DR. HOANG H. NGUYEN

Research Assistant Professor | Graph Learning • Blockchain Security • Transportation

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FEATURED WORKING EXPERIENCE

Research Assistant Professor

UTC Research Institute, The University of Tennessee at Chattanooga

- Designing graph machine learning solutions for multi-object, multi-camera tracking and trajectory prediction at traffic intersections, leveraging decentralized data sources to improve accuracy and robustness
- Developing federated learning frameworks to support collaborative research and real-world deployment in smart city systems
- Integrating large language models (LLMs) with graph neural networks to detect and analyze vulnerabilities in blockchain smart contracts

August 2025 – Present USA

Postdoctoral Researcher

CUIP, The University of Tennessee at Chattanooga

- Leveraging large language models (LLMs) and graph neural networks to analyze vulnerabilities in blockchain smart contracts
- Developing federated learning frameworks to enhance collaborative research and practical applications across smart city systems
- Designing machine learning solutions for trajectory prediction at traffic intersections, utilizing decentralized data to improve accuracy and reliability

August 2024 – July 2025 USA

Doctoral Researcher

L3S Research Center, Leibniz University Hannover

- Employing graph representation learning for vulnerability detection in blockchain smart contracts
- Developing a database to manage and analyze large-scale blockchain-powered social network data
- Utilizing graph embeddings to enhance investigative capabilities by predicting unseen connections in crimnal networks
- Applying graph neural networks to analyze data from cubelet sensors to enhance the accuracy of predicting multiple object trajectories

February 2020 – July 2024 Germany

Research Collaborator

HCMC University of Technology - HCMUT

- Modeling Ethereum smart contracts' control flow and data dependency
- Applying machine learning to analyze Bitcoin and Ethereum transaction security vulnerabilities
- Analyzing real-time data of warehouse and transportation management systems integrated with Ethereum and EOS blockchain

June 2018 – December 2019 Vietnam

Research Assistant & Research Associate

Singapore Management University

- Generating control-flow graphs and data dependencies of Android platform
- Analyzing Android apps behaviors based on whole-system control flow
- Identifying private data leaks in Android framework APIs
- Context-aware code localization and recommendation

Mar 2016 – March 2018 Singapore

RESEARCH INTERESTS

Graph Learning | Machine Learning | Smart Transportation | Program Analysis | Blockchain Security | Smart Contracts

EDUCATION

Dr. rer. nat. (Ph.D.) in Computer Science

Leibniz University Hannover

Grade: Very Good / Magna Cum Laude
Thesis: Graph Representation Learning for Security Analytics in Decentralized Software Systems and Social Networks

May 2024 Germany

M.Eng. in Computer Science

HCMC University of Technology - HCMUT

Computer Security - Grade: Good
Thesis: Generating Control-Flow Graph from Android Binary Code

April 2017 Vietnam

B.Sc. in Electronics and Telecommunications

HCMC University of Science - HCMUS

Computer and Embedded Systems - Grade: Fair

March 2013 Vietnam

TECHNICAL SKILLS

Python | Java | Javascript | Solidity

PyTorch | PyG | DGL | NetworkX | SKLearn | Ethereum | Hive | Soot

Git | Google Cloud APIs | Android SDK | Flask | NodeJS | KnockoutJS | D3JS

RESEARCH SKILLS

Report Writing | Presentation | Self Motivation | Teamwork | Problem Solving | Critical Thinking

FEATURED PROJECTS

DENSO | 5GAPS | ROXANNE | MANDO | SoChainDB | LibraryGURU | Android OS Analysis | Kurumaerabi

REVIEWS

CONFERENCES:

- AAAI Conference on Artificial Intelligence (AAAI 2025, 2024, 2023)
- International Conference on Software Engineering (ICSE 2025, 2018)
- International Conference on Software Maintenance and Evolution (ICSME 2024)

JOURNALS:

