Changhao Wu

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Education

Xi'an Jiaotong University, Xi'an, China — September 2015 – May 2019

Bachelor in Computer Science and Technology
GPA: 3.8/4.3 Rank: Top 5/158

University of California, San Diego, La Jolla, CA — February 2017 - June 2017

Exchange student in Computer Science and Engineering
GPA: 4.0

Brown University, Providence, RI — August 2019 - Present

Master of Science in Computer Science

Research

Ministry of Education Key Lab for Intelligent Networks and Network Security — Xi'an, China

Advised by Prof. Hao Li, Prof. Chengchen Hu — 2017 – 2019

Project: *Programming Network Stack for Middleboxes with Rubik*

- Designed Rubik, a domain-specific language for the middlebox stack, which decreases coding efforts for building a TCP/IP stack by two orders of magnitude (*e.g.*from 20,000 lines to 300 lines).
- Prototyped the compiler of Rubik and built various realistic cases using Rubik language, including 12 reusable protocol parsers, 4 network stacks, and 3 open-source middleboxes.
- Conducted optimizations in the IR and the backend of the compiler for improving the processing throughput, *e.g.*, the TCP/IP stack built on Rubik outperformed state-of-the-art by 23%.

Second author of this work, which has been **submitted to NSDI 2020**.

Brown Systems Research Group — Brown University, Providence, RI

Advised by Prof. Theophilus Benson — Aug 2019 - Present

Current Project: Researching on in-network compute's scalability and management in large data centers.

- Analyze and model the data dependency and consistency for register access and modifications
- Design algorithms for decomposing and merging P4 programs.
- Optimize the placement of micro P4 programs based on constraints, traffic pattern and network topology.

Highlighted Course Projects

Flash Chip Interface Controller Based on Verilog and C — Feb - Jun 2018

- Developed a system using verilog and C for deploying JFFS2 file system on a flash chip.
- Debugged hardware program with oscilloscope in bus frequency of 50KHz.
- Read through 10+ files of Linux kernel code to apply Linux MTD interface.

File Compression Software — Sep - Nov 2016

- Designed a new header format to record the structure of Huffman coding tree.
- Implemented compression algorithm and GUI with 2000 lines of C++ code.
- Improved the compression performance from 4mins to 10s for a 40MB file by leveraging a hash table.

Skills

- Programming Languages: C = Python > C++ > MATLAB > SQL
- Familiar with systems development tools: terminal, ssh, gcc, make, mininet, docker, *etc*.