Khai Nguyen

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RESEARCH INTEREST

My current works are making Optimal Transport scalable in Machine Learning. In particular, I investigate new dimension reduction methods (via projections) and new sub-sampling methods (mini-batches) for Optimal Transport. On the application side, I am interested in utilizing Optimal Transport to improve generative models, Bayesian inference, and other tasks that need to deal with probability measures. I am also interested in designing efficient Transformer architectures.

EDUCATION

University of Texas at Austin — Austin, Texas, USA
Ph.D. in Statistics at Department of Statistics and Data Sciences — 2021–Present

- GPA: 3.9/4.0
- Advisors: Dr. Nhat Ho (Assistant Professor at UT, Austin)

Hanoi University of Science and Technology (HUST) — Hanoi, Vietnam
Bachelor in Information System (another name of Computer Science) — 2015–2020

- GPA: 3.61/4.00, Major GPA: 3.71/4.00, Top: 1%, graduated with Excellent Degree.
- Thesis: "Distributional Sliced-Wasserstein and Applications to Generative Modeling"

EXPERIENCE

VinAI Research, *website: www.vinai.io* — Hanoi, Vietnam
AI Research Resident — 2019 –2021

- Research topics: Deep Generative Models, Optimal Transport
- Advisors: Dr. Hung Bui (Director of VinAI Research)
- Skills gained: Deep Generative Models (VAEs, GANs, Flows, and Score matching models, etc), Optimal Transport (Sinkhorn algorithm, Slicing approaches, Barycenter, variants of Wasserstein distance, Gromov Wasserstein, etc, Applications of OT (Wasserstein Autoencoder, Wasserstein GAN, Color Transfer, etc)

Data Science Laboratory (HUST), *website: ds.soict.hust.edu.vn* — Hanoi, Vietnam
Undergraduate Research Student — 2018–2020

- Research topics: Probabilistic Graphical Model, Continual Learning.
- Skills gained: Fundamental Machine Learning and Deep Learning, Topic models, Bayesian inference, Variational techniques, etc

SUBMISSIONS

Improving Mini-batch Optimal Transport via Partial Transportation
Khai Nguyen, Dang Nguyen, Tung Pham, Nhat Ho

- *Arxiv:* https://arxiv.org/abs/2108.09645
- *Under review*

On Transportation of Mini-batches: A Hierarchical Approach
Khai Nguyen, Dang Nguyen, Quoc Nguyen, Tung Pham, Hung Bui, Dinh Phung, Trung Le, Nhat Ho

- *Arxiv:* https://arxiv.org/abs/2102.05912
- *Under review*

Model Fusion of Heterogeneous Neural Networks via Cross-Layer Alignment
*Dang Nguyen, **Khai Nguyen**, Dinh Phung, Hung Bui, Nhat Ho*

- *Arxiv:* https://arxiv.org/abs/2110.15538
- *Under review*

PUBLICATIONS

On Multimarginal Partial Optimal Transport: Equivalent Forms and Computational Complexity
*Huy Nguyen, Khang Le, **Khai Nguyen**, Tung Pham, Nhat Ho*

- *The 25th International Conference on Artificial Intelligence and Statistics (AISTATS 2022)*

Structured Dropout Variational Inference for Bayesian Neural Networks
*Son Nguyen, Duong Nguyen, **Khai Nguyen**, Khoat Than, Hung Bui, Nhat Ho*

- *Arxiv:* https://arxiv.org/abs/2102.07927
- *Thirty-fifth Conference on Neural Information Processing Systems (NeurIPS 2021)*

Improving Relational Regularized Autoencoders with Spherical Sliced Fused Gromov Wasserstein
***Khai Nguyen**, Son Nguyen, Nhat Ho, Tung Pham, Hung Bui*

- *Arxiv:* https://arxiv.org/abs/2010.01787
- *International Conference on Learning Representations (ICLR) 2021*

Distributional Sliced-Wasserstein and Applications to Generative Modeling
***Khai Nguyen**, Nhat Ho, Tung Pham, Hung Bui*

- *Arxiv:* https://arxiv.org/abs/2002.07367
- *International Conference on Learning Representations (ICLR) 2021 (Spotlight 3.8%)*

PROFESSIONAL SERVICES

- **Reviewer at International Conference on Machine Learning (ICML) 2021, 2022**
- **Reviewer at Conference on Neural Information Processing Systems (NeurIPS) 2021**
- **Reviewer at Workshop on Deep Generative Models (NeurIPS) 2021**
- **Reviewer at International Conference on Learning Representations (ICLR) 2022**
- **Reviewer at International Conference on Artificial Intelligence and Statistics (AISTATS) 2022**

AWARDS

- Doctoral Fellowship of University of Texas at Austin — 2021
- Third Prize of Scientific Research Student Award of Hanoi University of Science and Technology — 2019

OTHER ACTIVITIES

Top 2% (19 over 1317) in Plant Pathology Challenge — CVPR 2020
Fine-Grained Visual Categorization (FGVC) workshop — May 2020

Southeast Asia Machine Learning School — Greater Jakarta, Indonesia
Universitas Indonesia — July 2019

Technical Talk Hanoi, Vietnam

Data Science Laboratory (HUST) June 2019

- Make an introduction to Optimal Transport and its applications in deep generative models.
- Slides: http://bit.ly/3pDEp1f

Teaching Assistant Hanoi, Vietnam

Data Science Laboratory (HUST) April - May, 2019

- Run a small course on fundamental machine learning models such as linear regressions, logistic regressions, k-nearest neighbors, support vector machines, and neural networks for new members.
- Make a tutorial about training deep neural networks with Tensorflow – a deep learning framework.

Top 12 in The 4th AutoML Challenge (AutoML3+) PAKDD 2019

Provided and Sponsored by 4Paradigm, ChaLearn, Microsoft and Amazon Jan 2019

LANGUAGES

- **Vietnamese:** Native
- **English:** IELTS - 7.5 Overall, 9.0 Reading, 8.0 Listening, 6.5 Writing, 6.5 Speaking.

PROGRAMMING LANGUAGES

- **Python:** Proficient

  Libraries: Pytorch, Scikit-Learn, Numpy, etc
- **Java**: Basic
- **C/C++**: Basic