You Wu

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JOB INTERESTS

Have solid background in both Software and Hardware. Have project experience in Operating System(**OS**), compiler(**LLVM**), security mitigations in **computer architecture** level. Open to any SDE positions and **CPU/GPU** architecture designs. Strong coding ability in Python, C/C++, as well as debugging experiences in Unix/Linux with simulators such as Gem5.

SKILLS

Programming Languages: Python, C/C++, Verilog, Java, SQL, HTML, Markdown

Tools: Git, Unix/Linux, GDB, Gem5, TensorFlow, AWS, QEMU, GCC, LLVM

EDUCATION

Ph. D. in Computer Engineering at **University of Southern California** Aug. 2017 - present
Ming Hsieh Department of Electrical Engineering Supervisor: Xuehai Qian

M. S. in Computer Science at **University of Southern California** Aug. 2017 – Dec. 2020
Department of Computer Science GPA:3.63/4.0

B. E. in Microelectronic Science and Engineering at **Tsinghua University**, China Aug. 2013 - Jul. 2017
Department of Microelectronics and Nanoelectronics Overall GPA: 89.2/100 Rank: 5/26
Thesis: The VLSI implementation of Binarized Neural Networks

WORK EXPERIENCE

Research Intern | Alibaba Group U.S. May. 2022 – Aug.2022
Advisor: Dr, Lide Duan, Alibaba DAMO Academy

- Worked on a project of Control Flow Integrity on **RISC-V** ISA
- **Qemu** profiling on proposed branch landing scheme defending for Jump Oriented Programming (JOP) attacks
- Proposed two extensions on branch landing scheme: one for Return Oriented Programing (ROP) defense, the other for function level fine-grained protection
- Designed a workflow to evaluate the proposed extension
- modified the **LLVM** source code to transmit IR to the target machine code with added defense instructions

RESEARCH EXPERIENCE

RL for Side Channel Attacks | University of Southern California | Research Assistant Jan. 2023 – present
Advisor: Prof. Xuehai Qian, University of Southern California

- Investigated on the current Deep Reinforcement learning frameworks on Interconnects
- Reproduced the interconnects side channel attacks on AWS servers
- Built the training framework to accomplish the side channel attacks

Defense for the Frontend Attack | University of Southern California | Research Assistant. Oct. 2021 – May. 2022
Advisor: Prof. Xuehai Qian, University of Southern California

- Frontend paths including LSD, DSB and MITE have the vulnerability to side channels
- Trying to enhance the **gem5** simulator to simulate the Frontend behaviors
- Proposed to use partition techniques with delaying update in the Frontend to eliminate speculative effects

Rowhammer Attack Project | University of Southern California | Research Assistant. Apr. 2021 – Dec. 2021
Advisor: Prof. Xuehai Qian, University of Southern California

- Focus on counter-based mitigation protecting the DRAM from rowhammer attack
- Investigated the state-of-the-art rowhammer mitigation strategies
- Reproducing the existing work using different rowhammer simulators

The Reversible Coherence Protocol | University of Southern California | Research Assistant. Sep. 2018 – Nov. 2021
Advisor: Prof. Xuehai Qian, University of Southern California

- Analyzed resent defense strategy like InvisiSpec and CleanupSpec.
- Designed a buffer-based Undo approach to mitigate the transient speculation flaw.
- Extended the current memory coherence protocol to support the merging and purging requests in our design
- Added processor support which help securely issue speculative instructions instead of blocking them
- Proposed a comprehensive mitigation which could eliminate the current speculation related attacks and interferences

GPU Power Virus Project | University of Southern California | Research Assistant. Apr. 2018 - Nov. 2018
Advisor: Prof. Xuehai Qian, University of Southern California

- Used genetic algorithm to automatically generate extremely high power consumption.
- Modified **gpgpusim** simulator to trace the access pattern for gpgpu simulations.

Design of a Specialization BNN Accelerator | Tsinghua University | Research Assistant Sep. 2016 - Jul. 2017
Advisor: Prof. Shouyi Yin, Institute of Microelectronics

- Designed an architecture which can efficiently execute the binarized neural computation.
- Investigated its application in different neural networks to accelerate computation.

Implementation of BNN on different platforms | Cornell University | Research Assistant. Jun. 2016 - Sep. 2016
Advisor: Prof. Zhiru Zhang, Dept. of Electrical and Computer Engineering

- Implemented both the hardcore and softcore of the BNN network on an **FPGA** hardware.
- Coded for the interface to connect the Rocket chip softcore with the BNN accelerator.
- Used High Level Synthesis tool **Stratus** to utilize limited resources to implement the project.

Vehicular behavior algorithm analysis | Tsinghua University | Research Assistant. Sep. 2015 - Jun. 2016
Advisor: Prof. Shouyi Yin, Institute of Microelectronics

- Used deep learning algorithms to analyze human behavior while driving a vehicle.
- Used the deep learning platform "**tensorflow**" to solve traditional problems, e.g. MNIST classification.
- Investigated the mechanism behind deep learning algorithms.

Pilot Assignment Algorithms for Wireless Networks | Tsinghua University | SRT Project. Mar. 2015 – May. 2016
Advisor: Prof. Wei Feng, Dept. of Electronic Engineering

- Investigated pilot assignment algorithms to achieve better performance in cellular MIMO systems.
- Performed simulation in cellular Gaussian networks to verify the theoretical results.

AWARDS

Recipient of the Annenberg Fellowship supported by the Viterbi School of Engineering 2017
Recipient of School Scholarship for Outstanding Academic Award, 2014
Two-time recipient of School Scholarship for Literary Award of Excellence, 2014, 2016

PUBLICATIONS

[arXiv] A Case for Reversible Coherence Protocol
You Wu, Xuehai Qian
preprint arXiv: 2006.16535

[CCF Trans HPC] ReBNN: in-situ acceleration of binarized neural networks in ReRAM using complementary resistive cell
Linghao Song, **You Wu**, Xuehai Qian, Hai Li, Yiran Chen
CCF Transactions on High Performance Computing 1, no. 3-4 (2019): 196-208.

OTHER EXPERIENCE

Fall 2022	Teaching Assistant: EE557 Computer Systems Architecture
Fall 2021	Teaching Assistant: EE557 Computer Systems Architecture
Summer 2020	Teaching Assistant: EE559 Mathematical Pattern Recognition
Summer 2018	Student Volunteer at ISCA'18