HOANG ANH HIEP
M.Sc in Information Technology
Field: Computer Vision, Deep Learning, Machine Learning

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○ GitHub Profile
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Personal Statement

"MSc in Computer Vision adept at building and deploying AI models. Seeking an AI Engineer role to leverage my technical skills in a collaborative team environment, where I can develop scalable solutions that directly impact business goals and drive product innovation."

Education

- **Soongsil University, Seoul, South Korea** *Mar 2022 - Feb 2024*

  Master of Science in Information Communication Convergence Technology CGPA: 92.9/100 - 4.11/4.5

  – **Thesis:** "Transformer-based using LiDAR Point Cloud for 3D Object Detection in Autonomous Driving under Occlusion Conditions"; Grant funded by MS and ICT under NRF, South Korea
  – **Advisor:** Prof. Yoo Myung Sik

- **University of Southern California, Los Angeles, USA** *Jul 2020 - Apr 2021*

  Remote Internship

  – **Project:** "Optimized Jumping on Quadruped Robots"
  – **Advisor:** Prof. Quan Nguyen

- **Hanoi University of Science and Technology, Hanoi, Vietnam** *Sep 2015 - Oct 2020*

  Degree of Engineer in Control Engineering and Automation Second Prize Thesis

  – **Thesis:** "Design a wireless embedded system for monitoring and predicting electrical load based on Recurrent Neural Networks"
  – **Advisor:** Prof. Hoang Sy Hong

Work and Research Experience

- **DeltaX Company** *April 2024 - Present*

  AI Researcher in Computer Vision South Korea

  – **Real-time 3D Object Detection for Autonomous Vehicle** ○ Source Code

    * Deployed a real-time 3D object detection system based on two approaches: multi-view camera fusion (image-based) and LiDAR-based detection, achieved robust perception for autonomous driving applications.
    * Research & implementation: FocalFormer3D, BEVFormer, Sparse4D, BEVFusion, ZeroDepth.
    * Developed a multi-threaded inference pipeline, achieving 15+ FPS on HPC and 10+ FPS on a Jetson-quantized model.
    * Designed front-end UI with Godot and implemented C++ inference pipeline for multi-sensor processing on Jetson.
    * Tested and implemented the image-based pipeline on a TI (Texas Instruments) board.
    * Performance optimization: TensorRT integration, mixed-precision training, batch processing, CUDA streams.
    * Dataset: Built our own 3D object detection dataset with Nuscenes style
    * Languages: Python, C++
    * Framework: MMDetection3D, PyTorch, TensorRT, OpenCV, Open3D, CUDA, MMEngine
    * Environment: Ubuntu 22.04, JetPack 5.1.13, CUDA 11.8, Multi-GPU training setup

  – **Real-time Human Intrusion Segmentation** ○ Source Code

    * Developed a real-time human intrusion detection system for smart factories using YOLO-based instance segmentation, processed large-scale camera inputs (up to 30 cameras) at 22-25 FPS.
    * Designed a multi-threading pipeline in C++ for efficient camera streaming, batch inference optimization, and a low-latency Python display buffer

* Implemented a high-performance post-processing module using vectorized NumPy operations (zero loops) for rule-based solution.
* Built a user-friendly PyQT-based UI for monitoring and control.
* Dataset: Built our own instance segmentation dataset with Cityscapes style
* Languages: Python, C++
* Framework: PyTorch, Utralytics, TensorRT, OpenCv, PyQT, and C++/CUDA.
* Environment: ubuntu 22.04.

– <u>**Real-time Panoptic Segmentation for Autonomous Wheelchair**</u>   ⌗ Source Code

* Developed custom Panoptic Segmentation model achieving 65.63 PQ on Seoul dataset and 22.1 FPS real-time performance.
* Implemented multi-backbone support: Swin Transformer, EfficientNetv2, EfficientFormerv2, ConvNeXt with custom Detectron2 framework.
* Built end-to-end production pipeline with Seoul dataset creation, automated labeling tools, and ONNX/TensorRT deployment.
* Optimized edge deployment achieving 4-frame parallel processing and 20 FPS performance on Jetson Orin AGX.
* Dataset: Built our own panoptic segmentation dataset with Cityscapes style.
* Languages: Python, C++
* Framework: Utralytics, Pytorch, TensorRT, Onnx, C++/CUDA
* Environment: Jetson Linux 35.2.1, Jetson Linux 5.1.12
* Edge Device: Jetson Orin AGX, Jetson Xavier NX
* Submitted research documentation for government certification.

