

Hoang Khoi Do

PhD Student | Computer Science | Trinity College Dublin

+353 894719603 dokh@tcd.ie Dublin, Ireland
in /hoangkhoido github.com/KhoiDOO x.com/Kohido

About

AI Research Scientist and Engineer with 4+ years of experience researching practical AI solutions for service-oriented platforms. Skilled in researching AI innovations, building, and optimizing AI systems and workflow. PhD Student at Trinity College of Dublin about "Language3D: Creating Editable 3D Content from Deep Language Understanding for 3D-First Digital Platforms" led by Dr. Binh-Son Hua.

Areas of Chasing

Foundation: Diffusion and Score-based generative model, Generative Adversarial Network

DownStream: Text-to-Image Generation, Unconditional Image Generation, 3D Content Generation

Professional Experience

AI Research Scientist & AI Engineer (*Gotit - ScanIt Vietnam*) (*DayOne*) **Hanoi, Vietnam** 06/2023 - 06/2024

- Contributing to receipt information extraction system (~2000 receipts/seconds, 65% automation rate).
- Researching **Large Language Model** for extracting main information from documents.
- Researching AI model to continually detect new receipt types fed into the system **without training**.
- Building an AI model to classify the type of receipt (**50** categories).
- Building an AI model to detect spam receipts from the receipt image which contains **many documents inside**.

AI Research Scientist & AI Engineer (*TrueID - VNG Corporation*) **Hanoi, Vietnam** 11/2022 - 11/2023

- Building an AI model to automatically extract, normalize, and detect tables from PDF commitment.
- Building an AI model for fraud document detection.
- Building an AI model to classify document types (**12** document domains, which contain ~5 categories each).
- Win FPT AI and Viettel AI in bidding on the document information extraction package (~\$1M) from Asia Commercial Bank.

AI Engineer (*BENIT PTY LTD*) **Hanoi, Vietnam** 1/2020 - 7/2021

- Analyzing the market, stock, and hypothesis, creating a portfolio, and building a trading data database.
- Creating a speech-to-text neural network and deploying it to a streaming server.
- Designing and creating database architecture for voice and text storage.

Software Engineer (*ADT Creative - ADT Group*) **Hanoi, Vietnam** 7/2019 - 9/2020

- Researching and creating AR/VR/MR applications and games.
- Researching and developing motion-tracking applications and games.

Education

PhD Student *School of Computer Science and Statistics, Trinity College of Dublin* **Dublin, Ireland** 2024-2028

- Program: Doctor in Philosophy, Computer Science (Full-Time).
- Research Grant: Language3D: Creating Editable 3D Content from Deep Language Understanding for 3D-First Digital Platforms led by Dr. Binh-Son Hua.

Bachelor of Science *Hanoi University of Science and Technology* **Hanoi, Vietnam** 2020-2024

- Program: Advanced Electronics and Telecommunication (Full-Time English Program) - GPA: 3.28.
- Relevant Courses: Multivariate Calculus, Linear Algebra, Probabilistic Theory, and Information Theory.

Undergrad. Research Leader *BioSignal and Image analysis - ScaleMind* **Hanoi, Vietnam** 12/2021 - 09/2024

- Teams management (**7** teams, **22** members).
- Constructing team workflow, research orientation, and project conduction (**5** publications, **8** projects).
- Knowledge enhancement and seminars organization.

- Teaching 50% proportion of a Machine Learning course, led by Prof. Viet Dung Nguyen. Main topics: Linear/Logistic Regression, Deep Neural Networks, CNNs, Time-series models, Attention mechanism, and Generative AI, where all topics are investigated mathematically.
- Teaching 2/16 lessons of an Information Theory course, led by Prof. Tien Hoa Nguyen. The lessons' topics are Distribution Divergence and Circular Encoding.
- Teaching 4/16 lessons of a Technical Writing course focussing on how to write a good paper, led by Prof Tien Hoa Nguyen.

Reference

- [Assoc. Prof. Binh Son Hua](#) - [✉](#) - School of **Computer Science** and **Statistics**, Trinity College **Dublin**
- [Assoc. Prof. Nguyen Hoang Tran](#) - [✉](#) - School of **Computer Science**, the University of **Sydney**
- [Assoc. Prof. Long Tran-Thanh](#) - [✉](#) - Department of **Computer Science**, University of **Warwick**
- [Assoc. Prof. Quoc-Viet Pham](#) - [✉](#) - School of **Computer Science** and **Statistics**, Trinity College **Dublin**
- [Assoc. Prof. Tien-Hoa Nguyen](#) - [✉](#) - School of **Electrical** and **Electronics** Engineering, HUST.
- [Assoc. Prof. Viet-Dung Nguyen](#) - [✉](#) - School of **Electrical** and **Electronics** Engineering, HUST.

