

H. T. Duong Vu

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PROFESSIONAL INTERESTS

My research interests lie at the intersection of affective computing, psychological theory, and interpretable machine learning for mental health. I am particularly interested in modeling emotional and cognitive states from multimodal behavioral and physiological data, while grounding computational representations in established psychological and neuroscientific frameworks. My work emphasizes understanding *why* models make decisions, and how these computational decision mechanisms relate to the way individuals perceive, reason, and make decisions in real-world contexts.

Current Research Focus: Bridging affective computing, digital phenotyping, and decision-theoretic machine learning to support the assessment and monitoring of mental health conditions. I focus on interpretable, theory-informed models that capture feature relevance and interactions, with the goal of developing scalable and clinically meaningful tools that reflect human decision processes, especially in low-resource and real-world settings.

EDUCATION

Sorbonne Université

BSc in Computer Science

Paris, France

2021 – 2024

- Research project: Prioritized Memories Activation (Chair: Engineer, PhD. Olivier SIGAUD)
- Project: Pen-based recognition of handwritten digits (Chair: Prof. Christophe MARSALA)
- Project: Interpreting MAP Decisions Through Feature Interactions (Chair: Assistant Prof. Pierre-Henri WUILLEMIN)

WORK EXPERIENCE

VinUniversity x VNU HCMIU

Tech-member

Vietnam

Oct 2025 – Jul 2026

- **Project “CBT”:** *“Neuroplasticity Tracking During Intervention For Depression and Anxiety: A Longitudinal, Cognitive-guided Digital Phenotyping Study”*. **External Funding:** IBRO/Wellcome. **Duration:** Oct-2025 - Jul 2026. **My Role:** Tech-member, UX/UI Lead.
 - * **Collaboration:** VinUniversity, HCMIU, RMIT VN, Nguyen Tri Phuong Hospital, Menthy Clinic, HYPPO Clinic.
 - * **Responsibilities:** Led the UX/UI development of a mobile digital CBT platform and conducted a 4.5-month longitudinal study (n=60) on Vietnamese mental health patients to investigate neuroplasticity changes during intervention.
 - * **Expected Outcomes:** 01 conference paper (Jul’26), 01 journal paper (Sep’26).

College of Engineering & Computer Science

Research Assistant (Advisor: Assistant Prof. Hieu PHAM)

Hanoi, Vietnam

Oct 2025 – Jan 2026

- **Project “NEURAI”:** *“Developing and Implementing Digital Mental Health Assessment Tools in Low-Resource Settings”*. **Funder:** VISHC. **Duration:** Apr - Dec 2025. **My Role:** Project Execution.
 - * **Collaboration:** VinUniversity, VNU HCMIU, RMIT Vietnam, Nguyen Tri Phuong Hospital, Menthy Clinics.
 - * **Responsibilities:** Developed a mobile application for multimodal digital phenotype acquisition; designed data engineering pipelines for synchronizing, cleaning, and structuring physiological, behavioral, and self-report data; implemented data modeling and feature extraction to support downstream statistical analysis and machine learning; conducted short-term data collection with Vietnamese mental health patients (15 days, n=100).
 - * **Expected Outcomes:** 01 journal paper (submit Feb’26)

- **Project:** “MemoCare: AI-Powered Cognitive Screening App for Early Dementia Detection”. **My Role:** Project Execution.

- * **Responsibility:** Developed multimodal NLP and computer vision models to evaluate a digitalized MMSE (Mini-Mental State Examination), extracting linguistic, behavioral, and visual cues from user interactions. Conducted statistical evaluation and inferential analysis to validate model outputs against clinical MMSE scores and assess reliability, sensitivity, and feature relevance.

- * **Research progress:** Project under technical development for data collection (Feb'26)

Computer Science Laboratory – LIP6, UMR 7606, CNRS

Research Assistant (Advisor: Prof. Christophe MARSALA)

Paris, France

Apr 2025 – Jul 2025

- **Project:** “Entropic Regularization Schemes for Learning Fuzzy Similarity Measures Based on the d -Choquet Integral”. **My Role:** Project Execution.

- * **Responsibilities:** Reimplemented and extended existing fuzzy KNN methods based on the Choquet integral; developed regularized fuzzy similarity models to improve stability and interpretability; analyzed feature relevance and interactions to support informed feature selection in classification tasks.

