JINGYU LIU

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EDUCATION

Hong Kong University of Science and Technology, Guangzhou, China **(expected)**   **09/2024 – 06/2028**

PhD in Financial Technology. Advised by Prof. Yingjie Xue

Harbin Institute of Technology, Shenzhen, China   **09/2019 – 06/2023**

B.E. in Computer Science and Technology

- Average score: 87.81/100 (92.28/100 in last 2 years)

PUBLICATIONS/PREPRINTS

Jingyu Liu, Yingjie Xue, Zifan Peng, Chao Lin, Xinyi Huang. FairRelay: Fair and Cost-Efficient Peer-to-Peer Content Delivery through Payment Channel Networks. Arxiv, 2024.

Jingyu Liu, Yang Zhao, Xinrui Xiao, and Jie Liu. 2023. CAS: Crop Aerial Sensing Simulation in Smart Farming In the 2023 20th Annual IEEE International Conference on Sensing, Communication, and Networking (SECON'23), Workshop on Sensing, Communication and Networking for Smart Agriculture, September 11–14, 2023, Madrid, Spain.

Jingyu Liu, Xinrui Xiao, Yang Zhao, and Jie Liu. 2022. Demo Abstract: Containerized Mobile Sensing Simulation Framework for Smart Agriculture. In the 20th ACM Conference on Embedded Networked Sensor Systems (SenSys'22), November 6–9, 2022, Boston, MA, USA. ACM, New York, NY, USA, 2 pages.

RESEARCH AND WORK EXPERIENCE

Thrust of Financial Technology

Hong Kong University of Science and Technology, Guangzhou, China   **12/2023 – Present**

Full-time Research Assistant | Advisor: Prof. Yingjie Xue

- Proposed FairRelay, the first cost-efficient decentralized content delivery protocol with fair incentives over Payment Channel Networks, utilizing multiple cryptographic primitives such as zero-knowledge proofs, homomorphic encryption, and fraud-proof schemes.
- Formally proved the security properties of FairRelay within the *Universal Composability Framework* and thoroughly evaluated its efficiency both on-chain and off-chain.

International Research Institute for Artificial Intelligence

Harbin Institute of Technology, Shenzhen, China   **08/2022 – 06/2023**

Part-time Undergraduate Research Assistant | Advisor: Prof. Yang Zhao

- Developed a containerized mobile sensing simulation (CMOS) framework for smart agriculture applications. The CMOS framework is an out-of-the-box solution for deploying unmanned vehicle simulations and generating synthetic datasets specific to the agriculture domain. Implemented using ROS (Robot Operating System), integrating Blender, Gazebo, MAVLink, and PX4 autopilots in Docker.
- Generated a large-scale synthetic image dataset of cornfields based on the aforementioned framework, used for training deep learning models on the corn leaf image segmentation problem. Our segmentation model outperformed the state-of-the-art segmentation model SAM with higher efficiency in corn leaf segmentation. This work resulted in a conference paper presented at SECON'23.

Software and Emerging Technologies Lab

Polytechnique Montréal, Montreal, Canada   **07/2022 – 10/2022**

Full-time Research Intern | Advisor: Prof. Mohammad Hamdaqa

- Proposed a multi-level ontology of residential lease agreements by modeling standard residential lease forms provided across Canada using Protégé, employing Giancarlo Guizzardi's approach.

- Based on the ontology, developed a set of domain-specific language (DSL) tools on JetBrains MPS, including two domain-specific languages: AliceGen and AliceVerify, which were used to formalize and verify leases written in natural language, subsequently converting them into Smart Contracts.

Skills

- **Distributed Systems**: A solid grasp of various consensus algorithms in distributed systems, including traditional crash fault tolerance protocols, permissioned BFT protocols like Tendermint, and permissionless BFT protocols such as Casper-FFG. Proficient in various blockchain architectures and scaling solutions, with a thorough understanding of the mechanisms behind mainstream DeFi protocols, such as MakerDAO, Tornado Cash, Compound, and Uniswap.
- **Cryptography**: Possesses experience with cryptographic algorithms and tools pertinent to blockchain technology like commitment schemes. Familiar with main-stream ZK proof schemes, along with associated frameworks like Circom, SnarkJS and Arkworks.
- **Foundational knowledge**: Strong foundation in operating systems, networking, and databases. Successfully completed all labs from MIT 6.S081, demonstrating familiarity with peer-to-peer network algorithms including Chord and Kademlia. Extensive experience with the PyTorch framework.
- **Programming Languages**: Versatile in programming languages, with proficiency in JavaScript, Solidity, Rust, Go, and Python.

Selected Projects

Atomic Buy

A Decentralized Framework for Trustless and Atomic Digital Content Purchases over the Lightning Network

RBTC

Bitcoin-like SegWit UTXO blockchain node and cli-wallet in Rust, implementing P2WPKH payment.

5-pipeline CPU in RISC-V

A 5 stage pipeline CPU in Verilog on miniRV-1 instruction set with dynamic branch prediction, running at a high clock speed of 152Mhz on FPGA.

Alice DSL

A set of domain-specific languages which model and verify residential leases, converting contracts to machine readable structure using JetBrains MPS.

Miscellaneous

- Welcome to my Blog: https://vieloooo.github.io/