

# PHAM ANH TUAN

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## EDUCATION

### NATIONAL UNIVERSITY OF SINGAPORE

Singapore

Bachelor of Engineering in Robotics & Machine Intelligence (2<sup>nd</sup> Major: Quantitative Finance, Minor: AI) **August 2025 – May 2029**

**Relevant Coursework:** Calculus, Differential Equations, Linear Algebra, Fundamentals of Robotics, Design and Manufacturing, Fundamentals of Artificial Neural Network, Programming Methodology

**Pre S/U GPA:** 4.9/5.0

### LY TU TRONG HIGH SCHOOL FOR GIFTED STUDENTS

Can Tho, Viet Nam

**Concentration:** Physics. **Graduation GPA:** 9.7/10

**August 2022 – May 2025**

**Leadership:** Class President; Founder & President, Chess Club; Vice President, Mathematics Club

## HONORS & AWARDS

- **Silver Medal**, Singapore Inter-Varsity Chess League, Singapore Inter-Varsity Chess Association **February 2026**
- **4th place**, RoboRoarZ AI Challenge, Singapore University of Technology and Design **January 2026**
- **3 Bronze Medals**, Vietnamese National Championship for Chess Clubs, Vietnam Chess Federation **June 2025**
- **Bronze Medal**, Vietnam National Physics Olympiad (VPhO) **January 2025**
- **3<sup>rd</sup> Prize**, City Contest for Youth & Children Innovation, Vietnam Fund for Supporting Technological Creations **September 2024**

## EXPERIENCE

### HORNET 11.0 ROBOTICS TEAM, NATIONAL UNIVERSITY OF SINGAPORE

Singapore

*Software Individual Contributor*

**September 2025 – Present**

- **Improved object recognition accuracy by 22%** via a **novel automated dataset selection & curation pipeline**.
- Implemented a **real-time stereo camera depth pipeline**, achieving **≤2% error** through rigorous calibration & validation.
- Built a robust **depth estimation system** using **MAD-based background filtering & symmetry correction** to localize 3D objects from partial disparity maps.
- **Reduced ROS2 communication overhead** by designing **custom message types** with **minimal bounding box & class metadata**.

## SELECTED PROJECTS

### HOSPITALITY AI [\[Link to project\]](#)

**January 2026**

- Implemented a **low-latency, multi-stage ML pipeline** using **ResNet-18 & YOLOv8n** for **real-time bed quality inspection**.
- Built **augmentation methods** to handle real-world constraints (occlusions, lighting, partial views), **improving robustness by 67%**.
- **Resolved training plateaus** through **targeted hyperparameter tuning & learning-rate scheduling**.

### REALISTIC AI ASSISTANT [\[Link to project\]](#)

**December 2025**

- Built a **conversational robot** on **ESP32-S3** using **WebSocket** audio streaming, **I2S microphone & amplifier** for **real-time STT/TTS**.
- Engineered **3D-printed animatronic eyes** controlled by a **PCA9685 16-channel PWM driver & custom LCD lip-sync patterns**.
- Coordinated **ESP32-Arduino** state management through **GPIO bit-signaling** for reliable system control.

### WALL-FOLLOWING ROBOT [\[Link to project\]](#)

**November 2025**

- Implemented **autonomous wall-following & maze escape** in **ROS2** using **Heading & Pledge algorithms** with **RANSAC-filtered LiDAR** for robust wall & corner detection.
- Optimized **holonomic drive kinematics** in **Gazebo**, achieving the **fastest course time**, deployed in simulation & real hardware.

## SKILLS

- **Technical experience & interests:** Robotics Perception & Planning, Autonomous Systems, Robotic Simulation & Control
- **Programming languages:** Python, C/C++, HTML/CSS
- **Engineering tools:** ROS, RViz, Gazebo, Linux, Git, MATLAB, LaTeX, Docker, SSH Protocol, Foxglove, PyTorch, YOLO, OpenCV
- **Languages:** Vietnamese (native); English (fluent —IELTS Academic: 8.5)
- **Certifications & qualifications:** SAT: 1540/1600; AP Physics 1: 5/5; AP Physics 2: 5/5
- **Other activities:** 1st Dan Taekwondo black belt; city- and national-level soccer (8 years); piano (7 years); drums (3 years).