– <u>**Real-time Object Detection for Autonomous Wheelchair**</u>   ⌗ Source Code

* Designed a real-time object detection model for an autonomous wheelchair that uses RGB images to detect various objects in real-world scenes.
* Based on deep learning network architecture: DETR, D-Fine, Yolov10...
* Designed multi-threading pipeline which achieved 20 FPS on Jetson Orin.
* Dataset: Built our own object detection dataset with COCO style.
* Languages: Python, C++
* Framework: Yolov8, Pytorch, TensorRT, Onnx, OpenVino
* Environment: Jetson Linux 35.2.1, Jetpack 5.1.12
* Edge Device: Jetson Orin AGX, Jetson Xavier NX
* Submitted research documentation for government certification.

• **ANDA Lab, Soongsil University**   *Mar 2022 - Mar 2024*
Research Assistant in Computer Vision   South Korea

– <u>**3D Object Detection for Autonomous Driving**</u>   ⌗ Source Code

* Developed a 3D Object Detection model for self-driving cars. Using LiDAR point cloud data as input, the model effectively detected traffic objects, including cars, pedestrians, and cyclists within 3D scenes.
* Designed deep learning network architecture: 3D sparse backbone, RPN, Encoder-Decoder, 3D Point Reconstruction, Transformer, etc.
* Dataset: KITTI dataset (*archived the highest rank on KITTI benchmark*), Waymo dataset.
* Languages: Python, C++
* Frameworks: PyTorch, Torchvision, OpenPCDet, Mayavi, Matplotlib, TensorBoard.
* Authored a research paper.

– <u>**Object Tracking for Autonomous Driving**</u>   ⌗ Source Code

* Developed an Object Tracking model for self-driving cars. With input from 2D RGB images, the model analyzed and monitored the trajectory of various objects, such as cars, pedestrians, and cyclists, within real-world traffic scenarios.
* Dataset: KITTI dataset
* Languages: Python, C++
* Frameworks: PyTorch, Torchvision, OpenCV, Matplotlib, TensorBoard.
* Authored a research paper.

– <u>**Crafting a 5-Year Research Proposal for Computer Vision**</u>

* Proposed a comprehensive 5-year research plan in computer vision (Grant funded by MS and ICT under NRF, South Korea).
* Field: Computer Vision, Machine Learning, Deep Learning
* Topic: 3D Panoptic Segmentation, 3D Scene Reconstruction, 4D Panoptic Tracking, 3D Semantic Scene Completion, Global Planning.

- **SETA International**   *Sep 2021 - Feb 2022*
  AI Engineer in Computer Vision   Vietnam

  - **AI Car Damage Assessment Detection**   Source Code

    * Collected and processed raw data from the data center of the client.
    * Built and implemented the model (Mask-RCNN) for car damage detection.
    * Framework: Pytorch, Torchvision, Matplotlib, Tensorboard.
    * Dev Tool: Docker, AWS EC2, Postman,...
    * Deployed and scaled up the system.

- **Dynamic Robotics and Control Lab, University of Southern California**   *Jul 2020 - Apr 2021*
  Remote Research Internship in Robotics   USA

  - **Optimized Jumping on Quadruped Robots**   Source Code

    * Designed a dynamic robot model based on the principles of rigid body dynamics and 3D spatial representation.
    * Developed and implemented a trajectory optimization algorithm in MATLAB, and conducted simulations using ROS and Gazebo to achieve 3D jumping capabilities for a quadruped robot.
    * Languages: Python, C++, Matlab.
    * Framework: Matlab, ROS, Gazebo.
    * Environment: Ubuntu 16.04, Ubuntu 18.04.

- **Mandevices Lab, Hanoi University of Science and Technology**   *2017 - 2020*
  Research Assistant in Computer Vision and Robotics   Vietnam

  - **Facial Recognition**   Source Code

    * Built a real-time human face recognition system, distinguishing different human faces.
    * Deployed MTCNN neural network using Keras on Raspberry Pi.
    * Framework: Tensorflow, Keras, MTCNN.
    * Languages: Python.

