# Quan Cao

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## SUMMARY

Participating and winning top awards in several STEM Competitions and Informatics Olympiads during three years of high school, I am deeply committed to using artificial intelligence to improve accessibility and quality of life for people with disabilities. After leading three big projects, I aspire to transform technical innovations into meaningful social impact.

## EDUCATION

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

**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

**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.

## LEADERSHIP & ACTIVITIES

**International Science and Engineering Fair** | Project Leader — May 2025
**Summer in Engineering and Applied Sciences** | Project Leader — Jul 2025 – Aug 2025
**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

- 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 Exellence Selection Exams – Physics Olympiad — Dec 2024
- 3rd Place – 12th grade Academic Exellence 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

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