HONG-HANH NGUYEN-LE

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RESEARCH INTEREST

Deepfake Detection, Adversarial Machine Learning, Security AI, Adaptive Learning

EDUCATION

Ph.D in Computer Science **University College Dublin, Ireland** *Sep 2023 - Expected Sep 2027*

- Supervised by Assoc. Prof. Nhien-An Le-Khac
- Research Topic: Generalized Deepfake Detection

BSc Computer Science **Ho Chi Minh City University of Science (HCMUS), Vietnam**

Honors Program *2016 - 2020*

- GPA: 3.6/4.00, top 1% of the the faculty
- Thesis project: *Visual Object Segmentation with Attention on Enhanced Reference*
- Thesis grade: 4.0/4.0

RESEARCH EXPERIENCE

Research Assistant **Hanoi, Vietnam**

VinUni-Illinois Smart Health Center (VISHC) *Dec 2021 - Jun 2022*

Motion Analiysis for Cerebral Palsy Children project: The project objective is to focus on developing a deep-learning-based framework to give an assessment of the disease level of children with cerebral palsy based on analyzing human pose's motion

- Analyzed three public datasets and evaluated them by developing models
- Participated in collecting real datasets in VinMec hospital

Physical Rehabilitation Assessment project: The project's goal is to provide an automated assessment of the quality of physical rehabilitation exercises

- Proposed the learning strategy based on videos alignment between patients' and experts' video using self-supervised learning
- Proposed a deep-learning-based framework for physical rehabilitation assessment and evaluate the performance on two public dataset

Student Research **HoChiMinh, Vietnam**

Knowledge Technology Department, HoChiMinh City University of Science *May 2019 - current*

Supervised by **Associate Professor. Dinh-Thuc Nguyen**

Privacy-preserving for Speaker Recognition project:

- Conduct literature review for Voice-based Cancellable Biometrics
- Train wav2vec2 to extract binary embedding vectors for cryptographic systems
- Conduct experiments on proposed loss function for privacy-preserving guarantees

Customers Counting project: The project focuses on counting predicting and countinng number of customers going in and out stores

- Studied state-of-the-art models for object detection task and compared them in terms of accuracy rate and speed
- Built a system that automatically extracts ROI areas out of IP Camera Interface using OpenCV.
- Designed and built an application connected to PostgreSQL to draw lines for videos using Python, OpenCV library and DBeaver-tool.
- Integrated detection model into tracking model for people counting task and conducted an experiment on real dataset.
- Detected 94/150 real cameras with the accuracy rate more than 85%.

Student Research **HoChiMinh, Vietnam**

Software Engineering Lab, HoChiMinh City University of Science *2018 - current*

Encoding Word Order in Complex Embeddings [Report]:

- Analyzed three positional encoding methods: Vanilla Position Embedding (VPE), Trigonometric Position Embedding (TPE), and Complex Positional Encoding (CPE)
- Re-implemented Transformer using for Translation
- Applied and experimented these different positional encoding methods on the IWSLT'15 English-Vietnamese dataset.
- Result: Achieve 0.154 (TPE), 0.17 (CPE) and 0.216 (VPE) on BLEU score.

Visual Object Segmentation with Attention on Enhanced Reference

BSc Thesis

Supervised by **[Prof. Minh-Triet Tran]** and **[Prof. Minh Do]**

- For semi-supervised video object segmentation problem, proposed 03 additional components as part of the inference process: Memory Augmentation module, Guided Segmentation module, multi-pass approach.
- For Few-shot segmentation problem, proposed attentive reference to evaluate the correspondence between features of the query and reference images.
- Achieve:
  - Rank 6 in the Semi-supervised track with 0.733 (J -score) and 0.787 (F-score)
  - Published one academic paper [1]
  - Few-shot segmentation problem: show empirically that our modification has minor effect on the result

TEACHING EXPERIENCE

Teaching Assistant **Dublin, Ireland**
Forensic Computing and Cybercrime Investigation (FCCI) *Sep 2023 - present*

