TRONG DUC NGUYEN

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Research Interests

My research focuses on developing and applying **Foundation Models for Healthcare**. I am particularly interested in leveraging large-scale AI to address critical challenges in **medical imaging and diagnostics**, aiming to build robust and reliable systems for real-world clinical applications.

Education

VinUniversity *Hanoi, Vietnam*
Ph.D. in Computer Science *08/2025 – Present*

- Awarded a full scholarship for the Ph.D. program.
- Research focus on Foundation Models for Healthcare.

Vietnam National University, VNU Hanoi University of Science *Hanoi, Vietnam*
Bachelor of Science in Data Science *09/2021 – 07/2025*

- **GPA:** 3.78/4.0
- **Honors:** Graduated **1st-rank** in Data Science
- **Thesis:** An Efficient Framework for Medical Image Segmentation via Few-Shot Learning and Automatically Generated Pseudo Labels.

Publications

C = Conference, S = Submitted Manuscript

[C1] **Trong Duc Nguyen**, Tien Dung Do, and Thanh Ha Do. Automated Pseudo-Label Generation and Parallel Computing for Enhanced Few-Shot Medical Image Segmentation. *Accepted at the 2024 Asia Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC).* [IEEE Xplore]

[C2] Minh Hieu Vu, The Son Phan, **Trong Duc Nguyen**, Du Tien Du, and Thanh Ha Do. Enhanced Object Detection on Aerial Cityscapes via Augmentation and YOLO Variants. *Accepted at the 2025 IEEE International Conference on Image Processing (ICIP).*

[S1] **Trong Duc Nguyen**, Thanh Ha Do. Query-Guided Support Modulation for Efficient Few-Shot Medical Image Segmentation Without Manual Annotation. *Submitted to Computer Methods and Programs in Biomedicine.* (Manuscript submitted 05/2025).

Research Experience

Computer Vision Lab, VNU Hanoi University of Science (HUS) *Hanoi, Vietnam*
Research Assistant (Advisor: Dr. Thanh Ha Do) *06/2022 – Present*

- Spearheaded research on few-shot learning for medical image segmentation.
- Designed and implemented a segmentation framework combining Superpixel-based Self-supervised Learning for automated pseudo-labeling and a Local Prototype Network to effectively mitigate data scarcity in few-shot settings.

Vietnam Academy of Science and Technology (VAST) *Hanoi, Vietnam*
Research Assistant, Institute of Mathematics *06/2023 – 09/2023*

- Investigated and implemented graph-based algorithms for community detection problems.
- Focused on the application and analysis of various clustering algorithms on social network datasets.

Industry Experience

Apero Technologies Group *Hanoi, Vietnam*
AI Engineer *02/2025 – Present*

- Designed and deployed core generative AI models powering mobile apps with **a collective 10–50 million downloads** on Google Play.
- Integrated multiple model families (Stable Diffusion, face generation, segmentation, object detection) to enable versatile image generation features.
- Developed pipelines combining ControlNet, LoRA, and segmentation models to support prompt-guided and region-conditioned image synthesis.
- Applied quantization and model optimization techniques to achieve efficient deployment on resource-constrained devices.

Military Commercial Joint Stock Bank (MB Bank) *Hanoi, Vietnam*
AI Engineer *06/2024 – 12/2024*

- Built an automated signature extraction and verification pipeline using object detection (YOLO), signature enhancement (CycleGAN), and deep feature matching.
- Developed modules for signature cleaning and forgery detection with emphasis on robustness under noisy document conditions.

Institute of Information Technology, VNU *Hanoi, Vietnam*
AI Engineer Intern *01/2024 – 05/2024*

- Designed lightweight deep learning architectures for human gesture and behavior recognition with stable accuracy across real-time scenarios.
- Combined models with MediaPipe and custom post-processing logic to enhance robustness for smart home IoT integration.

VNU Hanoi University of Science (HUS) *Hanoi, Vietnam*
Teaching Assistant (Linux Operating System Course) *11/2023 – Present*

- Delivered in-lab tutorials, supported assignment grading, and contributed to course material development.
- Guided students on hands-on Linux shell scripting, process management, and system calls.

Awards

- **First Prize, Faculty's Science Conference**, VNU Hanoi University of Science, 2024 (For research on few-shot medical image segmentation)
- **Second Place, Cityscape Aerial image Dataset for Object Detection (CADOT) Challenge**, at the IEEE International Conference on Image Processing (ICIP) 2025
- **NUS Summer Science School Scholarship**, National University of Singapore, 2024
- **National Key Development Program Scholarship in Mathematics**, Vietnam Institute for Advanced Study in Mathematics (VIASM), 2024 (4 Semesters)
- **Scientific Research Scholarship for Potential Students**, Vietnam Academy of Science and Technology (VAST), 2023
- **Excellence in Academic Performance Scholarship**, VNU Hanoi University of Science (VNU-HUS), Awarded in all **8 out of 8 semesters** (2021–2025)
- **Certificate of Merit for Outstanding Academic Performance**, VNU Hanoi University of Science (VNU-HUS), 2022, 2023, 2024
- **Do Quan Scholarship**, VNU Hanoi University of Science, 2023

Skills

- **Programming Languages:** Python, Java, R
- **ML/DL Frameworks:** PyTorch, OpenCV, Pandas, NumPy
- **Deep Learning Concepts:** CNNs, RNNs, GANs, U-Net, Stable Diffusion
- **Developer Tools:** Linux, Git, Docker
- **Languages:** Vietnamese (Native), English (Upper Intermediate)