Minh Phu Vuong

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Education

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

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

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

- **Thesis:** Synthesizing Challenging Pose Images for 2D Human Pose Estimation.

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

- **Thesis:** Traffic monitoring system by computer vision and machine learning. (https://bit.ly/40IEvJJ)

Research Projects

Effective Delayed Patching for Transient Malware Control on Networks

- Propose a delay-aware patching algorithm that models spread via the SI process, encodes time infection risk as edge weights to reveal "critical-edge" boundaries, and solves a constrained partition problem to select boundary nodes under a tight patch budget.
- Demonstrate through extensive simulations that the proposed method outperforms baselines in mitigating malware, particularly under delayed and resource-limited conditions.
- Tools: C++, Python, Matlab.

FairAD: Computationally Efficient Fair Graph Clustering via Algebraic Distance

- Develop a novel graph clustering algorithm that prevents bias by evenly distributing groups according to sensitive attributes such as age, gender, or ethnicity.
- 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.
- Tools: Python, Matlab, Scipy, CuPy.

Personalized federated learning with multivariate time-series data

- Develop deep learning models in a decentralized manner for solar power prediction, utilizing weather conditions, temporal factors, and historical data.
- Design a graph-based personalized federated learning to leverage both fine-grained level data dependencies and relationships between different clients to further enhance model performance.
- Tools: Python, Pytorch.

Experience

Teaching Assistant, Texas State University – San Marcos, TX — Sep 2022 – Present

- Conduct discussion sections and design reviews for students to improve their understanding of course materials and programming skills in Data Structures and Algorithms, Network Science and Network Analysis courses.
- Grade quizzes, exams, coding homework, hold office hours, and provide debugging assistance along with invaluable feedback to over **70 students**, contributing to the improvement of the course.

Technical Skills

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

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

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

Publications

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

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

To be appeared in ACM International Conference on Information and Knowledge Management (CIKM)

Effective Delayed Patching for Transient Malware Control on Networks October 2025

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

To be appeared in IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS)

Efficient Monte Carlo Algorithms for Approximating Katz Centrality on Large Graphs August 2025

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

Under review

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

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

Under review

Trapping Malicious Crawlers in Social Networks April 2025

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

Under review

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.

https://arxiv.org/abs/2404.02300

Synthesizing Challenging Pose Images for 2D Human Pose Estimation. Jun 2022

M.P. Vuong, D. Lim, H. Lee, S. Kim.

https://www.dbpia.co.kr/Journal/articleDetail?nodeId=NODE11113444

Awards

Computer Science Research Excellence Award – Texas State University
Dotoral Merit Fellowship – Texas State University
Graduate Research Assistant Tuition Scholarship – Texas State University, Jeonbuk National University