Xiaohai Dai

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EDUCATION

- **Huazhong University of Science and Technology** **Wuhan, China**
  Ph.D. of Computer Architecture (Supervisor: Hai Jin) *Sep. 2017 - Jun. 2021*
- **Huazhong University of Science and Technology** **Wuhan, China**
  Master of Computer Architecture (Supervisor: Hai Jin) *Sep. 2014 - Jun. 2017*
- **Xiangtan University (transfer in due to injury)** **Xiangtan, China**
  Bachelor of Computer Science and Technology *Sep. 2013 - Jun. 2014*
- **National University of Defense Technology (transfer out due to injury)** **Changsha, China**
  Bachelor of Computer Science and Technology *Sep. 2010 - Jun. 2013*

EXPERIENCE

The Hong Kong Polytechnic University **Hong Kong**
Research Assistant (Supervisor: Bin Xiao) *Jul. 2019 - Jan. 2020*

- Research on the scalability of blockchain systems.
- Designed a lightweight and efficient block validation mechanism for UTXO-based blockchain.

Nebulas (a permissionless blockchain company) **Beijing, China**
Internship *Mar. 2018 - Sep. 2018*

- Research on the consensus (i.e., Proof of Devotion, PoD) of Nebulas blockchain system.
- Research on the data mining and analysis of Ethereum.

The Hong Kong University of Science and Technology **Hong Kong**
Research Assistant (Supervisor: Long Quan) *Jul. 2016 - Mar. 2017*

- Designed and implemented a distributed system to run parallel three-dimensional reconstruction tasks on multiple machines.

ACADEMIC PROJECTS

A Simple Asynchronous Consensus *Aug. 2020 - Present*

- Decompose the Bitcoin consensus algorithm
- Design an asynchronous consensus as simple as Bitcoin for the permissioned blockchain systems

A Lightweight Storage Mechanism for DAG-based Blockchain *Apr. 2020 Oct. 2020*

- Analyzed the data redundancy in the DAG-based blockchain systems.
- Reduced the storage overhead by eliminating the data redundancy.

An Efficient Block validation Mechanism for Blockchain *Sep. 2019 Mar. 2020*

- Designed a lightweight status representation method for the UTXO-based blockchain systems.
- Based on the status representation, devised an efficient block validation mechanism.

A Lightweight Verifiable Query Mechanism for Blockchain *Apr. 2019 Jan. 2020*

- Designed a novel authenticated data structure by combining Merkle tree and Bloom filter.
- Based on the novel data structures, proposed a lightweight verifiable query mechanism for historical transactions on Bitcoin.

A Lightweight Storage Mechanism for Blockchain *Sep. 2018 Jan. 2019*

- Reunderstood the Bitcoin system from the prospective of a trading system.
- Argued that a user in Bitcoin only cares about his/her own transaction data, as an analogy of our real life.
- Designed a lightweight storage mechanism without sacrificing the decentralization.

SELECTED PUBLICATIONS

- **Xiaohai Dai**, Jiang Xiao, Wenhui Yang, et al. "LVQ: A Lightweight Verifiable Query Approach forTransaction History in Bitcoin." In Proceedings of the 40th IEEE International Conference on Distributed Computing Systems (ICDCS'20). IEEE, Singapore, 1020-1030
- **Xiaohai Dai**, Jiang Xiao, Wenhui Yang, et al. "Jidar: A Jigsaw-like Data Reduction Approach Without Trust Assumptions for Bitcoin System." In Proceedings of the 39th IEEE International Conference on Distributed Computing Systems (ICDCS'19). IEEE, Dallas, TX, USA, 1317-1326
- Hai Jin, **Xiaohai Dai**, Jiang Xiao. "Towards a Novel Architecture for Enabling Interoperability amongst Multiple Blockchains." In Proceedings of the 38th IEEE International Conference on Distributed Computing Systems (ICDCS'18). IEEE, Vienna, Austria, 1203-1211
- Chaofan Wang, **Xiaohai Dai**, Jiang Xiao, et al. "Demystifying Ethereum Account Diversity: Observations, Models and Analysis." Frontiers of Computer Science (FCS'21), 2021, 16(4), 1-12
- Rui Han, Jiang Xiao, **Xiaohai Dai**, et al. "Vassago: Efficient and Authenticated Provenance Query on Multiple Blockchains." In Proceedings of the 40th International Symposium on Reliable Distributed Systems (SRDS'21), IEEE, 132-142.
- Weifeng Hao, Jiajie Zeng, **Xiaohai Dai**, et al. "Towards A Trust-Enhanced Blockchain P2P Topology for Enabling Fast and Reliable Broadcast." IEEE Transactions on Network and Service Management (TNSM'20), 2020, 17(2), 904-917
- Wenhui Yang, **Xiaohai Dai**, Jiang Xiao, et al. "LDV: A Lightweight DAG-based Blockchain for Vehicular Social Networks." IEEE Transactions on Vehicular Technology (TVT'20), 2020, 69(6), 5749-5759

AWARDS AND HONORS

- Outstanding student of National University of Defense Technology, 2013
- Academic scholarship, 2017-2021
- FISCO BCOS Blockchain Application Contest (China), Best Creativity Award, 2018
- WeBank's First University Hackathon (Blockchain Track), Top Ten, 2019
- Huawei scholarship, 2020
- CCF-DPCS, Distinguished Doctorate, 2020
- ACM-Wuhan Doctoral Dissertation Award, 2021

KEY SKILLS

- Deep understanding of the popular blockchain systems, e.g., Bitcoin, Ethereum, Hyperledger Fabric.
- Familiar with many classical-BFT consensus algorithms, e.g., PBFT, Pala, Streamlet, HotStuff, Tendermint, Zyzzyva.
- Know well the Btcd (an implementation of Bitcoin in Golang) codes, partially familiar with the Geth (an implementation of Ethereum in Golang) codes and Fabric codes.
- Good at system programming, particularly in Golang.
- Proficient in English