Cao Trung Quan

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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 building and leading several projects, I aspire to transform technical innovations into meaningful social impact.

EDUCATION

2022 - 2025 High School Diploma at **Quang Tri Town High School** GPA: 9.54 (Grade 12)

EXPERIENCES

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.

Quang Tri Town High School STEM Club Jun 2024 - May 2025

President

- Supported multiple students in developing ideas and research plans to participate in the school-level Science and Engineering Fair.
- Directly contributed to organizing the "2024 STEM and Career Guidance Festival," engaging over 1,000 school students in hands-on product creation and booth exhibitions.
- Organized an inspirational session for younger students following my 4th place achievement at the International Science and Engineering Fair, attracting more than 100 participants.

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 language model to convert word selections into 3 coherent sentences with speech and Telegram output.

Translation Device Supporting Deaf-Mute Individuals in Communication

Personal Project

- Designed a smart glove with 12 IMUs to recognize sign language gestures using the MultiLayer Perceptron model achieving 99% accuracy and converting them into natural language.
- Implemented a two-way communication system that translates spoken language back into text, enabling interactive dialogue between deaf-mute 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
- **Quang Tri Town High School STEM Club** | President — Jun 2024 – May 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
- 2nd Place – Provincial Science and Engineering Fair – STEM Competition — Jan 2025

- 1st Place – 12th grade Academic Exellence Selection Exams – Physics Olympiad — Oct 2024
- 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
- 2nd Place – Provincial Science and Engineering Fair – STEM Competition — Jan 2024

- 3rd Place – 12th grade Academic Exellence Selection Exams – Physics Olympiad — Oct 2023
- 4th Place – Provincial Science and Engineering Fair – STEM Competition — Jan 2023

SKILLS & LANGUAGES

Programming: C/C++, Python
Framework/Tools: PyTorch, TensorFlow, OpenCV, Matlab, Arduino IDE
Embedded Systems: Microcontrollers (Arduino, ESP32, Raspberry Pi)
Languages: English (fluent, 6.5 IELTS), Vietnamese (native speaker)