ZHEXI LU

ShenYang ◇ China
(+86)13632853875 ◇ luzhexi58@gmail.com

EDUCATION

Northeastern University *September 2020 - June 2024*
B.S. in Information Security
Overall GPA: 4.13/5.0
Average Score:91.3/100
Ranking: Top 8%

RESEARCH INTEREST

My research interest lies in security and privacy-preserving aspects of Machine Learning (ML). Specifically, I am broadly interested in developing methodologies to improve the reliability, trustworthiness and efficiency of various ML systems. I have conducted several research projects such as accurate and honest uncertainty estimates of ML algorithms, optimal balance of security and efficiency in ML systems and efficient encryption algorithm, etc. My efforts have led to publications in highly-competitive conferences such as ICA3PP.

RESEARCH EXPERIENCE

Communication overhead optimization of distributed graph neural networks August 2023 - Present
Research Assistant *North Carolina State University*

- Studied intensively on fundamental theories in GNN paper.
- Implemented graph convolutional network on Pytorch.

Seizing Critical Parameters in Federated Learning May 2023 - August 2023
Research Assistant *Xi'an Jiaotong University*

- Proposed a Gaussian noise addition method based on critical training period to protect the uploading gradients.
- Evaluated the algorithm on CIFAR-100 dataset and obtained some preliminary results.

Searchable encryption based on the blockchains September 2022 - June 2023
Research Assistant *Northeastern University*

- Designed a novel model (FDRShare) achieved decentralized fine-grained access control with constant-size ciphertext.
- Integrated a bloom filter to the non-interactive blockchain boolean search protocol to improve search efficiency.
- Evaluated our model on a real dataset. The results verify the effectiveness of FDRshare compared to MedShare.

PROJECT EXPERIENCE

Blockchain-based medical data sharing system April 2023 - August 2023
Lead Developer *Northeastern University*

- Developed a Web3.0 platform for medical data sharing on blockchain, for transparent and traceable fundraising, using **Javascript, Flask**, integrating **MetaMask** for wallet functionality. Wrote and deployed the smart contract using **Solidity**.Using **SE** (searchable encryption) algorithms and **ABE** (attribute-based encryption) methods to enable fine-grained access control and user privacy preserving.

Encryption and Decryption Toolbox April 2022 - June 2022
Lead Developer *Northeastern University*

- A dual-machine encryption and decryption toolbox developed by **Qt** and implemented through socket programming to enable dual-machine communication. The toolbox supports message exchange and file transfer between two terminals. It includes implementation of common monoalphabetic ciphers such as Caesar cipher and Keyword cipher, polyalphabetic ciphers such as Vigenere cipher, Autokey ciphertext, Autokey plaintext, polygraphic substitution ciphers such as Playfair cipher, transposition ciphers, stream ciphers such as RC4, block ciphers such as **DES, AES** , public key ciphers such as**RSA, ECC**, as well as **MD5** and DH key exchange.

PUBLICATION

- **Zhexi Lu***, Zhichao Li*, Lingshuai Wang and Qiang Wang. FDRShare: A Fully Decentralized and Redactable EHRs Sharing Scheme with Constant-Size Ciphertexts. The 23rd International Conference on Algorithms and Architectures for Parallel Processing.(In press)

SCHOLARSHIPS & AWARDS

- **Second-class** scholarship of Northeastern University(2023)
- **Second-class** prize of National College Student Information Security Contest(2023)
- **Third-class** scholarship of Northeastern University(2021, 2022)
- **Third-class** prize of CUMCM(2022)

TECHNICAL STRENGTHS

Computer Languages	Python, C/C++, Matlab, JavaScript
Protocols & APIs	XML, JSON
Databases	MySQL, PostgreSQL