Nan Yan

Curriculum Vitae

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Education

2023–Now **M.Eng. in Computer Science and Engineering**,
Wuhan University, Wuhan, China,
Advisor: Prof. Li Yuqing, GPA: 90.07/100
Research Interests: Trustworthy AI, Federated Learning, Privacy Preserving

2019–2023 **B.Eng. in Computer Science and Engineering**,
Shandong University, Qingdao, China
GPA: 88.51/100, Graduated with Outstanding Honor

Selected Projects

Federated Learning

2023–2024 **Efficient and Straggler-Resistant Homomorphic Encryption for Heterogeneous Federated Learning**
- A contribution-aware encrypted weighted aggregation and sketching-based client selection algorithm for optimizing FL training efficiency with CKKS-based HE.
- Achieving a training speedup of 1.85–4.44$\times$, cut the communication overhead by 1.24–22.62$\times$, and reduce the straggler effect by up to 1.71–2.39$\times$.
- 4.5 kloc, codebase released and work accepted in the Proc. of IEEE INFOCOM 2024.

2022–2023 **Efficient and Straggler-Resistant Homomorphic Encryption for Heterogeneous Federated Learning**
- A fundamental and versatile federated learning framework, rigorously tested across diverse datasets and models, designed to facilitate efficient framework construction for federated learning tasks.
- Conducted a reproduction of federated learning incorporating knowledge distillation, alongside the implementation of five baseline methods for comprehensive comparison.

Open Source Software Release

2022–2023 **Pioneer: a low-cost Bluetooth-based virus tracking system**
- A cost-effective virus tracking system leveraging Bluetooth technology, secured with the national cryptographic algorithm SM3 for encryption and certification.
- Designed and implemented a comprehensive system encompassing backend database server development, Android application development, and iOS application development.
- 19.6 kloc, codebase released and work earned 137 stars, 99 forks.

Academic Experience

Conference and Journal Publications

2024 **Nan Yan**, Yuqing Li, Jing Chen, Xiong Wang, Jianan Hong, Kun He, Wei Wang, "Efficient and straggler-resistant homomorphic encryption for heterogeneous federated learning," *in Proc. IEEE INFOCOM, 2024 (acceptance rate: 19.6%).*

Manuscripts

2025 **Nan Yan**, Yuqing Li, Xiong Wang, Jing Chen, Kun He, Bo Li, "EmbedX: Embedding-Based Cross-Trigger Backdoor Attack Against Large Language Models," *USENIX Security 2025 (Under Review).*

2025 **Nan Yan**, Yuqing Li, Jing Chen, Xiong Wang, Wei Wang, Shuhua Li, "Towards Improved Differentially Private Federated Fine-tuning of Language Models on Heterogeneous Clients," *KDD 2025 (Under Review).*

2024 Yuqing Li, **Nan Yan**, Jing Chen, Xiong Wang, Jianan Hong, Kun He, Wei Wang, "FedPHE: A Secure and Efficient Federated Learning via Packed Homomorphic Encryption," *IEEE TDSC (Major revision).*

2025 Haoran Wang, Xiong Wang, Yuqing Li, Jing Chen, Junyi Zhang, **Nan Yan**, Kun He, "Improved Federated LoRA via Error-Free Aggregation and Matrix-Wise Freezing," *IJCAI 2025 (Under Review).*

2025 Haoran Wang, Xiong Wang, Yuqing Li, Jing Chen, Yuntao Nie, **Nan Yan**, Meng Jin, Bo Li, Can Mao, "FedP2P: Towards Accelerated Federated Learning with Peer-to-Peer Communication," *MobiCom 2025 (Under Review).*

Scholarships and Honors

2024 National Scholarship (Top 0.2% nationwide), Ministry of Education, China

2024 Metrit Student, WHU

2024 First Class Scholarship (Award Rate: 5% school-wide), WHU

2023 Outstanding Graduate Award, SDU

2023 Alumni Council Representative (Dept. CSE, 6/101), SDU

2023 The Power of Role Models Academy Person of the Year (Dept. CSE, Top 1), SDU

2022 Excellent Student Cadre, SDU

2020, 2022 Second Class Scholarship (Award Rate: 10% school-wide), SDU

2020, 2022×3 Merit-Based Scholarship, SDU

Competition Awards

2022 Second Prize of The 7-th National College Cryptography Mathematics Contest, Chinese Association for Cryptologic Research, China

2022 Second Prize of The 15-th National College Student Information Security Competition, Cyber Security Association, China

2022 First Prize of The 7-th National College Cryptography Mathematics Contest, Chinese Association for Cryptologic Research, North China Division

2021 First Prize of China Undergraduate Mathematical Contest in Modeling, Shandong Province

Patents and Software Copyrights

Feb 2025 "Large language model training method and system based on elastic federated low-rank adaptive fine-tuning", China Patent Application CN119443311A, PatentPending

Jan 2025 "Method for constructing a vertical federated learning system based on participant selection and parameter freezing", China Patent Application CN202411465068.7, PatentPending

Dec 2024 "Differential privacy-based heterogeneous federal fine tuning language model construction method and system", China Patent Application CN119150357A, PatentPending

Oct 2024 "Cross-silo heterogeneous federated learning system based on homomorphic encryption V1.0", China Software Copyrights 2024SR1516588

Apr 2024 "Method and device for constructing cross-silo heterogeneous federated learning system based on homomorphic encryption", China Patent Application CN117892322A, PatentPending

Mar 2024 "Network traffic obfuscation method, device, equipment and medium", China Patent Application CN117749402A, PatentPending