Huy Nguyen

CONTACT
INFORMATION

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EDUCATION

The University of Texas at Austin, Texas, USA.   2022-2027
Ph.D Student in Statistics at the Department of Statistics and Data Sciences.

- Advisor: Professor Nhat Ho and Professor Alessandro Rinaldo.

- GPA: 4.0/4.0

Ho Chi Minh University of Science, Ho Chi Minh City, Vietnam.   2017–2020
Bachelor of Science in Mathematics and Computer Science, Honor Program.

- Supervisor: Professor Dang Duc Trong.

- GPA: 9.75/10.0 - *Summa Cum Laude*.

RESEARCH
EXPERIENCE

The University of Texas at Austin, Texas, USA.   2023-Present
Graduate Research Assistant.

- Research topics: Towards Understanding Mixture of Experts: From Theory to Practice.

- Advisor: Professor Nhat Ho.

VinAI Research, Hanoi, Vietnam.   2020–2022
AI Research Resident.

- Research topics: Optimal Transport theory and its applications in Domain Adaptation.

- Skill gained: Did research on Optimal Transport (Sinkhorn algorithms, Barycenter computation, etc) and applied them to study Data Shift and Label Shift problems in Domain Adaptation.

RESEARCH
INTERESTS

My current research focuses on theoretical foundations for Mixture-of-Experts models. In particular, I try to comprehend the effects of different gating functions (namely softmax, top-K sparse, dense-to-sparse, etc) on the convergence of expert estimation under the Mixture-of-Experts models. Based on insights from these results, I aim to design novel gating functions which help improve the performance of Mixture-of-Experts applications, including Large Language Models and Medical Images.

PREPRINTS

2. Xing Han, **Huy Nguyen***, Carl Harris*, Nhat Ho, Suchi Saria. FuseMoE: Mixture-of-Experts Transformers for Fleximodal Fusion . *Under review, arXiv:2402.03226.*

1. Quang Pham, Giang Do, **Huy Nguyen**, TrungTin Nguyen, Chenghao Liu, Mina Sartipi, Binh T. Nguyen, Savitha Ramasamy, Xiaoli Li, Steven Hoi, Nhat Ho. CompeteSMoE - Effective Training of Sparse Mixture of Experts via Competition . *Under review, arXiv:2402.02526.*

PUBLICATIONS

14. **Huy Nguyen**, Nhat Ho, Alessandro Rinaldo. On Least Squares Estimation in Softmax Gating Mixture of Experts . *Proceedings of the International Conference on Machine Learning, 2024.*

13. **Huy Nguyen**, Pedram Akbarian, Nhat Ho. Is Temperature Sample Efficient for Softmax Gaussian Mixture of Experts? . *Proceedings of the International Conference on Machine Learning, 2024.*

12. **Huy Nguyen**, Pedram Akbarian, TrungTin Nguyen, Nhat Ho. A General Theory for Softmax Gating Multinomial Logistic Mixture of Experts . *Proceedings of the International Conference on Machine Learning, 2024.*

11. **Huy Nguyen**, Pedram Akbarian, Fanqi Yan, Nhat Ho. Statistical Perspective of Top-K Sparse Softmax Gating Mixture of Experts. *In International Conference on Learning Representations, 2024.*

10. **Huy Nguyen***, TrungTin Nguyen*, Khai Nguyen, Nhat Ho. Towards Convergence Rates for Parameter Estimation in Gaussian-gated Mixture of Experts. *In International Conference on Artificial Intelligence and Statistics, 2024..*

9. **Huy Nguyen**, Khai Nguyen, Nhat Ho. On Parameter Estimation in Gaussian Deviated Mixture of Experts. *In International Conference on Artificial Intelligence and Statistics, 2024..*

8. **Huy Nguyen**, TrungTin Nguyen, Nhat Ho. Demystifying Softmax Gating Function in Gaussian Mixture of Experts. *Advances in Neural Information Processing Systems, 2023 (Spotlight, Top 3.6%).*

