Tien Dat Nguyen

Dong Ha, Viet Nam

(84)-913-017-559 | kaistdat123@gmail.com | Github | Linkedin | Google Scholar | tiendat104.github.io

Overview

I am a master student at the university of Waterloo, supervised by Professor Victor Zhong. My current research interest is to use language to make ML more efficient and generalizable. I finished my bachelor at KAIST university with a major in Computer Science.

Education

University of Waterloo *September 2024 - August 2026*

Master of Mathematics in Computer Science

Korea Advanced Institute of Science and Technology (KAIST) *September 2019 - February 2024*

Bachelor in Computer Science

Experience

Reading to Learn Laboratory

Graduate Student *September 2024 - Present*

- I am currently in the stage of figuring out my research topic with my supervisor.

KAIST Vision and Learning Laboratory

Research Assistant (Advisors: Phd Jinwoo Kim and Professor Seunghoon Hong) *August 2021 - January 2024*

- In fall 2021, we researched the use of Riemannian manifold to enable neural networks representing non-trivial geometric properties of graph data.
- In 2022, our research related to Graph Machine Learning, which utilised Transformer for the molecular property prediction task.
- In spring 2023, we researched on Equivariance Learning, aiming to exploit and integrate data symmetry bias into neural networks design for better generalisation.
- From summer 2023, I carried out independent research with the idea to expand the applicability of our prior Equivariance Learning research work LPS.
- My research duties involve ideas-developing for framework enhancement, experiment implementation and training, literature surveying, technical writing, theoretical results proving.

Publications

*: equal contribution

Learning Symmetrization for Equivariance with Orbit Distance Minimization [Paper][Code]

Tien Dat Nguyen*, Jinwoo Kim*, Hongseok Yang, Seunghoon Hong

NeurReps 2023 Workshop

Learning Probabilistic Symmetrization for Architecture Agnostic Equivariance [Paper][Code]

Jinwoo Kim, Tien Dat Nguyen, Ayhan Suleymanzade, Hyeokjun An, Seunghoon Hong

NeurIPS 2023 (**Spotlight Award, Top 3% of Submissions**)

Pure Transformers are Powerful Graph Learners [Presentation] [Paper][Code]

Jinwoo Kim, Tien Dat Nguyen, Seonwoo Min, Sungjun Cho, Moontae Lee, Honglak Lee, Seunghoon Hong

NeurIPS 2022

Research Projects

Learning Symmetrization for Equivariance with Orbit Distance Minimization *June 2023 - October 2023*

KAIST Vision and Learning Laboratory

- Developed a novel symmetrization method built upon proposals of Kim et al. (2023) but introduced a framework modification to extend its applicability to a broader range of symmetry groups.
- Empirically showed competitive performance on image classification task with rotation symmetry and for the first time in literature, successfully applied symmetrization for task with Lorentz symmetry.

Probabilistic Symmetrization for Architecture Agnostic Equivariance *November 2022 - May 2023*

KAIST Vision and Learning Laboratory

- Develop a novel symmetrization method that can make arbitrary base models such as MLP or Transformer become equivariant to the given symmetry group, while maximising model expressiveness in expectation.
- Implemented the method on various base models, including patch-based transformers that can be initialised from pretrained vision transformers.
- Empirically demonstrated competitive performance on various tasks and datasets, and showed potential benefits of transferring pretrained parameters across data from different symmetries.

Graph Transformers for OGB-LSC@NeurIPS Molecular Property Prediction Challenge *September 2022 - October 2022*

KAIST Vision and Learning Laboratory, LG AI Research Institute

- Tokenized extra geometric features, such as molecular rings, and provided as additional tokens for graph Transformers.
- Achieved a competitive performance compared to top 5 models on PCQM4Mv2 leaderboard

Pure Transformers for Graph Learning *February 2022 - August 2022*

KAIST Vision and Learning Laboratory, LG AI Research Institute

- Proposed a Transformer model without graph-specific modifications that is theoretically expressive and possesses strong practical performance.
- When trained on large-scale molecular dataset PCQM4Mv2, achieved significantly better performance than GNN baselines and competitive performance compared to Transformer variants with sophisticated graph-specific inductive bias.

Riemannian Manifold for Graph Representation Learning *August 2021 - January 2022*

KAIST Vision and Learning Laboratory

- Explored the use of Riemannian manifold parameterized by neural networks to learn graph embeddings that can represent non-trivial geometric properties.

Honors and Awards

Undergraduate Research Program (URP) Excellence Award *Spring, 2022*

College of Engineering, KAIST

Dean's List award *Spring, 2021*

School of Computing, KAIST

First prize in the National Olympiad Mathematics *February, 2018*

Ministry of Education and Training, Vietnam

Third prize in the National Olympiad Mathematics *February, 2017*

Ministry of Education and Training, Vietnam

Skills

Programming	TensorFlow, Keras, PyTorch (4 years), PyTorch Geometric, PyTorch Lightning (2 years), Python (5 years)
Machine Learning	Geometric Deep Learning, Graph Machine Learning, Computer Vision, Natural Language Processing
Research	Problem solving, Analytical thinking, Research communication
Mathematics	Geometric theory, Linear algebra, Probability and Statistics, Calculus
Languages	Vietnamese (Native), English (Fluent, IELTS 8.0)