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wuwuz.github.io

Education

Carnegie Mellon University Pittsburgh, US
- *Ph.D. in Computer Science* *Feb. 2021 - Present*

Peking University Beijing, China
- *Bachelor of Science (Honored) in Computer Science* *Sep. 2016 - Jul. 2020*
  - **Turing Class**: First honor class
  - **GPA**: 3.73/4.00

Working Experience

Shanghai Qizhi Institute Shanghai, China
- *Research Assistant, High Performance Blockchain Network Research* *Aug. 2020 - Feb. 2021*

University of Hong Kong Hong Kong SAR, China
- *Research Assistant, Privacy-preserving Data Aggregation* *Jun. 2021 - Aug. 2021*

Publications

- Wang, M.*, **Zhou, M.***, Shi, S., & Qian, C. **Vacuum Filters : More Space-Efficient and Faster Replacement for Bloom and Cuckoo Filters.** VLDB, 2020.

  *Equal contribution.

- Hou, C.*, **Zhou, M.***, Ji, Y., Daian, P., Tramer, F., Fanti, G., & Juels, A. **SquirRL: Automating Attack Analysis on Blockchain Incentive Mechanisms with Deep Reinforcement Learning.** NDSS 2021.

  *Equal contribution.

Research Experiences

Sparse Vector Mean Estimation under Local Differential Privacy
Advisor: Prof. Giulia Fanti, Prof. Elaine Shi, Prof. Hubert Chan *Apr. 2021 - Present*
- Proposed a new flexible LDP definition for vector analytics.
- Proved new lower bounds on the utilities for vector analytics in LDP.
- Designed an algorithm that achieves nearly optimal estimation error.

Mercury: Fast Transaction Broadcast in High Performance Blockchain System
Advisor: Prof. Dong Zhou *Aug. 2020 - Feb. 2021*
- Built a robust network virtual coordinate in malicious network
- Constructed a broadcast scheme based on location-awareness clustering and early outburst strategy
- Achieved more than 50% latency improvement in Conflux Network(1000 nodes with 2000+ TPS)

VRecon: An Efficient Set Reconciliation Algorithm
Advisor: Prof. Yunhuai Liu, Prof. Chen Qian *Apr. 2020 - Jul. 2020*
- Designed an efficient set reconciliation algorithm based on Vacuum Filter and Invertible Bloom Fitler.
- Achieved 45% more bandwidth saving compared to existing works using matching vector optimization.
- Achieved both scalability and robust performance within linear time complexity.

SquirRL: Automating Attack Analysis on Blockchain Incentive Mechanisms with DRL
Advisor: Prof. Giulia Fanti, Prof. Ari Juels *Jun. 2019 - Jun. 2020*
- Proposed a general framework for automatical attack discoveries on complex blockchain protocols.
- Implemented interactive environments for Bitcoin/Ethereum/GHOST protocols, supporting multi-agent setting.
- Achieved best attack results in real-data simulations with reinforcement learning.

Vacuum Filters : More Space-Efficient and Faster Replacement for Bloom and Cuckoo Filters
Advisor: Prof. Chen Qian *Mar. 2019 - Aug. 2019*

- Proposed new table structures based on Cuckoo Filter to achieve SotA memory utilization.
- Optimized insertion/lookup and implemented parallel operations, achieving SotA throughput performance.
- Proposed a dynamic re-construction scheme for real application.

Competitions

International Collegiate Programming Contest, Regional Gold Medal, *ICPC Foundation* Oct. 2018
National Olympiad of Informatics, Gold Medal, *China Computer Federation* Aug. 2015

Awards and Honors

Outstanding Dissertation for Bachelor's Degree (**Top 10** in the EECS school), *PKU* Jun. 2020
Turing Benteng Scholarship, *PKU* Nov. 2019
Kwang-Hua Scholarship (**Top 3** in class, ∼**1%** of students), *PKU* Dec. 2018
Chuang-Long Ke Scholarship, *PKU* Dec. 2017
Dean Scholarship for Freshman, *PKU* Sep. 2016

Coding

- **Primary Languages**: C, C++, Python
- **Others**: Java, Rust