

Duc-Anh Pham

AI Research Engineer — Computer Vision & Deep Learning

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SUMMARY

Graduate student at TUAT specializing in **AI, Computer Vision, and Image Processing**. Focused on **lightweight models, quantization-aware training, and inference acceleration** for real-time deployment on **resource-constrained embedded systems**. Experienced in **embedded IoT systems with 4G/5G connectivity and edge computing**.

EDUCATION

Tokyo University of Agriculture and Technology

M.S. in Department of Electrical Engineering and Computer Science

Tokyo, Japan

Aug 2024 - Present

Hanoi University of Science and Technology - School of Electrical and Electronic Engineering

Graduated in Elitech K64 Embedded system and IoT

Hanoi, Vietnam

Aug 2019 - May 2023

PUBLICATION

Dual-Rate Alpha Binary Networks: An Energy-Efficient Optimization Approach for Waste Classification

July 2025

Binary Quantization Project

Python, Pytorch

Authors: Duc Anh Pham and Hironori Nakajo

18th IIAI International Congress on Advanced Applied Informatics (IIAI-AAI 2025), Kitakyushu, Japan, 2025

- Proposed a novel dual-rate binary quantization neural network (DRA-BNN) using **quantization-aware training (QAT)** for real-time waste classification on embedded devices.
- Achieved **89.80% accuracy** on CIFAR-10 with **237M FLOPS**, outperforming ReLU and prior binary networks.
- On a public garbage dataset, reached **82.66% accuracy** at **237.63M FLOPS**, significantly more efficient than ResNet18 (**91.62% at 1820M FLOPS**).

Estimating the Coverage of Multiple Species of Paddy Field Weeds Using Semantic Segmentation

July 2025

Image Segmentation and Classification

Python, Pytorch

Authors: Yusuke Sayou, Duc-Anh Pham, Tetsuya Nakamura, Keisuke Katsura, Taiichiro Ookawa and Hironori Nakajo

18th IIAI International Congress on Advanced Applied Informatics (IIAI-AAI 2025), Kitakyushu, Japan, 2025

- Proposed a semantic segmentation method to estimate weed coverage in rice paddies, classifying into five categories including broadleaf, Cyperaceae, and aquatic plants. Constructed a real-world dataset captured via smartphone with top-down images covering 1 m² per sample.
- Achieved a mean IoU of **0.60** using a single-stage segmentation approach, outperforming multi-stage variants in both accuracy and efficiency.

Navigable Areas Segmentation Method for Unmanned Surface Vehicles in Paddy Fields

Oct 2023

Image Navigation

Python, Pytorch

Authors: Kentaro Machida, Tetsuya Nakamura, Jingyong Cai, Thanh Nguyen-Quang, Duc Anh Pham, Han Huy-Dung, Huy Hoang Nguyen, Taiichiro Ookawa, Hironori Nakajo

2023 IEEE 11th Region 10 Humanitarian Technology Conference (R10-HTC), Rajkot, India, 2023, pp. 1088–1094, doi: 10.1109/R10-HTC57504.2023.10461770

- Developed a segmentation-based navigation system for unmanned surface vehicles operating in flooded paddy fields.
- Achieved **85.2% segmentation accuracy** and enabled a **91% success rate** in autonomous navigation trials.

A novel Violence Detection for Drone Surveillance

May 2023

Image Detection

Python, YOLO

Authors: Huy Hoang Nguyen, Quoc Trung Le, Van Quang Nghiem, Minh Son Hoang, Duc Anh Pham

2023 International Conference on Communication, Circuits, and Systems (IC3S), BHUBANESWAR, India, 2023, pp. 1–6, doi: 10.1109/IC3S57698.2023.10169405

- Built a YOLOv4-based real-time violence detection system for aerial drone footage.
- Achieved **92.3% precision** and **88.7% recall** on a custom surveillance dataset at **18 FPS** on Jetson Nano.

PROJECTS

Student Detection System

Image detection Project

Mar 2022 - May 2022

Python, Keras, OpenCV

- Developed a real time system for human detection
- Utilized YOLOv5 models for bounding box extraction

Sleeping Positions Recognize System

Image segmentation classification Project

June 2022 - Aug 2022

Python, TensorFlow

- Developed a system to recognize 23 human sleeping positions in hospital bed
- Implemented pre-trained ResNet50 and EfficientNetB0

EXPERIENCE

Nakajo Laboratory – Tokyo University of Agriculture and Technology (TUAT)

Graduate student

Tokyo, Japan

Oct 2024 - Present

- Real-time computer vision applications and **edge AI deployment** on resource-constrained hardware (Raspberry Pi, Jetson Nano).
- Research on classification, semantic segmentation, quantization-aware training, and binary neural networks using PyTorch and Keras.
- Data collection, annotation, and processing for agricultural and paddy field applications.

Viettel High Technology Industries Corporation

Embedded/Telecommunications Network Developer

Hanoi, Vietnam

Oct 2023 - Oct 2024

- Research and development of 4G/5G and Mixmode network technologies
- Physical layer development for Downlink transmission process
- Interface development for Mixmode Network chips from Viettel, Intel, Qualcomm, Zilink, Comba
- Created an automated quality testing tool for RRU using Python

EDABK Laboratory – Hanoi University of Science and Technology (HUST)

AI - Embedded Research Student

Hanoi, Vietnam

Apr 2021 - Oct 2023

- Research in Machine Learning, Deep Learning, and CNNs
- Video/Image Processing for human sleep recognition and violence detection using drones
- Development of Embedded OS and RTOS projects

TECHNICAL SKILLS

Programming Languages: Python, C/C++, MATLAB, Shell scripting

Deep Learning Frameworks: PyTorch, TensorFlow, Keras, TensorRT

Libraries & Tools: NumPy, Pandas, Scikit-learn, OpenCV, Git, Docker, ONNX

Embedded & Networking: 4G/5G Physical & Downlink Architecture, Real-Time OS (RTOS), Microcontrollers, Edge Computing

LANGUAGES

- **Vietnamese:** Native
- **English:** IELTS Overall Band 7.5
- **Japanese:** JLPT N3

Mar 2023

July 2024