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
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 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   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 exisitence 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*, 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

SKILLS

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