- Empirical Software Engineering, Springer (2025)
- Information and Software Technology, Elsevier (2024, 2023)
- IEEE Transactions on Network and Service Management, IEEE (2024)
- IEEE Network Magazine, IEEE (2024)
- IEEE Transactions on Dependable and Secure Computing, IEEE (2024)
- IEEE Transactions on Information Forensics and Security, IEEE (2025, 2024)
- IEEE Transactions on Software Engineering, IEEE (2025, 2024)
- Knowledge-Based Systems, Elsevier (2023)
- IEEE Transactions on Multimedia, IEEE (2022)

LIST OF PUBLICATIONS

Graph Representation Learning for Vulnerability Detection in Blockchain Smart Contracts - MANDO Project

- **Nguyen, H. H.**, Nguyen, N.M., Xie, C., Ahmadi, Z., Kudenko, D., Doan, T. N., & Jiang, L. (2023, May). MANDO-HGT: Heterogeneous Graph Transformers for Smart Contract Vulnerability Detection. In *Proceedings of 20th International Conference on Mining Software Repositories*. (Rank A)
- **Nguyen, H. H.**, Nguyen, N.M., Doan, H.P., Ahmadi, Z., Doan, T. N., & Jiang, L. (2022, November). MANDO-GURU: Vulnerability Detection for Smart Contract Source Code By Heterogeneous Graph Embeddings. In *Proceedings of the ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering* (pp. 1736-1740) . (Rank A*)
- **Nguyen, H. H.**, Nguyen, N.M., Xie, C., Ahmadi, Z., Kudenko, D., Doan, T. N., & Jiang, L. (2022, October). MANDO: Multi-Level Heterogeneous Graph Embeddings for Fine-Grained Detection of Smart Contract Vulnerabilities. In *Proceedings of the 9th IEEE International Conference on Data Science and Advanced Analytics* (pp. 1-10). (Rank A)
- Bang, T., **Nguyen, H. H.**, Nguyen, D., Trieu, T., & Quan, T. (2020). Verification of ethereum smart contracts: a model checking approach. *International Journal of Machine Learning and Computing, 10*(4).

Graph Similarity Learning on Multi-Target Multi-Camera Object Tracking

- Nguyen, T.T., **Nguyen, H.H.**, Sartipi, M., and Fisichella, M. (2024). LaMMOn: Language Model Combined Graph Neural Network for Multi-Target Multi-Camera Tracking in Online Scenarios. *Machine Learning Journal*. (Q1 Journal)
- Nguyen, T.T., **Nguyen, H.H.**, Sartipi, M., and Fisichella, M. (2023). Multi-Vehicle Multi-Camera Tracking With Graph-Based Tracklet Features. *IEEE Transactions on Multimedia*. (Q1 Journal)
- Nguyen, T.T., **Nguyen, H.H.**, Sartipi, M., and Fisichella, M. (2023). Real-Time Multi-Vehicle Multi-Camera Tracking With Graph-Based Tracklet Features. *Journal of Transportation Research Record*. (Q2 Journal)

ACHIEVEMENTS

Best Paper Award, 2024
L3S Research Center, Leibniz University Hannover

Two Best Paper Awards, 2023
L3S Research Center, Leibniz University Hannover

SIGSOFT CAPS: ICSE 2023 Travel Grants, 2023
45th International Conference on Software Engineering, ICSE 2023

Silver Award $7000 at Blockchain Hackathon, 2018
Vietnam Blockchain Hub

SMU Internship Scholarship for Excellent Graduate Students, 2016
HCMC University of Technology

500,000 app downloads, 2015
Google Play store

EXTERNAL LINKS

Homepage:
https://hoanghnguyen.com
Google Scholar:
https://scholar.google.com/citations?user=cDB2Tt8AAAAJ
DBLP:
https://dblp.uni-trier.de/pid/200/9071.html
ORCID:
https://orcid.org/0000-0003-0611-4634
LinkedIn:
https://www.linkedin.com/in/mrerichoang
Github:
https://github.com/erichoang

