Huyen-Trang Pham

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Education

Hanoi University of Science and Technology (HUST) Hanoi, Vietnam
Bachelor of Data Science and Artificial Intelligence 2020 – 2024
CPA: 3.81/4.0

Skills Summary

- **Programming Languages**: Python, Java, SQL
- **Frameworks**: Scikit-learn, TensorFlow, Pytorch
- **Tools**: LaTeX

Relevant Course

- **Selected University Courses**: Introduction to Artificial Intelligence; Introduction to Machine Learning, Introduction to Data Science, Natural Language Processing, Computer Vision

Research Experience

- **AI Research Resident - VinAI Research (August 2023 - Present)**:
  Advisors: Prof. Nhat Ho, Prof. Tan Nguyen
  Research directions: Mixture of Experts, Optimal Transport

  Mixture of Experts (MoE)

  - Drew a novel connection between **Mixture of Experts** and **Prompt-based Continual Learning**, proposing methods to enhance prompt-based continual learning with an MoE foundation.
  - Theoretically examined the benefits of a perturbed cosine router in MoE models and verified results through experiments.
  - Applied MoE architectures to build a global-local framework for **Visual State-space models**.

  Optimal Transport

  - Proposed a novel distance (TSW-SL) that leverages the advantages of both the Sliced Wasserstein distance, known for its computational efficiency and the Tree Sliced Wasserstein distance, which preserves topological properties.
  - Introduced a novel class of splitting maps that generalizes the existing one studied in TSW-SL, enabling the use of all positional information from input measures.
  - Designed a new metric for measures on the sphere, utilizing spherical tree structures and a spherical Radon transform to derive efficient closed-form expressions for optimal transport problems for measures supported on a sphere.
- **Research Student, DSLab - SoICT - HUST (December 2021 - August 2024)**:
  Advisors: Dr. Linh Ngo, Prof. Khoat Than
  Research directions: Online Learning, Continual Learning

  Online Learning

  - Investigated state-of-the-art approaches for **concept drift** using Bayesian online learning.
  - Developed **adaptive dropout** and **hypernetwork architectures** to improve efficiency and performance in online learning.

  Continual Learning

  - Conducted an in-depth analysis of four primary directions in continual learning, identifying their strengths and weaknesses.
  - Proposed **Lipschitz-driven regularization** to improve memory-based continual learning based on theoretical insights into local robustness.

Teaching Experience & Professional Services

- **Reviewer, ICLR 2025 (October 2024)**:
  Main task: Review papers submitted to ICLR 2025
- **Reviewer, AISTATS 2025 (October 2024)**:
  Main task: Review papers submitted to AISTATS 2025
- **Teaching Assistant, Introduction to Data Science course - HUST (October 2023 - January 2024)**:
  Supervisor: Prof. Khoat Than
  Main task: Help new students get hands-on coding experience and grade capstone projects.
- **Teaching Assistant, Object-oriented Programming course - HUST (March 2023 - July 2023)**:
  Supervisor: Dr. Nguyen Nhat Hai
  Main task: Help undergraduate students with Object-oriented programming, and grade student assignments.

Publications

- Huy Nguyen, Pedram Akbarian*, **Trang Pham***, Trang Nguyen*, Shujian Zhang, Nhat Ho. *Statistical Advantages of Perturbing Cosine Router in Sparse Mixture of Experts.* ICLR, 2025 [PDF].
- Viet-Hoang Tran*, Minh Khoi Nguyen Nhat*, **Trang Pham**, Thanh Chu, Tam Le**, Tan Nguyen**. *Distance-based Tree-Sliced Wasserstein distance.* ICLR, 2025 [PDF].
- Viet-Hoang Tran*, Thanh Chu*, Minh Khoi Nguyen Nhat, **Trang Pham**, Tam Le**, Tan Nguyen**. *Spherical Tree-Sliced Wasserstein distance.* ICLR, 2025 [PDF].
- Minh Le, An Nguyen*, Huy Nguyen*, Trang Nguyen*, **Trang Pham***, Linh Van Ngo, Nhat Ho. *Mixture of Experts Meets Prompt-Based Continual Learning.* NeurIPS, 2024 [PDF].
- Viet-Hoang Tran*, **Trang Pham***, Tho Tran, Tam Le**, Tan Nguyen**. *Tree-Sliced Wasserstein Distance on a System of Lines.* Under review [PDF].

Selected Course Projects

- **Vietnamese Medicine and Biology Summarization [Project Link]**:
  - Perform abstractive text summarization on self-created Vietnamese Medicine and Biology (VBM) dataset.
  - Use part-of-speech as prompts to fine-tune models.
  - Leverage K-means and Herding algorithm to extract important sentences in VBM input documents before feeding them into text summarization models.
- **Vietnamese Traditional Game: Mandarin Square Capturing [Project Link]**:
  - Build Mandarin Square Capturing game using Object-oriented techniques.
- **Fashion Search Framework [Project Link]**:
  - Employs advanced computer vision techniques to significantly enhance the accuracy and efficiency of locating visually similar fashion products by encoding images into semantic vector representations.
  - Integrate YOLOv5 to facilitate interactive user engagement by allowing users to select specific clothing features, thereby improving search customization and enriching the overall user experience in retrieving desired fashion items.

Scholarship

- **Academic Achievement Scholarship - HUST**
  Awarded to top 3% HUST students having excellent academic achievements in each semester.
- **Vietcombank scholarship** 2024
  Scholarship of Vietcombank for students with excellent academic performance.
- **Exness scholarship** 2023
  Scholarship of Exness company for students with excellent academic performance and good English.

Honor and Adwards

- **Best Presentation Award** July, 2024
  Awarded for the student with out-standing thesis presentation, SoICT, HUST
- **Student with five good merits** July, 2021
  Awarded Student with five good merits honour, city level

Extracurricular Activities

- **Mentee, Math and Science Summer Program (MaSSP)** Jun, 2021
  Subject: Data Science and Machine Learning; Topic conducted: World Happiness Analysis
- **Member, Department of Studies, Scientific Research and Career Orientation, HUST** Oct, 2020
  Organized and coordinated activities related to academic studies, scientific research, and career orientation

Language

- **Vietnamese**
  Native or Bilingual Proficiency
- **English**
  Full professional proficiency

References

- **Prof. Nhat Ho**
  The University of Texas at Austin
- **Prof. Tan Nguyen**
  National University of Singapore
- **Prof. Khoat Than**
  Hanoi University of Science and Technology