

Nhut Nam Le

Curriculum Vitae

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Research objectives

My research ambitions revolve around the assumption that the world is actually simple. In view of this, theories are developed through the use of Mathematical formulations that explain the universal. We can complete proofs for them using the Graph theory language, which allows us to formalise essentially whatever problem we have.

Education

- 12/2023–present **M.Sc in Applied Mathematics, VNU-HCMC - University of Science, HCMC, Ho Chi Minh City, Vietnam.**
Research areas: Graph theory, Combinatorial optimization.
- 12/2022–present **M.Sc in Computer Science, VNU-HCMC - University of Science, HCMC, Ho Chi Minh City, Vietnam.**
Research areas: Multi-relational graphs, optimization methods for neural networks.
Current GPA: 9.18/10.0.
- 08/2021–08/2022 **B.Sc-M.Sc Programme in Computer Science, VNU-HCMC - University of Science, Ho Chi Minh City, Vietnam.**
Research interested: Machine learning, representation learning on graphs, knowledge graphs, & optimization methods for neural networks.
Overall stage GPA: 9.00/10.00.
- 08/2018–09/2022 **B.Sc in Computer Science, VNU-HCMC - University of Science, Ho Chi Minh City, Vietnam.**
Research interested: Machine learning, representation learning on graphs, knowledge graphs, & optimization methods for neural networks.
Thesis title: Link Prediction on Knowledge Graphs based-on Convolutional Neural Networks, Phan Anh-Hao & Le Nhut-Nam
Graduation grade: Overall GPA: 8.33/ 10.00. Major GPA: 8.95/ 10.00
- 06/2015–06/2018 **High School Education - Hoang Le Kha High School For The Gifted, Vietnam.**
Graduation grade: Very good

Professional interests & major research topics

My major academic research focus is graph mining. I am also quite interested in theoretical computer science fields includes graph theory and combinatorial optimization.

Work Experience

- 03/2023–present **(Internship) Artificial Intelligence Engineer, DIGIME PTE. LTD.**
- Digital Image-Video Processing.
 - Multiple Objects Tracking; Multiple Objects Detection.
- 01/2023–present **Graduated Research Student, Department of Computer Science, Faculty of Information Technology, VNUHCMC - University of Science.**
- Advised by Prof. PhD. Le Hoai Bac, and MS.c Le Ngoc Thanh about Temporal Knowledge Graph Completion.
- 09/2022–present **Visiting Lecturer, Department of Computer Science, Faculty of Information Technology, VNUHCMC - University of Science.**
- Assistant subjects: Parallel Programming, Graph Mining, Introduction to Data Science, Programming for Data Science, Introduction to Machine Learning, Data Visualization, Introduction to Programming 1, Introduction to Information Technology.
 - Preparing, and grading final projects materials for students.
- 06/2021–07/2022 **Undergraduated Research Student, Department of Computer Science, Faculty of Information Technology, VNUHCMC - University of Science.**
- Advised by MS.c Le Ngoc Thanh about Link Prediction on Knowledge Graphs.

Publications

Journals

- Thanh Le, **Nam Le**, and Bac Le. **Knowledge Graph Embedding by Relational Rotation and Complex Convolution for Link Prediction.** Expert Systems with Applications, p.119122., 2022 (Q1, Impact Factor: 8.665, Citation Score: 12.20)

Conferences

- Thanh Le, **Nam Le** and Bac Le. **Embedding Model with Attention over Convolution Kernels and Dynamic Mapping Matrix for Link Prediction.** Accepted at 14th Asian Conference on Intelligent Information and Database Systems, 2022. (RankB, CORE2021)

Technical skills

Programming Language	Python, C/C++, Java, Julia (Usage frequency ordering)
Framework	PyTorch, CUDA, Keras, Tensorflow (Usage frequency ordering)
Toolchains	Git, L ^A T _E X, Conda

Open-Source

Contribution

- Open-source Static-Temporal Multi-Relational Data Projects
- OpenKE - An Open-Source Package for Knowledge Embedding (KE): Adding KGE algorithms, useful validation module.
- Knowledge Graph Embedding by Relational Rotation and Complex Convolution for Link Prediction: Contributor of the project.

Languages

Vietnamese Native Speaker

English English - intermediate level (5.5 Overall IELTS); written in English, publications and presentations are in English

Personal Projects

- A study about Layer-wise Relevance Propagation in PyTorch Implementation of unsupervised layer-wise relevance propagation (LRP; Bach et al.; Montavon et al.) in PyTorch with mixed-precision training for VGG networks from scratch. This tutorial served as a starting point. In this implementation, we provide a study about layer-wise relevance propagation from our master's course (HCMUS Master Course: Research Methodologies) and a framework that is easy to understand for PyTorch users. Public source at: <https://github.com/m32us/ReMethods>
- A study on graph partition algorithms Graph partitioning is the process of dividing a graph into multiple subgraphs or partitions, such that each subgraph is connected and has a certain desirable property, such as balanced size or minimal cut size. Although it is a challenging problem, finding a partition that makes graph analysis easier has applications in scientific computing. In this project, we provide a Python programming language implementation for a few well-known graph partitioning techniques. Public source at: https://github.com/m32us/Lab_03_Graph_Partition
- A study optimization methods in Deep Neural Networks and common regularization techniques Study and implement various optimization methods based on local descent for Deep Neural Networks. These methods are first-order methods; they include gradient descent, gradient descent momentum, nesterov accelerated gradient, adaptive subgradient method, RMSProp, adadelta, and adaptive moment estimation method. Furthermore, various deep network architectures are implemented with PyTorch and tested with the above optimization methods with PyTorch. Public source at: <https://github.com/nhutnamhcmus/optimchan>
- Build a Knowledge Graph and apply KGE Techniques for Link Prediction Build a Knowledge Graph and apply KGE Techniques for Link Prediction. We provide a brief introduction to Web Scraping: Learning about how Web Scraping work. Furthermore introduction to Knowledge Graph: Basis definition and its applications. We build a simple Knowledge Graph with Python: Crawl data with Wikipedia API, use some NLP techniques and apply TransE model on created KG for link prediction. Public source code at: <https://github.com/nhutnamhcmus/build-knowledge-graphs-tutorial>

Google AI4Code - Understand the relationship between code and comments in Python notebooks using language models: codebert, graphcodebert and optimization techniques in Python (gradient accumulation, automatic mixed precision training, 8-bit Optimizers - 8-bit Adam/AdamW Optimizer and fast tokenizers). Public source code: <https://github.com/nhutnamhcmus/ai4code-optimization-techniques>

Presentations & Talking

- (Master Course) **Optimization Techniques for Transformers** Present about optimisation techniques include Gradient Accumulation; Automatic Mixed Precision Training; and 8-bit Optimizers - 8-bit Adam/AdamW Optimizer. Presenter: Le, Nhut-Nam. [Slide]
Deep Learning
- (Master Course) **Optimization Methods and Regularization:** Gradient Descent with Momentum, Gradient Descent with Nesterov Accelerated Gradient; Optimization Experiment on Beale function for Gradient Descent Variants and Beyond (AdaGrad, AdaDelta, RMSProp, Adam); Second-Order Optimization Method (Newton's Method; Secant's Method and Quasi Newton Method) by Le, Nhut-Nam. [Slide]
Applied in
Machine Learning
- (Master Course) **Temporal Parallelization of Inference in Hidden Markov Models.** Presentation section: Sum-product algorithm in terms of associative operations; Parallelization of the sum-product algorithm presented by Le, Nhut-Nam.
Advanced topics in
Machine Learning