  - **Traffic Vehicle Recognition**   Source Code

    * Built a real-time vehicle recognition system in traffic: cars, pedestrians, cyclists, etc.
    * Deployed deep neural network based on Yolo v3.
    * Framework: Tensorflow, Keras, Yolo3.
    * Languages: Python.

TECHNICAL SKILLS AND INTERESTS

Programing Languages: Python, C/C++, Matlab, C#.
Libraries : OpenCV, Open3D, Scikit-Image, Pillow, Matplotlib, Mayavi, TorchVision, Wandb, Tensorboard.
Dev Tools: VScode, Git, Github, Docker, Pycharm, Spyder, Jupiter.
Frameworks: Tensorflow, Pytorch, Keras, Mxnet, Detection2, OpenPCDet.
Relevent Coursework: Design and Analysis of Algorithms, Operating Systems, Object Oriented Programming, Database Management System, Software Engineering, System Design, Linux/Ubuntu, NVIDIA Cuda Toolkit.
Areas of Interest: Computer Vision, 3D Object Detection, Vision Robotic.
Soft Skills: Problem Solving, Self-learning, Presentation, Adaptability, Team Working.
Languages:Vietnamese (Native), English (Intermediate - equivalent to IELTS 6.5), Korean (Basic).

PUBLICATION

- **IEEE Sensors Journal**   *Ranking: Q1, IF: 4.325*   Publication
  - Title: TSSTDet: Transformation-based 3-D Object Detection via Spatial Shape Transformer
  - Author: First author.
  - Field: Computer Vision, 3D Object Detection, Deep Learning, Machine Learning, Autonomous Vehicle.
  - Date of Publication: 12 January 2024.
  - *archived the top rank on the KITTI benchmark at release

- **IEEE Sensors Journal**   *Ranking: Q1, IF: 4.325*   Publication
  - Title: 3ONet: 3-D Detector for Occluded Object Under Obstructed Conditions.
  - Author: First author.
  - Field: Computer Vision, 3D Object Detection, Deep Learning, Machine Learning, Autonomous Vehicle.
  - Date of Publication: 13 July 2023.
  - *archived the top rank on the KITTI benchmark at release

- **IEEE Access**   *Ranking: Q1, IF: 3.4*   Publication
  - Title: AFMtrack: Attention-Based Feature Matching for Multiple Object Tracking.
  - Author: Second author.
  - Field: Computer Vision, Object Tracking, Deep Learning, Machine Learning, Autonomous Vehicle.
  - Date of Publication: 10 June 2024.

- **Machine Vision and Applications Journal**   *Ranking: Q2, IF: 2.983*   Publication
  - Title: CAMTrack: a combined appearance-motion method for multiple-object tracking.
  - Author: Second author.
  - Field: Computer Vision, 3D Object Detection, Deep Learning, Machine Learning, Autonomous Vehicle.
  - Date of Publication: 07 May 2024.

- **KICS Conference**   Publication
  - Title: Shape Aware for 3D Object Detection using LiDAR Point Cloud.
  - Author: First author.
  - Field: Computer Vision, 3D Object Detection, Deep Learning, Machine Learning, Autonomous Vehicle.
  - Date of Publication: 16 June 2023.

- **ICOIN Conference**   Publication
  - Title: ESSDet: Enhancing Spatial Shape for 3-D Object Detection.
  - Author: First author.
  - Field: Computer Vision, 3D Object Detection, Deep Learning, Machine Learning, Autonomous Vehicle.
  - Date of Publication: 03 July 2024.

CERTIFICATE

• **English**	TOEIC-745, IELTS 7.0 (Target)
• **C++**	Sololearn
• **Python Core**	Sololearn
• **Machine Learning**	Sololearn
• **Machine Learning with Python**	IBM
• **Introduction to Self-Driving Cars**	University of Toronto
• **Neural Networks and Deep Learning**	DeepLearning.AI
• **Deep Neural Networks with PyTorch**	IBM
• **Visual Perception for Self-Driving Cars**	University of Toronto

REFERENCE

- **Prof. Yoo Myung Sik**, Full Professor of Department of Electronic Engineering - Soongsil University, Seoul; myoo@ssu.ac.kr; scholarworks.bwise.kr/ssu/researcher-profile?ep=1064

- **Prof. Hoang Sy Hong**, Vice President of School of Electrical Engineering – Hanoi University of Science and Technology; hong.hoangsy@hust.edu.vn; (+84)9 3450 6261