Ya Wang

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Education

Nanjing University, Nanjing, China **Sept. 2018 - Expected June 2022**

B.S. in Electronic Information Science and Technology with a Minor in Computer Science

GPA: **4.54/5.0**; **Ranking**: **3/201**

Core Courses: Calculus (96/100), Circuit Analysis (93), Data Structure and Algorithms (95), Signal and System (99), High-Frequency Circuit (93), Quantum Physics (95), Introduction to Computer Systems (93)

Member of **Outstanding Engineer Class** in Nanjing University

The Hong Kong University of Science and Technology, Hong Kong SAR, China **July 2021 - Dec. 2021**

Visiting Research Intern at the Department of Electronic & Computer Engineering, *Advisor:Prof. Wei Zhang*

MITxPRO SPOC Program **Jan. 2021 - Mar. 2021**

Took the "Applying Machine Learning to Engineering and Science" course, and got **full scores.**

Publication

- H. Song*, Y. Wang*, M. Wang,and Z. Wang, "UCViT: Hardware-Friendly Vision Transformer via Unified Compression" 2022 IEEE International Symposium on Circuits and Systems (ISCAS), 2022, under review

Research Experience

Hardware-Friendly Vision Transformer via Unified Compression **Oct. 2020 - Oct. 2021**

Research Assistant, *Lab of Integrated Circuits and Intelligent System (ICAIS), Nanjing University*

- Developed a unified compression framework for Vision Transformer (UCViT), whose focus is compressing the original ViT model by incorporating the low bit-width quantization and the dense matrix decomposition.
- Proposed a dedicated design by leveraging aggressive quantization, in which the majority matrix multiplications are converted to the hardware-friendly shift and addition operations. Besides, a small module was incorporated into the quantized model by harnessing the unique characteristic of multi-head attention during matrix decomposition.
- Benefited from the effective fusion of different compression techniques and the hardware-friendly operations, the proposed model can save up to 98% energy consumption in inference compared to the original ViT model and obtains a highly compact structure with a competitive compression ratio (up to 6.7 times) on cifar10 and cifar100 image classification tasks.

Automatic Generation Framework of Large Verification Samples for EDA Tools **July 2021 - Nov. 2021**

Research Intern, Reconfigurable Computing System Laboratory (RCSL), Advisor:Prof. Wei Zhang, HKUST

- Proposed a Chipyard-based large-scale system on chip (SoC) generation and verification framework to meet the verification requirements of EDA tools.
- Proposed framework can easily generate customized large-scale SoC, parameterize the number and type of CPU cores, CPU micro-architecture parameters, bus structure, etc., and automatically deploy them in a multi-FPGA system.
- Verified the generated SoC system at different levels including software level simulation, multi-core memory access and communication verification before Linux system startup and OpenMP-based multiple-threaded software test after boot loading a Linux.

High Speed Chip Interconnection System and Design of Optimized Coding **Sept. 2020 - Sept. 2021**

Research Assistant, Advisor: Prof. Yuan Du, Nanjing University

- Constructed FPGA based channel testing system using GTX transceivers for high-speed differential signals.
- Analyzed and verified high-speed signal integrity with different encoding methods and various channels made of PCB using IBERT tools.
- Explored the optimized encoding method and channel for high-speed signal transmission based on the premise of low BER and jitter.

NEMU (NJU Emulator) - A Simple but Complete Full-System Emulator **Sept. 2020 - Jan. 2021**
Research Assistant, Advisor: Prof. Liang Wang, Nanjing University

- Built a complete system emulator that supports X86 architecture using C language and implemented PC console games like the Chinese Paladin series games.
- Implemented main features including a monitor with a debugger, a CPU core supporting instructions based on X86 architecture and a memory module with the emulation of cache, protection modes and paging.
- Emulated several I/O devices, interrupt, and exception.

Visual Aid System for the Blind Based on Deep Learning **Sept. 2019 - Sept. 2020**
National College Student Innovation and Entrepreneurship Project, Advisor: Prof. Yuxiang Fu, Nanjing University

- Utilized PyTorch-based yolov3 model trained with our own data set (7500 images formed by 15 different objects in the lives of blind people) and the achieved mean average precision is about 74%.
- Converted the model parameter format and transplanted it to HUAWEI Altas200DK development platform to accelerate inferencing, we get about 25fps.
- Measured the distance between the blind with infrared sensors and the object and used Text-to Speech API to broadcast and inform the users.

Prize and Awards

- National Scholarship (Highest scholarship for Chinese undergraduates, 3 out of 204), 2020
- Puxin Elite Scholarship (1 out of 204, Reward outstanding talents in the field of integrated circuits), 2021
- CETC The 14th Research Institute Guorui Scholarship, 2021
- People's Scholarship in Nanjing University, 2019&2020&2021
- Outstanding Student Cadre Model (only one selected in whole college, 1 out of 800), 2021
- Competitions Expert of Kaggle Competition (top 1.7% in the world), two silver medals (top 5%), 2021
- Best Performance Awards of 2021 Xilinx Women in Technology (WIT) Hackathon
- Second Prize in Final Contest at National Undergraduate IOT Design Contest, 2020; Grand Prize in the eastern China division (top 5% nationally)
- Honorable Mention in 2020 MCM
- Second prize in TI cup Jiangsu college students electronic design competition (Quadrotor aircraft), 2020

Extracurricular Activities

Deputy Secretary of Youth League Committee of ESE School in Nanjing University **July 2020 - Sept. 2021**

- Organized large-scale activities of ESE School (including knowledge competition, voluntary activities, tree planting, unpaid blood donation, etc.) and the routine activities of classes in all grades of the school, aiming to enhance communications between class members and enhance everyone's sense of social responsibility.
- Organized more than 20 teams at our school to carry out social practice all over the country.

Freshman Peer Mentor of ESE School in Nanjing University **July 2020 - July 2021**

- Provided professional direction choices, major courses, extracurricular activities, and other suggestions on all aspects of college life to around 80 freshmen in two classes to help them in better adjusting to the new surroundings and life.

Volunteer in Special Education Institutions for Autistic Children **Sept. 2019 - Dec. 2019**

- Provided teaching assistance, including helping teachers make teaching tools, repeatedly communicating with autistic children to improve their attention and perception, and simulating daily shopping or travel scenes to help them learn common sense in daily life.

Skills

Programming Languages: Python, C/C++, Verilog, Chisel, Matlab, Latex
Framwroks: PyTorch, Keras, Chipyard, OpenCV