Minh Phu Vuong

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Education

Texas State University, Ph.D. in Computer Science — Sep 2022 – Present

- **Relevant courseworks:** Network Analysis, Data Mining, Deep Learning, High Performance Computing, Advanced Parallel Processing, Scientific Computing.

Jeonbuk National University, M.S. in Computer Science and Engineering — Graduated Aug 2022

Ho Chi Minh City University of Technology, B.E. in Electrical Engineering — Graduated Dec 2019

Research Projects

Efficient Monte Carlo Algorithms for Approximating Katz Centrality on Large Graphs

- Propose two random walk–based Monte Carlo algorithms for approximating Katz centrality on large graphs, with their GPU implementations leveraging thread-level parallelism and blocked scheduling.
- Demonstrate up to three orders of magnitude speedups over the baselines on nine real-world datasets, while achieving low mean relative error and high accuracy in ranking the most influential nodes.

FairAD: Computationally Efficient Fair Graph Clustering via Algebraic Distance

- Introduce a novel fair graph clustering method via algebraic distance that imposes fairness constraints in the affinity matrix and leverages graph coarsening to convert the optimization problem into a simpler graph cut problem, which is solved efficiently.
- Achieve up to 40× speedup over state-of-the-art fair spectral clustering methods while maintaining competitive fairness and clustering quality on synthetic and six real-world datasets.

Effective Delayed Patching for Transient Malware Control on Networks

- Propose a novel patching policy that incorporates the influence of patching delay in a susceptible-infected epidemic model, formulated as a constrained graph partitioning problem to identify which nodes to patch.
- Demonstrate through extensive simulations on synthetic and real-world networks that the proposed policy significantly outperforms baseline strategies in minimizing the number of infected nodes, especially under longer patching delays and limited patching resources.

Publications

Efficient Monte Carlo Algorithms for Approximating Katz Centrality on Large Graphs — February 2026

G. Cornett, **M.P. Vuong**, C.-H. Lee.

ACM International Conference on Web Search and Data Mining (WSDM) 2026

SDT-GNN: Streaming-based Distributed Training Framework for Graph Neural Networks — December 2025

X. Huang, W. Zhuo, **M.P. Vuong**, S. Li, J. Kim, B. Rees, C.-H. Lee.

IEEE International Conference on Big Data 2025

FairAD: Computationally Efficient Fair Graph Clustering via Algebraic Distance — November 2025

M.P. Vuong, Y.-J. Lee, I. Ojeda-Ruiz, C.-H. Lee.

ACM International Conference on Information and Knowledge Management (CIKM) 2025

Effective Delayed Patching for Transient Malware Control on Networks — October 2025

M.P. Vuong, C.-H. Lee, D. Y. Eun.

IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS) 2025

CATGNN: Cost-Efficient and Scalable Distributed Training for Graph Neural Networks — April 2024

X. Huang, W. Zhuo, **M.P. Vuong**, S. Li, J. Kim, B. Rees, C.-H. Lee.

arXiv preprint arXiv:2404.02300, 2024.

Awards

IEEE MASS 2025 Student Travel Grant – U.S. National Science Foundation
Dotoral Merit Fellowship – Texas State University
Computer Science Research Excellence Award – Texas State University
Graduate Research Assistant Tuition Scholarship – Texas State University, Jeonbuk National University

Teaching Experience

Teaching Assistant, Texas State University – San Marcos, TX Fall 2022, Spring 2023, Fall 2023

- Hold office hours for students to improve their understanding of course materials and programming skills in Computer Networks, Data Structures and Algorithms, and Introduction to Network Science courses.
- Grade quizzes, exams, coding assignments, and provide debugging assistance along with invaluable feedback to 40-70 students.

Technical Skills

Programming: Python • C++ • MATLAB • Shell• Markdown• Latex

Libraries: PyTorch• TensorFlow • PyG • DGL • NetworkX • cuGraph • Scikit-Learn • Matplotlib • Pytest

Machine Learning: Graph Neural Networks • Deep Neural Networks • Diffusion Models • Federated Learning • Transformers • Clustering • Classification • Regression • Supervised/Unsupervised Learning • Computer Vision