navigation with SLAM Toolbox and Nav2—achieving 0.12 m path deviation and 93.33% navigation success.
- Built an eye-operated communication system using a fine-tuned Gemma2 model to convert word selections into 3 coherent sentences with speech and Telegram output.

### Translational Gloves for Enhancing Communication of Mute-Deaf People

*Personal Project*

- Designed a bilingual glove-based device with 12 IMUs to recognize sign language gestures with 99% accuracy and convert them into natural speech.
- Implemented a two-way communication system that translates spoken language back into text, enabling interactive dialogue between hearing- and speech-impaired individuals and others.
- Enhanced comprehension by integrating the Gemma2:2B language model to form natural sentences from discrete signs, with bilingual (Vietnamese/English) support and extensible vocabulary.

Applying Machine Learning to Flood Forecasting in Central Vietnam

*Team Project — Project Leader*

- Developed a machine-learning flood forecasting system using the U.S. CAMELS dataset to predict river flows in ungauged basins of central Vietnam.
- Trained a multilayer perceptron on 110,000+ hydrological and climatic samples, achieving accurate streamflow predictions for the Long Dai River despite scarce local data.
- Deployed the model as a real-time web application providing early flood warnings, with planned extensions for satellite data integration and multi-basin coverage.

Smart Home Intrusion Detection and Alert System

*Team Project — Project Leader*

- Built an intelligent security system using Raspberry Pi 4B, USB camera, and OpenCV to detect and recognize family members via facial recognition.
- Integrated CNN-based human and animal detection, infrared motion sensor, and light sensor for real-time monitoring and automated lighting control.
- Implemented an email alert mechanism that sends images of intruders to homeowners when unfamiliar faces are detected, ensuring responsive home security.

LEADERSHIP & ACTIVITIES

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International Science and Engineering Fair   Project Leader	May 2025
Summer in Engineering and Applied Sciences   Project Leader	Jul 2025 – Aug 2025
Google Developer Student Club – HCMUS   AI Specialist	2025 – Present
Outstanding Young Faces of Quang Tri Province	Mar 2025
University Admission Counseling Day   Ambassador	Jan 2024
Nghia Dung Karatedo   First Dan Black Belt in Karatedo	Jun 2022

COMPETITIONS & AWARDS

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• 4th Place – International Science and Engineering Fair – STEM Competition	May 2025
• 1st Place – Vietnam Science and Engineering Fair – STEM Competition	Mar 2025
• 3rd Place – National Youth Informatics Competition – Informatics Olympiad	Aug 2024
• 1st Place – Regional Youth Informatics Competition – Informatics Olympiad	Jul 2024
• 1st Place – Provincial Youth Informatics Competition – Informatics Olympiad	May 2024
• 1st Place – 12th grade Academic Excellence Selection Exams – Physics Olympiad	Dec 2024
• 3rd Place – 12th grade Academic Excellence Selection Exams – Physics Olympiad	Dec 2023
• 2nd Place – Provincial Science and Engineering Fair – STEM Competition	Jan 2025
• 2nd Place – Provincial Science and Engineering Fair – STEM Competition	Jan 2024

LANGUAGES

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Languages: English (fluent, 7.0 IELTS), Vietnamese (native speaker)