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

- GPA: 3.95/4.0
- 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

AT&T Labs — Texas, USA
Research Intern — June 6 2022 –August 12 2022

VinAI Research — Hanoi, Vietnam
AI Research Resident — 2019 –2021

Data Science Laboratory (HUST) — Hanoi, Vietnam
Undergraduate Research Student — 2018–2020

Publications

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

- *Arxiv:* https://arxiv.org/abs/2108.09645
- *International Conference on Machine Learning (ICML 2022)*

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
- *International Conference on Machine Learning (ICML 2022)*

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

– *Arxiv:* https://proceedings.mlr.press/v151/le22a.html
– *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%)*

Submissions

Revisiting Sliced Wasserstein on Images: From Vectorization to Convolution
***Khai Nguyen**, Nhat Ho*

– *Arxiv:* https://arxiv.org/abs/2204.01188
– *Under review*

Amortized Projection Optimization for Sliced Wasserstein Generative Models
***Khai Nguyen**, Nhat Ho*

– *Arxiv:* https://arxiv.org/abs/2203.13417
– *Under review*

Transformer with Fourier Integral Attentions
Tan Nguyen, Minh Pham, Tam Nguyen, Khai Nguyen, Stanley J. Osher, Nhat Ho

– *Arxiv:* https://arxiv.org/abs/2206.00206
– *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*

Professional services

- Reviewer at Journal of Machine Learning Research (JMLR) 2022
- Reviewer at International Conference on Machine Learning (ICML) 2021, 2022
- Reviewer at Conference on Neural Information Processing Systems (NeurIPS) 2021, 2022
- 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
- Reviewer at AAAI Conference on Artificial Intelligence (AAAI) 2023

Awards

- ICML Participation Grants 2022
- 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