Fangyu Gai

Curriculum Vitae

+1 2508993406
fangyu.gai@ubc.ca
https://fangyugai.me/
greferry
gitferry

Educational Background

2018

Ph.D., *University of British Columbia*, Vancouver and Kelowna, Canada, research on the general area of blockchain technology, mainly focusing on layer-2 scaling of blockchain systems.

2015 2017

Master of Science, *National University of Defense Technology*, Changsha, China, major in Computer Science and Technology.
Thesis: Research on Trust Management for Internet of Things

2011 2015

Bachelor of Science, *Beijing Institute of Technology*, Beijing, China, major in Information Security.
Thesis: Enhance Adaboost Algorithm by Integrating LDA Topic Model

Research Interests

- Distributed Systems
- Blockchain & Smartcontract

Research Experience

2019

Rethinking Byzantine Fault Tolerant (BFT) Protocols in the Age of Blockchains, *June 2019 - December 2019*.

Description This is a joint research project with our industrial partner Dapper Labs. In this proposed research, we aim to develop such a framework together with Dapper Labs. As a starting point, we will make use of Hot-Stuff, which provides an algorithmic foundation for describing several new-generation BFT protocols such as Tendermint and Casper. In particular, we will combine Hot-Stuff with a realistic network model based on our previous work. This combination will enable us to analyze the throughput and delay performance of various BFT protocols. Finally, we will conduct extensive simulations to verify our theoretical findings.

Funding Agency Natural Sciences and Engineering Research Council of Canada (NSERC).

2018

Research and implementation on Layer 2 scaling of blockchain systems.

Role Group leader.

Description Scaling remains the primary focus of current development of blockchain. Layer 2 solutions including Plasma, TrueBit and StateChannel provide "off-chain" solutions. Current research is based on Plasma framework, addressing remaining issues.

Project website `https://github.com/gitferry/mastering-ethereum`

2017 – 2018 **Research and implementation on reputation-based consensus protocol**.

Role Group leader.

Description Beyond cryptocurrencies, it is believed that blockchain can also be used to protect other properties such as reputation. This project presents a reputation-based consensus protocol called Proof of Reputation (PoR), which guarantees reliability and integrity of transaction outcomes.

Funding Agency National Science Foundation of China (NSFC).

Project website `https://github.com/gitferry/PoR`

2016 – 2017 **Research on Blockchain based Identity Authentication and data protection for Internet of Things**.

Role Group leader.

Description IoT suffers from potential systemic failures as it scales with disastrous consequences. This project proposes an integrated blockchain and IoT hardware solution to solve IoT's issues with identity, security, and interoperability.

Funding Agency State Scientific and Technological Commission.

Working Experience

Internship

2019 **Back-end Engineer (part-time)**, *Dapper Labs Inc.*, Vancouver, Canada, Consensus nodes for Flow blockchain..
Starting from Dec. 2019.

2019 **NSERC Research Project**, *Dapper Labs Inc.*, Vancouver, Canada, Rethinking Byzantine Fault Tolerant (BFT) protocols in the age of Blockchains..
Jun. 2019 - Dec. 2019

2014 **Software Designer Internship**, *JoyShare Inc.*, Beijing, China, Developed an iOS App named JoyShare, which helps users share their goods online..
Oct. 2013 - Feb. 2014

Teaching Assistant

2019 **ENGR 453 Internet of Things**, *University of British Columbia*, Kelowna, Canada.
SUPERVISOR Professor Chen Feng

2016 **Cryptography**, *National University of Defense Technology*, Changsha, China.
SUPERVISOR Professor Xinwen Jiang

Open Source Contributor

2018 **Solidity Document Translation**, *HiBlock Inc.*, Beijing, China.
Working as a member of Chinese Solidity document translation team, which is authorized by Solidity team.

Languages

Chinese	Native	*Mother Tongue*
English	IELTS 7.0	*Listening: 7.5, Reading: 8.0, Writing: 6.0, Speaking: 7.0*
Japanese	Basic Fluency	*Good Understanding, Medium Speaking, Basic Writing*

Skills

Programming	Soldity, Python, Go, Objective-C, Javascript, LaTeX	
Tools	GitHub, PyCharm, BitBucket, Vim, Docker	*Program Version Control and Program Repositories.*
Other Skills	Communication, Organization, Writing, Translation	

Participation In Events

2019 **Blockchain@UBC Summer Institute 2019**, Vancouver, Canada.

2017 **Google Developer Dyas**, Beijing, China.

2017 **The 5th Internet Security Conference**, Beijing, China.
The largest Asia-pacific security event with the highest level and widest influence.

2017 **The 12th International Conference on Wireless Algorithms, Systems, and Applications**, *as a speaker*, Guilin, China.
An academic conference focusing on ubiquitous infrastructure and infrastructureless wireless networks.

2015 **The 3rd Kcon**, Beijing, China.
A well known hacker meeting in China.

Publications

[Gai et al., 2019] Gai, F., Grajales, C., Niu, J., and Feng, C. (2019). A secure consensus protocol for sidechains. *CoRR*, abs/1906.06490.

[Gai et al., 2016] Gai, F., Li, Z., Jiang, X., and Guo, H. (2016). Enhance adaboost algorithm by integrating lda topic model. In *International Conference on Data Mining and Big Data*, pages 27–37. Springer.

[Gai et al., 2018] Gai, F., Wang, B., Deng, W., and Peng, W. (2018). Proof of reputation: A reputation-based consensus protocol for peer-to-peer network.

[Gai et al., 2017a] Gai, F., Zhang, J., Zhu, P., and Jiang, X. (2017a). Multidimensional trust-based anomaly detection system in internet of things. In *International Conference on Wireless Algorithms, Systems, and Applications*, pages 302–313. Springer.

[Gai et al., 2017b] Gai, F., Zhang, J., Zhu, P., and Jiang, X. (2017b). Ratee-based trust management system for internet of vehicles. In *International Conference on Wireless Algorithms, Systems, and Applications*, pages 344–355. Springer.

[Gai et al., 2017c] Gai, F., Zhang, J., Zhu, P., and Jiang, X. (2017c). Trust on the ratee: A trust management system for social internet of vehicles.

[Li et al., 2018] Li, D., Peng, W., Deng, W., and Gai, F. (2018). A blockchain-based authentication and security mechanism for iot. In *27th International Conference on Computer Communication and Networks, ICCCN 2018, Hangzhou, China, July 30 - August 2, 2018*, pages 1–6.

[Liu et al., 2018] Liu, D., Wang, J., Rong, Z., Mi, X., Gai, F., Tang, Y., and Wang, B. (2018). Pangr: A behavior-based automatic vulnerability detection and exploitation framework. In *17th IEEE International Conference On Trust, Security And Privacy In Computing And Communications / 12th IEEE International Conference On Big Data Science And Engineering, TrustCom/BigDataSE 2018, New York, NY, USA, August 1-3, 2018*, pages 705–712.