Jin Fang

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Education

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

M.S./Ph.D. in Computer Science 2020.9-present

- Research focus on Programmable Network, Distributed Training and In-network Computing
- Advisor: Hongli Xu

Hunan University (HNU) Hunan, China

B.S. in Computer Science 2016.9-2020.6

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'23**)

Experience

Simulating network faults with programmable dataplane Suzhou, China

Research Assistant 2022.12-present

- Build a user-friendly, multi-backend fault injection system in programmable dataplane
- Design a parser generation algorithm to handle flow dependency
- 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 asychronous 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 distibuted training tasks by 81.2%

Developing and testing Alcor, a cloud native SDN platform Suzhou, China

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

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 exisitence the malicious user.

Patents

1. G. Zhao, **J. Fang**, H. Xu, C. Wu, *A gradient scheduling method based on programmable switch under PS architecture*, Published: CN114900482A
2. H. Xu, **J. Fang**, G. Zhao, H. Tu, H. Wang, *A VNF placement method in the edge cloud*, Published: CN113961324A

Courses

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

Awards

- 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
- Excellent Graduation Thesis of Hunan University 2020

Skills

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

Services

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