7. Dat Do*, **Huy Nguyen***, Khai Nguyen, Nhat Ho. Minimax Optimal Rate for Parameter Estimation in Multivariate Deviated Models. *Advances in Neural Information Processing Systems, 2023.*

6. Dung Le*, **Huy Nguyen***, Khai Nguyen*, Trang Nguyen*, Nhat Ho. Fast Approximation of the Generalized Sliced-Wasserstein Distance . *IEEE International Conference on Acoustics, Speech and Signal Processing, 2024.*

5. Khai Nguyen, Tongzheng Ren, **Huy Nguyen**, Litu Rout, Tan Nguyen, Nhat Ho. Hierarchical Sliced Wasserstein Distance. *In International Conference on Learning Representations, 2023.*

4. **Huy Nguyen***, Khang Le*, Dung Le*, Dat Do, Tung Pham, Nhat Ho. Entropic Gromov-Wasserstein between Gaussian Distributions. *Proceedings of the International Conference on Machine Learning, 2022.*

3. **Huy Nguyen***, Khang Le*, Khai Nguyen, Tung Pham, Nhat Ho. On Multimarginal Partial Optimal Transport: Equivalent Forms and Computational Complexity. *In International Conference on Artificial Intelligence and Statistics, 2022.*

2. **Huy Nguyen***, Khang Le*, Quang Minh Nguyen, Tung Pham, Hung Bui, Nhat Ho. On Robust Optimal Transport: Computational Complexity and Barycenter Computation. *Advances in Neural Information Processing Systems, 2021.*

1. Thu Nguyen, Duy H. M. Nguyen, **Huy Nguyen**, Binh T. Nguyen, Bruce A. Wade. EPEM: Efficient Parameter Estimation for Multiple Class Monotone Missing Data. *Information Sciences Journal, Volume 567, page 1-22.*

| TEACHING EXPERIENCE | **The University of Texas at Austin**, Texas, USA. Teaching Assistant at the Department of Statistics and Data Sciences. |

- SDS302F - Foundations of Data Analysis. Fall 2022
- SDS322E - Elements of Data Science. Spring 2023
- SDS320E - Elements of Statistics. Fall 2023

PROFESSIONAL SERVICES

- Reviewer at the Electronic Journal of Statistics (EJS).
- Reviewer at the International Conference on Machine Learning (ICML) 2022, 2024.
- Reviewer at the Conference on Neural Information Processing Systems (NeurIPS) 2022-2023.
- Reviewer at the International Conference on Artificial Intelligence and Statistics (AISTATS) 2022-2024.
- Reviewer at the International Conference on Learning Representations (ICLR) 2024.
- Reviewer at the New Frontiers in Learning, Control, and Dynamical Systems Workshop (ICML) 2023.

HONORS AND
AWARDS

- **AISTATS 2024 Registration Grant**. 2024
- **ICLR 2024 Travel Award**. 2024
- **NeurIPS 2023 Scholar Award**. 2023
- **Doctoral Fellowship** of the University of Texas at Austin. 2022
- Class of 2020 **Valedictorian** of Ho Chi Minh University of Science (HCMUS). 2020
  - Graduated 1 year earlier with the highest GPA ever in HCMUS, at 9.75/10.0.
- **Merit Scholarship** for gifted students in Mathematics. 2018, 2019
  - Granted by Vietnam Institute for Advanced Study in Mathematics (VIASM).
- **Full Scholarship** of Ho Chi Minh University of Science. 2017
  - Only for a student having the highest score in the university entrance examination.

TECHNICAL
SKILLS

- *System*: MacOS, Linux, Windows.
- *Programming Languages*: Python (Pytorch, Sci-kit Learn, Numpy, Matplotlib), R, MATLAB.
- *Softwares*: LaTeX, Microsoft Offices.

REFERENCES

- **Nhat Ho.** Email: minhnhat@utexas.edu (Advisor).
- **Alessandro Rinaldo.** Email: alessandro.rinaldo@austin.utexas.edu (Co-advisor).