Publications

- [🔗](#), [📄](#). **H. K. Do**, T. Quynh Dinh, M. D. Nguyen and T. Hoa Nguyen, "Semantic Communication for Partial Observation Multi-agent Reinforcement Learning," 2023 IEEE Statistical Signal Processing Workshop (SSP), Hanoi, Vietnam, 2023, pp. 319-323, doi: 10.1109/SSP53291.2023.10207979.
- [🔗](#). Nguyen, TB., **Do, HK.**, Nguyen, MD., Nguyen, TH. (2023). Personal Federated Learning via Momentum Target with Self-Improvement. In: Nguyen, T.D.L., Verdú, E., Le, A.N., Ganzha, M. (eds) Intelligent Systems and Networks. ICISN 2023. Lecture Notes in Networks and Systems, vol 752. Springer, Singapore.
- [🔗](#). V. D. Nguyen, M. P. Luong and **H. K. Do**, "Endoscopic Image Classification using Block-based Color Feature Descriptors," 2022 RIVF International Conference on Computing and Communication Technologies (RIVF), Ho Chi Minh City, Vietnam, 2022, pp. 214-219.
- [🔗](#). Nguyen, V.D., Trinh, H.N., **Do, H.K.** (2024). Block-Based Texture Features for Chromoendoscopy Classification. In: Vo, V.T., Nguyen, TH., Vong, B.L., Le, N.B., Nguyen, T.Q. (eds) 9th International Conference on the Development of Biomedical Engineering in Vietnam. BME 2022. IFMBE Proceedings, vol 95. Springer, Cham.
- [🔗](#), [📄](#). Nguyen, V.D.; Bui, N.D.; **Do, H.K.** Skin Lesion Classification on Imbalanced Data Using Deep Learning with Soft Attention. Sensors 2022, 22, 7530.

Manuscripts

- [🔗](#), [📄](#). **Do, K.**, Nguyen, D., Tran, N. H., & Nguyen, V. D. (2024). PAT: Pixel-wise Adaptive Training for Long-tailed Segmentation.
- [🔗](#), [📄](#). **Do, K.**, Nguyen, D., Nguyen, H., Tran-Thanh, L., Tran, N.-H., & Pham, Q.-V. (2024). Revisiting LARS for Large Batch Training Generalization of Neural Networks.

Honors & Awards

- 1st Prize Award - 41th Student Research Conference (May. 2024) - [PAT: Pixel-wise Adaptive Training for Long-tailed Segmentation](#)
- Top 4 finalists - National Student Research Competition (Aug. 2023) - [Skin Lesion Classification On Imbalanced Data Using Deep Learning With Soft Attention](#)
- 1st Prize Award - 40th Student Research Conference (May. 2023) - [Skin Lesion Classification On Imbalanced Data Using Deep Learning With Soft Attention](#)

- Finalist - Intel International Science Engineering Fair (2020) - [Virtual Laboratory - Product Video](#)
- 1st Prize Award - Intel Vietnam Science Engineering Fair (2019) - [Virtual Laboratory](#)

Online Courses & Tutorials

- [CS229 Machine Learning](#) - Andrew Ng - [Stanford|ONLINE](#)
- [CS236: Deep Generative Models](#) - Stefano Ermon - [Stanford|ONLINE](#)
- [Diffusion and Score-Based Generative Models](#) - Yang Song - [MIT Center for Brains, Minds, and Machine](#)

Certifications

See more at [Certificate Gallery](#)

- [Build Better Generative Adversarial Networks \(GANs\)](#) (Mar. 2023) - [DeepLearning.AI](#)
- [Apply Generative Adversarial Networks \(GANs\)](#) (Jan. 2023) - [DeepLearning.AI](#)
- [TensorFlow: Advanced Techniques](#) (Jan. 2022) - [DeepLearning.AI](#)
- [TensorFlow Developer Certificate](#) (Oct. 2021) - [TensorFlow](#)

Skills

- **AI/DL/ML:** Pytorch, Pytorch Lightning, Pytorch Metrics, Accelerator, Tensorflow, Scikit-learn, Scipy
- **Data/Matrix:** Pandas, Numpy
- **Database:** SQL, MongoDB.
- **Version Control:** GitLab, GitHub
- **Soft Skills:** Presentation, Planning, Organized, Teamwork, Active Listening.

Languages

- **Vietnamese** [Native]
- **English** [Second Language] - [IELTS 7.0](#)

Appendix | Generative Research Projects

- Leader - Implementer** [DogFusion: Dog Image Generation via Diffusion Model and Classifier-free Guidance](#) 2024
- **Description:** Training DDPM with CFG for Dog Image Generation.
- Leader - Implementer** [NerLightning - Simple NERF Archive](#) 2024
- **Description:** Benchmark repo for NERF - Neural Radiance Field.