Paris Brain Institute

Research Assistant (Advisor: Clinician, MD, PhD, PH. Agustí ALENTORN)

Paris, France

Dec 2024 – Apr 2025

- **Project:** “Clinical Neural Style Transfer for Tumor Staining with Stable Diffusion Models”. **My Role:** Project Execution.

- * **Responsibilities:** Developed and evaluated neural style transfer pipelines for histopathology images using diffusion-based generative models; adapted Stable Diffusion frameworks to translate tumor staining styles while preserving underlying tissue structure; conducted qualitative and quantitative analysis to assess clinical plausibility and consistency of generated images.

AWARDS

- [Nov 2020] National Creative Youth Award 2020; by Communist Youth Union Central Committee.
- [Nov 2019] Awarded 3rd prize in Junior Technological Intervention; by Vietnam Union of Science and Technology Associations (VUSTA).

PUBLICATION

Scientific Report

- [R.1] Chaval et al. (2025, June), Feeling Machines: Ethics, Culture, and the Rise of Emotional AI. [\[link\]](#)

ACADEMIC ACTIVITIES

School Projects

- [Winter 2024] Contract Management System Using Apache Spark
 - Built a distributed contract management application using Apache Spark with Scala and SBT, supporting automated processing at scale.
 - Designed and implemented a custom XML-to-JSON parsing pipeline to improve data ingestion efficiency and schema consistency.
 - **Achievement:** Ranked 1st in the 2024 cohort for the *Cloud Data Management* module based on final project evaluation.
- [Summer 2024] Prioritized Memory Activation @ Sorbonne Université
 - Designed and implemented an efficient reinforcement learning algorithm inspired by computational neuroscience models of memory prioritization and activation.
 - **Achievement:** Ranked 1st in the 2024 cohort for the *Introduction to Research* module based on final project evaluation.

- **[Summer 2024]** Pen-Based Handwritten Digit Recognition @ Sorbonne Université
 - Implemented a pen-based handwritten digit recognition system from scratch using the MNIST dataset, covering data preprocessing, feature extraction, and evaluation.
 - Manually implemented and compared supervised and unsupervised learning algorithms, including KNN, Perceptron, Decision Trees, and their variants, without relying on external ML libraries.
 - **Achievement:** Final project scored 20/20, ranking in the top 5% of the course cohort.
- **[Winter 2023]** Interpreting MAP Decisions Through Feature Interactions @ Sorbonne Université
 - Designed a simulation framework with controlled synthetic data to study Maximum A Posteriori (MAP) classification and inferential statistics principles.
 - Extended the core framework to analyze feature relevance and feature interactions in MAP decision-making.
 - **Achievement:** Completed an extended project component and mentored a peer in the same cohort on the methodology and implementation.

SELECTED SKILLS

- **Programming:** Python, C/C++, Java, SQL, Bash/Linux, Assembly, Scala, OCaml
- **Machine Learning & AI:** Classical ML, Bayesian inference, MAP decision theory, fuzzy systems, Choquet integral, interpretable ML, feature relevance analysis
- **Deep Learning:** PyTorch, neural networks, diffusion models, CNNs, UNet architectures, multimodal learning (NLP, CV, physiological signals)
- **Data & Systems:** Data modeling, data engineering pipelines, distributed computing (Apache Spark), statistical evaluation, experimental design
- **Tools:** Git, Docker, Streamlit
- **Languages:** Vietnamese (native), English (IELTS 7.0), French (DALF C1)

REFERENCE

Hieu PHAM, Assistant Prof.

Assistant Professor, College of Engineering & Computer Science (CECS) & Scientific Director, Entrepreneurship Lab (E-lab),
 Head and PI, Computer Vision and Medical AI Lab (CVMAIL),
 PI, VinUni-Illinois Smart Health Center (VISHC),
 Email: hieu.ph@vinuni.edu.vn

Agustí ALENTORN, Clinician, MD, PhD, PH

MD, PI, Heterogeneity, immunity and brain tumor therapy (BRIGHT) & Head and PI, Primary Cerebral Lymphoma Team
 PI, Institute of Neurology
 Clinician, PH, Pitié-Salpêtrière Hospital
 Sorbonne Université
 Paris Brain Institute (ICM)
 Email: Agusti.Alentorn@icm-institute.org

Christophe MARSALA, Prof.

Professor, Sorbonne Université
 Head and PI, Learning, Fuzzy and Intelligent systems (LFI)
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