

HOANG H. NGUYEN

Researcher PhD Candidate

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WORKING EXPERIENCE

Researcher PhD Candidate

L3S Research Center, Leibniz University Hannover

- Applying graph embeddings and deep learning for social network analysis to establish or predict unobserved connections of the entities such as persons, organizations, and locations, to enhance investigation capabilities for large criminal cases
- Applying graph learning on control-flow graphs, program call graphs, and data dependency for vulnerability detection in blockchain smart contracts
- Building a database for storing and retrieving blockchain-powered social network data, which is suitable for the analytics of massive-scale social networks and cross-domain user behaviors

📅 February 2020 – Current 📍 Germany

Research Collaborator

HCMC University of Technology - HCMUT

- Modeling of control flow and data dependency of Ethereum smart contracts
- Using machine learning techniques to analyze security vulnerabilities in transaction data of Bitcoin and Ethereum networks
- Analyzing real-time data of warehouse and transportation management systems, which integrate to Ethereum and EOS blockchain

📅 June 2018 – December 2019 📍 Vietnam

Research Associate

Singapore Management University

- Generating control-flow graphs and data dependencies of Android platform
- Analyzing Android apps behaviors based on whole-network graphs
- Context-aware code localization and recommendation

📅 May 2017 – March 2018 📍 Singapore

Research Assistant

Livlabs, Singapore Management University

- Generating control-flow graph of Android framework
- Analyzing Android apps behaviors based on whole-system control flow
- Identifying private data leaks in Android framework APIs

📅 Mar 2016 – Feb 2017 📍 Singapore

Android Developer

Fabrica Vietnam Co., Ltd

- User experience analysis using Material Design
- QR Code and Image Processing technologies
- Payment Processing technologies
- Building apps related to Coupon & Auction, Car Selling, and Overlay Photos

📅 Jun 2014 – Dec 2015 📍 Vietnam

Android Team Leader

EFSE Co., Ltd

- Exploring/Designing mobile apps' user-interaction interface for the young
- Near Field Communication and Call Blocking technologies
- Analyzing Android native launcher
- Designing new techniques for floating apps
- Building apps related to Android Launcher, NFC, Call Blocker, and Location

📅 Jan 2013 – May 2014 📍 Vietnam

RESEARCH INTERESTS

Graph Mining Network Analysis
Machine Learning Program Analysis
Blockchain Smart Contracts

EDUCATION

🎓 PhD in Computer Science

Leibniz University Hannover

Thesis: Graph Representation Learning for Security Analytics in Decentralized Software Systems and Social Networks

📅 Ongoing 📍 Germany

🎓 MEng in Computer Science

HCMC University of Technology - HCMUT

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

📅 April 2017 📍 Vietnam

🎓 BSc in Electronics and Telecommunications

HCMC University of Science - HCMUS

Computer and Embedded Systems - Grade B
📅 March 2013 📍 Vietnam

TECHNICAL SKILLS

Java Python Javascript Solidity
PyTorch NetworkX Scikit-learn
NumPy 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

MANDO SoChainDB ROXANNE
Blockchain WMS-TMS LibraryGURU
Android System Analysis Shaken QR
Kurumaerabi Android Launcher

REVIEWER

- Information and Software Technology journal, Elsevier, 2023
- 37th AAAI Conference on Artificial Intelligence 2023 (AAAI 2023, Washington DC, USA, February 7-24, 2023)
- Digital Transformation and Global Society 2020 (DTGS 2020, St. Petersburg, Russia, June 24-26, 2020)
- 40th International Conference on Software Engineering 2018 (ICSE 2018, Gothenburg, Sweden, May 27 - June 03, 2018)

FEATURED PUBLICATIONS

- ✿ **MANDO Project - Applying Graph Learning for Vulnerability Detection in Blockchain Smart Contracts**
 - **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)
 - **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*)
 - 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).

- ✿ **Combining Graph Matching and Siamese Network on Multi-Target Multi-Camera Object Tracking**
 - 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

- ✿ **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

REFERENCES

- Prof. Dr.-techn. Wolfgang Nejdl**
@ nejdl@l3s.de
✉ Leibniz University Hannover
- Assoc. Prof. Dr. Lingxiao Jiang**
@ lxjiang@smu.edu.sg
✉ Singapore Management University
- Assoc. Prof. Dr. Tho Quan**
@ qttho@hcmut.edu.vn
✉ HCMC University of Technology
- Dr. Zahra Ahmadi**
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✉ Leibniz University Hannover

EXTERNAL LINKS

- 🏠 **Homepage:**
<https://hoanghnguyen.com>
- 🔍 **Google Scholar:**
<https://scholar.google.com/citations?user=cDB2Tt8AAAAJ>
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<https://orcid.org/0000-0003-0611-4634>
- in **LinkedIn:**
<https://www.linkedin.com/in/mrerichoang>
- 🐙 **Github:**
<https://github.com/erichoang>



ROXANNE Project - Real Time Network, Text, And Speaker Analytics For Combating Organized Crime -
<https://roxanne-euproject.org/>

- Ahmadi, Z., **Nguyen, H. H.**, Zhang, Z., Bozhkov, D., Kudenko, D., Jofre, M., ... & Solewicz, Y. (2023). Inductive and transductive link prediction for criminal network analysis. *Journal of Computational Science*, 102063. (Q1 Journal)
- 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)
- Dikici, E., Fabien, M., Horinek, J., Hughes, J., Janošik, M., Kovac, M., Motlíček, P., **Nguyen, H.H.**, Parida, S., Rohdin, J., Skácel, M., ... & Krishnan, A. (2021). ROXSD: a Simulated Dataset of Communication in Organized Crime. In *ISCA Symposium on Security and Privacy in Speech Communication (2021)* (pp. 32-36).
- Fabien, M., Parida, S., Motlíček, 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)



Library GURU Project - Android API recommendation system -
<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*)



Project on 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)