Cuong Pham

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PROFESSIONAL INTERESTS

I have a strong interest in data-driven techniques incorporating signal processing and machine learning methods for healthcare research with the goal of enhancing the digitalization of the computer-aid medical system. I conduct human-based biosignal experiments and analyze multi-modal biomedical datasets associated to different sub-domain studies in neurology, cardiology, and digital remote monitoring.

EDUCATION

Ritsumeikan University — Shiga, Japan
M.Eng. in Advanced Information Science and Engineering — *2021 – 2023*

- Thesis: Remote Photoplethysmography Assessment Using Deep Learning (Chair: Dr. Ruck Thawonmas)

VNU-HCM University of Technology — HCMC, Vietnam
B.Eng. in Physics Engineering - Biomedical Engineering specialization — *2015 – 2020*

- Remarks: 1st-rank Faculty Honors (2016) | GPA: 3.5/4.0
- Thesis: Investigate Imaginary Limb Movements In Brain Computer Interface Based on Motor Imagery

WORK EXPERIENCE

VinUni-Illinois Smart Health Center, VinUniversity — Hanoi, Vietnam
PhD Student (Advisor: Dr. Hieu Pham) — *Aug 2024 – now*

- **Mental Health Research**: Coordinate a team of multidisciplinary experts and students, collaborate with hospitals in Vietnam for data collection on mental health patients; developed a platform for seamless wearable data acquisition.
- **AI in Digital Phenotyping**: Research for a unified data formulation technique for digital phenotypes data; develop multimodal AI framework for well-being daily predictive modeling application.

School of Biomedical Engineering, VNU-HCM International University — HCMC, Vietnam
Research Assistant (Advisor: Dr. Huong Ha) — *Nov 2023 – Jul 2024*

- **Brain Computer Interface (BCI) Research**: designed and calibrated experiment protocol; supported data acquisition and management process; taught EEG signal processing for undergrad students.
- **Data Modeling**: serialized and processed the collected in-house datasets; developed ML pipeline for predictive modeling tasks; conducted performance benchmarking with other data sources; deployed and maintained web apps for Cloud storage, performance response analysis and data visualization.
- **Online-BCI**: collaborated with the software developers to build a customized desktop app for BCI data acquisition and response controller; deployed and evaluated user-specific calibrated modeling for real-time mouse control system; conducted inspection process to integrate the platform into cross-regional collaborative project (KC4.0-MOST).

HATO Medical Technologies ApS — Odense, Denmark
Machine Learning Engineer — *Jun 2022 – Nov 2023*

- **Cardiology Research**: worked closely with cardiologists and health-tech startup stakeholders to establish standardized clinical labeling protocols tailored to specific use cases at a local Danish emergency department focusing on final outcomes for cardiovascular diseases ; conducted literature reviews for evidence-based decision making, wrote technical documentation, prepared research materials and wrote grant proposals/fundings.
- **Data Pipeline**: collected and handled data from public repositories and clinical sources. Implemented a scalable data processing pipeline, including data cleaning, and alignment across sources. Collaborated with software developers to integrate a data serialization pipeline into the backend architecture of the in-house product.
- **AI/ML Development**: implemented a Cloud-based internal data management system with interactive web app and tested its streamline workflow. Monitored and evaluated time-series predictive modeling; deployed models for real-time abnormalities detection and interpretation; inspected and ensured the solution meet technical requirements.

Biological Engineering Laboratory, Ritsumeikan University Shiga, Japan
M.Eng. Research Assistant (Advisor: Dr. Kashihara Koji) *Oct 2021 – Aug 2023*

- **Drug Infusion Research**: developed a hybrid controller to regulate cardiac output and mean arterial pressure within during drug infusion using ML model with short-time previous drug inputs; evaluated on a mathematical modeling responses of dogs with heart-failure dataset. Presented at IEEE LifeTech '22.
- **RPPG Signal Quality**: designed pipeline to track landmarks on customized forehead region-of-interest, using combination of unsupervised optical models and deep auto-encoder network to improve signal-to-noise ratio; evaluated on public remote-photoplethysmograph datasets.
- **RPPG Experiments**: collected data (5 healthy subjects with different camera settings & postures); designed platform to synchronize facial video and blood volume pulse signal; evaluated heart rate benchmarks among different configurations with unsupervised methods and statistical analysis.
- **RPPG Feature Assessment**: investigated the reliability of waveform feature related to cardiac aging/stiffness by using a real-time Face-Mesh tracking with deep learning model and a customized morphology extraction; evaluated on a public well controlled rPPG dataset.

GTOPIA Vietnam. Ltd HCMC, Vietnam
Signal Processing Intern (Mentor: Dr. Liem Huynh) *Jan – Jun 2020*

- **Wearable Research**: designed pipeline with API for raw data aggregation from in-house wearable product; designed signal processing pipeline for vital-sign hemodynamic monitoring; conducted experiments on commercial wristbands's performance under different usage scenarios.
- **Data Collection**: collaborated with Ho-Chi-Minh-Heart-Institute for large-scale clinical data acquisition. Processed, categorized, and digitalized health records of administered patients with cardiovascular diseases.

Biomedical Electronics Laboratory, Shibaura Institute of Technology Tokyo, Japan
Research Intern (Advisor: Dr. Shinichiro Kanoh) *Sep – Nov 2019*

- **EEG Experiment**: involved in data collection activities for Auditory and Motor Imagery studies; conducted experimental analysis on EEG visualization for motor cortex response and how to conduct neuro-feedback. Revised experiment procedure for the Bachelor Thesis.