1. COMP47470: Data and Database Forensics
   - Program: MSc in Forensics Computing and Cybercrime Investigation
   - Semester: Fall 2023, Fall 2024
   - Responsibilities:
     - Delivering lectures on data forensics: Introduction to NLP for Digital Forensics, LLM-generated Text Detection Introduction
     - Providing technical support to students
     - Grading assignments
     - Reviewing and providing feedback on assignments
2. COMP47510: Financial Investigation Techniques
   - Program: MSc in Forensics Computing and Cybercrime Investigation
   - Semester: Spring 2023, Spring 2024
3. COMP40160: Research Project
   - Program: MSc in Forensics Computing and Cybercrime Investigation
   - Semester: Summer 2023
   - Responsibilities:
     - Supervising Master students' research projects
     - Providing reach and technical guidance
     - Reviewing and providing feedback on research proposals and final reports
   - Achievements:
     - 2023: Supervised a student who got A+ for the Master's thesis and published a paper at a TrustCom conference (Rnak B).
     - 2023: Supervised a student who got B+ for the Master's thesis.

Teaching Assistant **Dublin, Ireland**
School of Computer Science, University College Dublin *Sep 2024 - present*

1. Module: COMP30030 - Introduciton to AI
   - Semester: Fall 2024
   - Responsibilities:
     - Supporting practical lab sessions

Teaching Assistant **Ho Chi Minh, Vietnam**
Medical Statistics and Informatics Department, Pham Ngoc Thach University of Medicine *Nov 2022 - Aug 2023*
- Three courses: "Basic Informatics", "Applied Medical Statistics", "Introduction to Python"

Teaching Assistant **Ho Chi Minh, Vietnam**
Information Technology Department, Ho Chi Minh City University of Science (HCMUS) *Jul 2022 - Jul 2023*
- Two courses: "Introduction to cryptography" and "Applied Mathematics and Statistics"

HONORS AND AWARDS

1st UCC AI Quest **2023**
- Organized by University College Cork and CRT AI
- Achievement: Achieved €5000 from the 1st UCC AI Quest Challenge for the topic 'Semantic segmentation for vegetation recognition in satellite images'

Vietnam Summer School of Science (VSSS) Scholarship, Rencontres du Vietnam Foundation **2022**
- Full tuition fee and stipend in 4 days for top 150 scholars (based on academic excellent performance and research activities) selected from more than 1400 students across Vietnam
- Achieved a runner-up prize in the Science-A-Thon Challenge in VSSS09

The Vingroup Innovation Foundation (VINIF) Scholarship, Domestic Post-Graduate Scholarship Program **2020**
- Full tuition fee and stipend for top 150 excellent scholars (based on academic performance and research activities) selected from 640 students across Vietnam in 17 different areas of study

Honda Scholarship **2020**
- Selected as one of 103 scholars (based on academic performance and extracurricular activities) from 813 students across Vietnam

Exceptional Academic Achievement, Top 1% out of 680 students of Faculty of Information Technology, HCMUS **2018 - 2020**

Research Workshop in Computing, NUS School of Computing **2019**
- Full tuition fee and stipend of the workshop for students in 3 days

1st Prize in Thach Thuc, Academic competition organized by Faculty of Information Technology, VNU-HCMUS **2019**

1st Prize in Makerthon, Technology product creation contest organized by Ho Chi Minh City Communist Youth Union **2018**

2nd Prize in Hau Due Pascal, Academic Competition of Faculty of Technology, VNU-HCMUT **2018**

Odon Vallet Scholarship, excellent high school students **2015**
- Awarded by Professor Odon Vallet, France's Sorbonne University, France

1st national prize in Vietnam National Secondary Student Science and Engineering Competition **2015 - 2016**

SKILLS

Languages Vietnamese (*native*), English
Tools C++, Python, git, PyTorch, LaTeX

PUBLICATIONS

2024

[1] Nguyen-Le, H. H., Tran, V. T., Nguyen, D. T., & Le-Khac, N. A. (2024, June). D-CAPTCHA++: A Study of Resilience of Deepfake CAPTCHA under Transferable Imperceptible Adversarial Attack. In 2024 International Joint Conference on Neural Networks (IJCNN) (pp. 1-8). IEEE.

[2] Nguyen-Le, H. H., Tran, L., Nguyen, D. S. A., Le-Khac, N. A., & Nguyen, T. (2024). Privacy-preserving speaker verification system using Ranking-of-Element hashing. Pattern Recognition, 111107.

[3] Nguyen-Le, H. H., Tran, V. T., Nguyen, D. T., & Le-Khac, N. A. (2024). Deepfake Generation and Proactive Deepfake Defense: A Comprehensive Survey. Authorea Preprints.