

JIN FANG

✉ fanjin98@outlook.com · ☎ (+86) 181-5566-1676 · 🌐 www.fangjin.site

EDUCATION

University of Science and Technology of China (USTC) Anhui, China

M.S. in Computer Science 2020.9-2023.6

- Research focus on Programmable Network, In-network Computing and Distributed Systems
- Advisors: Prof. Hongli Xu and Prof. Gongming Zhao

Hunan University (HNU) Hunan, China

B.S. in Computer Science 2016.9-2020.6

- Excellent Graduation Thesis of Hunan University

PUBLICATIONS

1. **J. Fang**, G. Zhao, H. Xu, Z. Yu, B. Shen, X. Li, *GOAT: Gradient Scheduling with Collaborative In-Network Aggregation for Distributed Training*, IEEE/ACM International Symposium on Quality of Service (IWQoS'23)
2. **J. Fang**, G. Zhao, H. Xu, C. Wu, Z. Yu, *GRID: Gradient Routing with In-network Aggregation for Distributed Training*, IEEE/ACM Transactions on Networking (ToN)
3. **J. Fang**, G. Zhao, H. Xu, H. Tu, H. Wang, *Reveal: Robustness-Aware VNF Placement and Request Scheduling in Edge Clouds*, Computer Networks (ComNet)

EXPERIENCE

Simulating network faults with programmable dataplane Suzhou, China

Main Developer 2022.12-present

- Build a user-friendly, multi-backend fault injection system in programmable dataplane
- Design a parser generation algorithm to handle flow dependency and load the table entries
- Formulate the fault injection point selection problem
- Implement several network faults with P4 in TNA and PSA architectures

Accelerating distributed training with programmable switches Zhijiang Lab, Hangzhou, China

Research Intern 2022.6-2022.9

- Improve the in-network aggregation throughput by mitigating the influence of asynchronous arrived packets
- Design a knapsack-based randomized rounding algorithm for gradient scheduling
- Implement a distributed training prototype with Pytorch
- Implement the in-network aggregation logic in Tofino with P4
- Reduce the communication overhead of distributed training tasks by 81.2%

Developing and testing Alcor, a cloud native SDN platform Futurewei, Remotely

Developer 2021.6-2021.9

- Write an automatic building script for large scale deployment with bash
- Write an end-to-end test of the virtualization control plane (ACA) with C++
- Develop grpc thread for pulsar subscribe information (PR #274) with C++

Robust-awareness VNF placement in the edge cloud Hefei, China

Main Developer 2021.2-2021.6

- Improve the robustness of edge clouds by limiting the influence of malicious users and failed VNFs
- Design a two-phase algorithm to solve the problem of VNF placement and request scheduling
- Implement a prototype containing 6 Nvidia Jetson Tx2s and 20 Raspberry Pis with Python
- Improve the network throughput by 57% under existence the malicious user

Implement a LSTM model based on high-level synthesis

Hunan, China

Main Developer

2019.6-2020.1

- Train a LSTM model based on Keras to predict the steam pressure in nuclear power plant reactor
- Implement the trained LSTM model with C++ and deploy it into a Pynq-Z2 board
- Reduce the inference time by 90x compared with software implementation
- *Win the award of Excellent Graduation Thesis of Hunan University*

PATENTS

1. G. Zhao, **J. Fang**, H. Xu, C. Wu, *A gradient scheduling method based on programmable switch under PS architecture*, CN114900482B
2. H. Xu, **J. Fang**, G. Zhao, H. Tu, H. Wang, *A VNF placement method in the edge cloud*, CN113961324A

COURSES

- | | |
|---|--------|
| • COMP6002P, Combinatorial Mathematics | 89/100 |
| • COMP6201P, Parallel Programming | 86/100 |
| • COMP7102P, Advanced Algorithm Design and Analysis | 91/100 |

AWARDS

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| • Doctoral first-class academic scholarship | 2023 |
| • Excellent price (25%) in Intel P4 China Hackthon | 2022 |
| • Doctoral first-class academic scholarship | 2022 |
| • Master's first-class study scholarship | 2021 |
| • Master's first-class study scholarship | 2020 |

SKILLS

- Programming Language: C/C++, Python, P4, C#, Swift
- Developing Framework: Pytorch, p4c, eBPF, Mininet

SERVICES

- External Reviewer: IEEE JSAC, IEEE TNET, COMNET
- Teaching Assistant: COMP6103P Advanced Computer Networking