PUBLICATION

Peer-reviewed Conference Paper

- [**C.2**] **C. Pham** and K. Kashihara (2022, March), A Hybrid Controller for Multiple Drug Infusion in Heart Failure using Convolutional Neural Network. *In 2022 IEEE 4th Global Conference on Life Sciences and Technologies (LifeTech) (pp. 340-344).* [link]

- [**C.1**] Nguyen, M. T. D., **Pham, C. Q.**, Nguyen, H. N., Le, K. Q., & Huynh, L. Q. (2022), A Statistical Approach to Evaluate Beta Response in Motor Imagery-Based Brain-Computer Interface. *8th International Conference on the Development of Biomedical Engineering in Vietnam (pp. 203-217).* [link]

TALKS

- [**Dec '24**] Development and Evaluation of Multimodal AI Framework for Mental Health Assessment: A Preliminary Study @ Brain Informatics 2024 (Bangkok, Thailand).
- [**Jun '24**] Evaluation of Cue-based Protocol Implementations in Motor Imagery - based Brain-Computer Interface Experiments @ NeuroCoB/Brainconnects 2024 (Putrajaya, Malaysia).
- [**Oct '19**] Exercise Physiology: Improving Stationary Bike Training Performance Using Heart Rate Variability @ ISAS 2019, (HCMC, Vietnam).
- [**Mar '19**] Exercise Physiology: Cardiac Endurance Training for Students by Stationary Bike @ SEATUC 2019 (Hanoi, Vietnam)

AWARDS

- [**Dec '24**] Travel Grant for ME-UYR 2025; by IEEE Signal Processing Society.
- [**Mar '22**] GAKKAI scholarship grant; by Ritsumeikan University.
- [**Sep '21**] Fully-funded Monbukagakusho (MEXT) Scholarship; by Japanese Government.

ACADEMIC ACTIVITIES

Teaching Assistant

- [**Spring '25**] Object-Oriented Programming and Data Structures @ CECS, VinUniversity
- [**Fall '24**] Computer Vision @ CECS, VinUniversity
- [**Fall '22**] Experiments in Artificial and Natural Intelligence @ CISE, Ritsumeikan University

Reviewer

- 13th International Symposium on Information and Communication Technology (SOICT 2024)
- 10th International Conference in Vietnam on the Development of Biomedical Engineering (BME10)

School Projects

- [**Fall '22**] WasteWise @ GSISE, Ritsumeikan University
  - Team of 6 collaborate with TH Nürnberg (Germany); develop an AI-based mobile app for trash-bins time collection recommendation in public spaces using crowdsourcing dataset.
  - **Deployed** app and evaluated on the pilot data in Shiga and Kyoto city.
- [**Summer '22**] Pic2Fit @ KYOTO Design Lab, Kyoto Institute of Technology
  - Designed a proof-of-concept virtual clothes fitting application tailored for small shops in Kyoto, Japan.
  - **Awarded** 2nd prize in Kyoto Startup Weekend Competition; by Techstars.
- [**Fall '18**] Stationary Bike @ VNU-HCM University of Technology
  - Designed circuits for workload adjustment adapting to the biker's heart rate; collaborated with HCMC Institute of Biomedical Physics to evaluated VO2max improvement on students over endurance training course.
  - **Intergrated** system into laboratory experiment course for students.
- [**Spring '17**] Pet Feeder
  - Tech-lead freelance team to design the low-cost automated pet-feeding system; conducted mechanical design and material 3D-printing, developed electrical circuits and platform for IoT user control.
  - **Delivered** MVP to the reserved customers.

Communitiy Involvement

- [**Dec '24**] Technical Staff @ Asian Conference on Machine Learning (ACML 2024).
- [**Jan '23**] English Teaching Staff @ Ritsumeikan Junior High.
- [**Oct '22**] Technical Staff @ International Conference on Intelligent Robots and Systems (IROS 2022).

SELECTED SKILLS

- **Programming**: Python, MATLAB, Linux, R, SQL, Javascript, C#
- **Machine Learning**: OpenCV, Scikit-learn, LightGBM, XGBoost, Keras, Pytorch, Lightning
- **Tech Stacks**: Database (MySQL, MongoDB, Firebase), Webapp (Streamlit, Flask), Mobile (React Native), Cloud AWS (S3, EC2, Lambda), Tools (Git, Docker, Jira)
- **Miscellaneous**: Data Analysis (scipy, pandas, ggplot2, dplyr), Bio-Signal Experimentation (ECG, EEG, PPG, EMG, wearable/bio-sensors), Signal Processing (spectral & time-frequency analysis, transformations, filtering), Circuit (ESP32, Arduino, Raspberry Pi)
- **Language**: Vietnamese (native), English (professional, IELTS 7.0)

REFERENCE

Hieu Pham, Ph.D.
Assistant Professor, College of Engineering & Computer Science (CECS) &
Scientific Director, Entrepreneurship Lab (E-lab),
PI at VinUni-Illinois Smart Health Center, VinUniversity.
Email: hieu.ph@vinuni.edu.vn

Ha Thi Thanh Huong, Ph.D.
Head of Brain Health Lab &
Chair, Department of Tissue Engineering and Regenerative Medicine
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