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Long P. Hoang

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RESEARCH INTEREST

My research focuses on advancing optimization techniques for multi-objective deep neural networks, improving not only their helpfulness, but also their robustness and safety. I am particularly interested in exploring their effectiveness in large-scale applications, including recommender systems and large language models.

EDUCATION

PhD **Singapore University of Technology and Design (SUTD)** **09/2024 – Present**

- Academic advisor: Prof. Wei Lu
- Major: Information Systems Technology and Design.

Bachelor **Hanoi University of Science and Technology (HUST)** **08/2018 – 09/2022**

- Academic advisor: Dr. Thang N. Tran
- Major: Mathematics and Informatics. CPA: 3.11/4.00 (Rank 18 out of 94 in my department).

PUBLICATIONS

[1] Minh-Duc Nguyen, Phuong Mai Dinh, Quang-Huy Nguyen, **Long P. Hoang**, Dung D. Le, Improving Pareto Set Learning for Expensive Multi-objective Optimization via Stein Variational Hypernetworks, *In Proceedings of the AAAI Conference on Artificial Intelligence*, 2025

[2] Tuan A. Tran[†], **Long P. Hoang**[†], Dung D. Le, Thang N. Tran, A Framework for Controllable Pareto Front Learning with Completed Scalarization Functions and its Applications, *Neural Networks* , 2024

[3] **Long P. Hoang**, Dung D. Le, Tuan A. Tran, Thang N. Tran, Improving Pareto Front Learning via Multi-Sample Hypernetworks, *In Proceedings of the AAAI Conference on Artificial Intelligence*, 2023

[4] Anh T. Ho, Tuan A. Tran, **Long P. Hoang**, Ha H. Le, Thang N. Tran, Multi Deep Learning Model for Building Footprint Extraction from High-Resolution Remote Sensing Image, *In Intelligent Systems and Networks*, 2022

EXPERIENCE

PhD Student **StatNLP Reseach Group, SUTD**

Advisor: Prof. Wei Lu

Personalized SFT Dataset for your Language Model *04/2025 – Present*

- Developing a collaborative filtering framework to select a small, challenging, and diverse dataset personalized for a given language model.
- Empirically validated that fine-tuning with 1,000 high-quality examples selected via our method yields better performance than using the entire 220,000-example dataset.

Chain-of-Thought Behavior *09/2024 – 02/2025*

- Studied token-level representations with and without Chain-of-Thought (CoT) prompting.
- Identified a representational collapse phenomenon under CoT that enhances model confidence, emphasizes salient information, and mitigates gender bias.

[†]Co-First Author

Research Assistant **College of Engineering and Computer Science, VinUniversity**

Advisor: Assist. Prof. Dung D. Le

Controllable Multi-Objective Recommender System *10/2022 – 10/2023*

- Developed a new framework for Multi-Objective Recommendation which considers a variety of criteria, including fairness, robustness, novelty in special scenarios such as cold start, adversarial attack,...

Expensive Multi-Objective Optimization *03/2023 – 10/2023*

- Approximated the entire trade-off curve of black-box objects using Pareto Front Learning with Hypernetworks computed by Gaussian Processes (accepted to AAAI 2025).

Profiling the Pareto Front in Multi-Task Learning *02/2022 – 10/2022*

- Proposed a novel method named Multi-Sample Hypernetwork to approximate the entire trade-off curve of conflicting objectives (accepted to AAAI 2023).

Undergraduate Research Assistant **School of Applied Mathematics and Informatics, HUST**

Advisor: Dr. Thang N. Tran

Multi-Objective Optimization with Completed Scalarizations *02/2022 – 02/2023*

- Proposed and proved the convergence of a new framework for Pareto Multi-Task Learning with Scalarization Functions in the pseudo-convex and quasiconvex assumptions (accepted to the journal Neural Networks).

Building Footprint Extraction from Remote Sensing Images *07/2021 – 10/2022*

- Developed a two-stage framework, which combines U2-Net and Mask-CNN, to increase 1.8-2.5% mAP, mAR for Building Footprint Extraction, especially effective in populated areas (accepted to ICISN 2022).

ADWARDS & CERTIFICATES

- AISG PhD Fellowship, granted by AI Singapore, Sep 2024 – Sep 2028.
- 3rd Prize (Grooo International company's sponsorship) in Scientific Research Student Conference at School of Mathematics and Informatics, Hanoi University of Science and Technology, Jul 2022.
- Certificate of Completion of Developer Circles Vietnam Innovation Challenge in Data Science, sponsored by Facebook, Nov 2020.

REFERENCES

1. **Prof. Wei Lu** (Ph.D), Information Systems Technology and Design, Singapore University of Technology and Design *luwei@sutd.edu.sg*
2. **Assist. Prof. Dung D. Le** (Ph.D), College of Engineering and Computer Science, VinUniversity *dung.ld@vinuni.edu.vn*
3. **Dr. Thang N. Tran** (Ph.D), School of Applied Mathematics and Informatics, Hanoi University of Science and Technology *thang.tranngoc@hust.edu.vn*