REFERENCES

Available upon request

Graph Representation Learning for Criminal Network Analysis - ROXANNE Project - https://roxanne-euproject.org/

- Ahmadi, Z., **Nguyen, H. H.**, Zhang, Z., Bozhkov, D., Kudenko, D., Jofre, M., Calderoni, F., Cohen, N., & Solewicz, Y. (2023). Inductive and transductive link prediction for criminal network analysis. *Journal of Computational Science*, 102063. (Q1 Journal)
- **Nguyen, H. H.**, Bozhkov, D., Ahmadi, Z., Nguyen, N. M., & Doan, T. N. (2022, July). SoChainDB: A Database for Storing and Retrieving Blockchain-Powered Social Network Data. In *Proceedings of the 45th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2022)* (pp. 3036-3045). (Rank A*)
- Nguyen, T. H., **Nguyen, H. H.**, Ahmadi, Z., Hoang, T. A., & Doan, T. N. (2021, December). On the Impact of Dataset Size: A Twitter Classification Case Study. In *IEEE/WIC/ACM International Conference on Web Intelligence and Intelligent Agent Technology* (pp. 210-217). (Rank B)
- Maly, K., Backfried, G., Calderoni, F., Černocký, J., Dikici, E., Fabien, M., Hořínek, J., Hughes, J., Janošík, M., Kovac, M., Motlicek, P., **Nguyen, H. H.**, Parida, S., Rohdin, J., Skácel, M., Zerr, S., Klakow, D., Zhu, D. & Krishnan, A. (2021). ROXSD: a Simulated Dataset of Communication in Organized Crime. In *ISCA Symposium on Security and Privacy in Speech Communication*, Virtual Event, 10-12 November 2021 (pp. 32-36).
- Fabien, M., Parida, S., Motlícek, P., Zhu, D., Krishnan, A., & **Nguyen, H. H.** (2021). ROXANNE Research Platform: Automate Criminal Investigations. In *Interspeech* (pp. 962-964). (Rank A)
- **Nguyen, H. H.**, Zerr, S., & Hoang, T. A. (2020, December). On Node Embedding of Uncertain Networks. In *2020 IEEE International Conference on Big Data (Big Data)* (pp. 5792-5794). IEEE. (Rank B)

Android API Recommendation System - Library GURU Project - http://libraryguru.info

- Yuan, W., **Nguyen, H. H.**, Jiang, L., Chen, Y., Zhao, J., & Yu, H. (2019). API recommendation for event-driven Android application development. *Information and Software Technology, 107*, 30-47. (Q1 Journal)
- Yuan, W., **Nguyen, H. H.**, Jiang, L., & Chen, Y. (2018, May). LibraryGuru: API recommendation for Android developers. In *Proceedings of the 40th International Conference on Software Engineering: Companion Proceedings* (pp. 364-365). (Rank A*)

Analyzing Android System Behaviors

- **Nguyen, H. H.**, Jiang, L., & Quan, T. (2017, May). Android repository mining for detecting publicly accessible functions missing permission checks. In *2017 IEEE/ACM 25th International Conference on Program Comprehension (ICPC)* (pp. 324-327). IEEE. (Co-located ICSE 2017) (Rank A)
- **Nguyen, H. H.**, Jiang, L., & Quan, T. T. (2017). Whole-system analysis for understanding publicly accessible functions in Android.(2017). In *South East Asian Technical University Consortium (SEATUC) 11th Symposium Proceedings: Ho Chi Minh City, Vietnam, March 13-14*.
- **Hoang, N. H.** (2016, June). Poster: Android whole-system control flow analysis for accurate application behavior modeling. In *Proceedings of the 14th Annual International Conference on Mobile Systems, Applications, and Services Companion* (pp. 30-30). (Rank B)