Appendix | Projects - BioSignal and Image Analysis - ScaleMind

- Leader - Implementer** [PAT: Pixel-wise Adaptive Training for Long-tailed Segmentation](#) 2023 - 2024
- **Description:** Loss function for tackling long-tailed segmentation via weighting. Proposing an adaptive function with better performance and lower computation cost.
 - **Collaborators:** Minh Duong Nguyen, Nguyen Hoang Tran, Viet Dung Nguyen.
- Leader - Implementer** [Revisiting LARS for Large Batch Training Generalization of Neural Networks](#) 2023 - 2024
- **Description:** Analysis of the unstable learning curve of LARS and LAMB optimizer with and without warming up, thus identifying the underlying issues from sharp minimizer. Proposing a simple yet effective loss function to tackle the issues.
 - **Collaborators:** Minh Duong Nguyen, Nguyen Hoang Tran, Long Tran Thanh, Tien Hoa Nguyen, Quoc Viet Pham.
- Member** [Which layers should undergo personalization in Federated Learning?](#) 2023 - 2024
- **Description:** Proposing a novel algorithm for optimizing the Federated Learning system via layer-wise optimization.
 - **Collaborators:** Nam Khanh Le (Leader), Minh Duong Nguyen, Nguyen Hoang Tran.
- Leader** [Revisiting the Disequilibrium Issues in Tackling Heart Disease Classification Tasks](#) 2022 - 2024
- **Description:** Proposing a novel feature extraction method for balancing the contribution of ECG signal's leads and a novel loss function for balancing gradient magnitude under a long-tailed dataset.
 - **Collaborators:** Minh Thao Hoang, Phuong Linh Nguyen, Minh Duong Nguyen, Viet Dung Nguyen.
- Leader** [How Homogenizing the Channel-wise Magnitude Can Enhance EEG Classification Model?](#) 2022 - 2024
- **Description:** Proposing a novel feature extraction method for balancing the contribution of EEG signal's leads, based on heatmap interpolation and edge detection algorithm.
 - **Collaborators:** Anh Huyen Ngo, Minh Duong Nguyen, Viet Dung Nguyen.
- Leader - Implementor** [Language Driven Object Grasping via Feature Augmentation](#) 2024
- **Description:** Designing and implementing a multi-modal model whose inputs are text and image with the output being the object's bounding box that the robot needs to grasp.
- Leader - Implementor** [AtomEst: ML Atomization Energy Estimation](#) 2024
- **Description:** Designing and implementing a benchmark repo to compare performance between Machine Learning models and Attention-based Graph Neural Networks on estimating Atomization Energy.
- Leader - Implementor** [MTLDOG - Domain Generalization for Multi-Task Learning](#) 2024
- **Description:** A Benchmark repo for analyzing the performance of model and optimization algorithm for Multi-task Learning under Multi-domain scenarios.
 - **Collaborators:** Nam Khanh Le, Minh Duong Nguyen
- Leader - Implementor** [MTLA - Multi-Task Learning Archive](#) 2023 - 2024
- **Description:** A Benchmark repo for analyzing the performance of model and optimization algorithm for Multi-task Learning.
 - **Collaborators:** Minh Duong Nguyen.
- Leader - Implementor** [SOME - Shared Online Multi-agent Knowledge Exchange](#) 2023 - 2024
- **Description:** An algorithm for a Multi-agent Reinforcement Learning system, where agents face partial observation and tackle by predicting the future actions of others.
 - **Collaborators:** Minh Duong Nguyen.
- Leader - Implementor** [DecodeltAll](#) 2023 - 2024
- **Description:** A sandbox for practicing implementing encoder-decoder from scratch across various domains and applications.
 - **Collaborators:** Tat Chuyen Mai, Nguyen Duong Nguyen Nhat, Khanh Ly Trinh, Thanh Huyen Dang, Quynh Trang Ong.
- Leader - Implementor** [SORT-AACA - Sorting Algorithms: A Comparative Analysis](#) 2023
- **Description:** Implementations of TimSort (Python's default sorting algorithm) and IntroSort.
- Leader - Implementor** [Skin Lesion Classification On Imbalanced Data Using DL With Soft Attention](#) 2022
- **Description:** Proposing a multi-modal model whose input is patient metadata (i.e. age, gender, capturing localization) and dermoscopy image to classify skin lesions. Proposing using heuristic loss function to tackle the long-tailed issue in the dataset.
 - **Collaborators:** Viet Dung Nguyen.
- Leader - Implementor** [ChromoEndoscopy Disease Classification](#) 2022

- **Description:** Proposing using Feature Descriptors and Bag-of-Visual-Word as feature extraction for Machine Learning models to increase the model performance.

- **Collaborators:** Viet Dung Nguyen.

Leader - Implementor *Image Processing/Filter Scratch Implementation*

2022

- **Description:** Implementations of various image processing and filters.