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SKILLS

Knowledge Graph   7+ yrs

Anonymization   7+ yrs

Multi-Party Computation   1+ yrs

Zero-Knowledge Proof   1+ yrs

Homomorphic Encryption   1+ yrs

Hyperledger Fabric   1+ yrs

Machine Learning   1+ yrs

Deep Learning   1+ yrs

PROGRAMMING

Python   5+ yrs

Go   1+ yrs

.NET   2+ yrs

Node.js   2+ yrs

TOOLS

Docker   5+ yrs

Git   7+ yrs

Linux   5+ yrs

ANH-TU HOANG

Postdoctoral Researcher in Privacy, Security, Knowledge Graphs, and Decentralized Systems

ABOUT ME

I am a fast learner and an adventurer who is always eager to discover new directions of research and technology and apply them to solve problems in innovative and effective ways. My research interests include privacy, security, decentralized systems (i.e., blockchain), and machine learning/deep learning.

WORK EXPERIENCE

Reviewer   Dec 20 - Now
University of Insubria, Varese (Italy)

Review articles on various privacy-preserving technologies ($differential\ privacy$, k-anonymity, $privacy$-$preserving\ machine\ learning/deep\ learning$) from high-quality venues: VLDB, ACM Transactions on Privacy and Security, IEEE Internet Computing, International Journal of Cooperative Information Systems, ACM Transactions on Data Science, Data Science and Engineering.

Postdoctoral Researcher   Dec 20 - Nov 22
University of Insubria, Varese (Italy)

My research projects are funded by the EU H2020 CONCORDIA project. These projects' topic includes:

Privacy-preserving publishing of knowledge graphs:

- introduced new k-anonymity techniques protecting data owners in anonymized $knowledge\ graphs$ (KGs), a data structure used to represent, from state-of-the-art attacks;

- implemented the anonymization techniques in $Python$;

- exploited $Scikit$-$Learn$'s clustering algorithms (e.g., k-medoids, hdbscan) to anonymize KGs;

- implemented the Relational Graph Convolution Network models in $PyTorch$ to evaluate the quality (e.g., classification accuracy) of anonymized KGs in practice.

Decentralized Proximity Advertising System:

- proposed a permissioned blockchain platform, using $Hyperledger\ Fabric$, that supports proximity advertising campaigns exploiting IoT devices that interact with customers' smartphones to send advertising information and retrieve customers' information;

- developed a non-interactive $zero$-$knowledge$-$proof$ scheme using Pedersen commitment, ECIES, and Elgamal, a homomorphic encryption scheme in Go;

- implemented $smart\ contracts$ in Go to generate the proofs through a $multi$-$party\ computation$ protocol where each party is a verifier belonging to an advertiser or a publisher;

- implemented dApps in $Node.js$ to interact with the platform.

Supervising a PhD student, two Master students, and a Bachelor student in developing blockchain-based systems using Hyperledger Fabric.

Presenting in events of EU H2020 CONCORDIA project and the ICDE conference.

Ph.D. Student   Oct 17 - Dec 20
University of Insubria, Varese (Italy)

Courses: I took deep learning, and NoSQL courses and implemented deep learning models (Tensorflow) in the Google Landmark classification challenge hosted on Kaggle.

Directed Graph Anonymization: designed a new k-anonymity-based anonymization algorithm for directed graphs that is more efficient than the state-of-the-art algorithms for directed graphs.

KG Anonymization:

- introduced the first k-anonymity techniques protecting data owners in anonymized KGs in static and sequential publishing scenarios;

- extended node2vec (PyTorch) to generate users' vectors such that the information loss of anonymizing two users' data is similar to the distance between their vectors;

- developed a cluster-based anonymization algorithm that allows data providers to use Scikit-Learn's clustering algorithms (e.g., k-means, HDBSCAN) to generate anonymized KGs.

Sequential Anonymization of KGs:

- extended k-anonymity techniques to protect users' identities when attackers exploit multiple anonymized KGs;

- designed an efficient anonymization algorithm generating anonymized KGs such that w continuous KGs satisfy k^w-tad.

Marker centroid detection in X-ray radiographs: implemented an adapter library that is used for training a ResNet-based model to detect the centroids of metal markers in X-ray projections using MXNet and Python.

Research Intern   Mar 13 - Sept 13
National Institute of Informatics, Tokyo (Japan)

Watermarking on Anonymized Relational Datasets: proposed a watermarking technique detecting the illegal distribution of anonymized data and implemented the technique in .NET (C#).

Text Anonymization: collaborated to present machine learning and NLP techniques detecting temporal phrases containing users' location and time in tweets.

Teaching Assistant & Lecturer   Sept 09 - Oct 17
University of Science-Vietnam National University, Ho Chi Minh City (Vietnam)

I researched anonymization techniques and supervised Bachelor students on theses collaborated with companies.

Supervised Bachelor students on theses collaborated with companies.

I gave lectures on: programming (C/C++), fundamental of databases, Oracle security technologies, NoSQL (Redis, MongoDB, Cassandra, sharding/replication), and web programming (Docker, .NET, Ruby on Rails, Node.js, Java).

EDUCATION

Ph. D. - Computer Science   2017 - 2020
University of Insubria - Varese (Italy)

Thesis work on anonymization techniques for knowledge graphs (Python).

Master - Information Systems   2009 - 2012
**University Science, Vietnam National University - Ho
Chi Minh City (Vietnam)**

Thesis work on anonymization techniques for relational dataset (.NET).

Bachelor - Information Technology   2005 - 2009
**University Science, Vietnam National University - Ho
Chi Minh City (Vietnam)**

Thesis work on a platform that generates Windows Mobile games (.NET).

RELATED PUBLICATIONS

1. **Anh-Tu Hoang**, Barbara Carminati, Elena Ferrari. Personalized Anonymization of Knowledge Graphs. The IEEE Transactions on Dependable and Secure Computing (Under Preparation).

2. **Anh-Tu Hoang**, Barbara Carminati, Elena Ferrari. Promark: A Blockchain-Based Proximity Marketing Platform (Under Preparation).

3. **Anh-Tu Hoang**, Barbara Carminati, Elena Ferrari. 2022. Time-Aware Anonymization of Knowledge Graphs. The ACM Transactions on Privacy and Security (Accepted).

4. **Anh-Tu Hoang**, Barbara Carminati, Elena Ferrari. 2021. Privacy-Preserving Sequential Publishing of Knowledge Graphs. IEEE International Conference on Data Engineering. 2021–2026.

5. **Anh-Tu Hoang**, Barbara Carminati, Elena Ferrari. 2020. Cluster-based anonymization of knowledge graphs. Applied Cryptography and Network Security. Springer International Publishing. 104–123.

6. V. Nguyen, J. De Beenhouwer, S. Bazrafkan, A-T Hoang, S. Van Wassenbergh, and J. Sijbers. 2020. BeadNet: A Network for Automated Spherical Marker Detection in Radiographs for Geometry Calibration. CTMeeting-2020, Regensburg, Germany.

7. Hoang-Quoc Nguyen-Son, **Anh-Tu Hoang**, Minh-Triet Tran, and Isao Echizen. 2013. Anonymizing Temporal Phrases in Natural Language Text to be Posted on Social Networking Services. Digital-Forensics and Watermarking. 437–451.