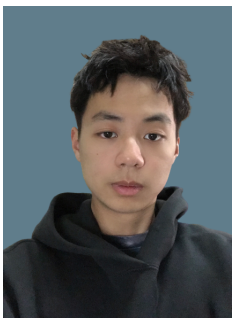
YANG YANG

PERSONAL INFORMATION



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EDUCATION

Undergraduate

Jilin University, Changchun, China *Feb. 2019 – Present*
GPA: 3.69/4.0
Rank: 9%
Major: Computer Science and Technology
Interests: Computer Architecture · High Performance Computing · Programming Systems · Deep Learning

AWARDS

Undergraduate Academic Year Scholarship

The First Class Fellowship *Sept. 2020*

The Second Class Fellowship *Sept. 2021*

RESEARCH EXPERIENCE

ETECA Lab

Emerging Technology Enabled Computer Architecture Lab *Feb. 2022 – Present*
Jilin University, Changchun, Jilin, P.R.China
Research Assistant, Advisor: Prof. Jingweijia Tan
Research on: Computer architecture & High-Performance Computing

- Extended the **microarchitecture** of General-Purpose Graphics Processing Unit (**GPGPU**).
- Explored the **process variation** of **MCM**-GPUs based on **FinFET** and state-of-the-art **chiplet** technology.
- To the best of our knowledge, for the first time, we implemented a Low-Level Analysis and Modeling Framework for **NVIDIA** Ampere architecture GPUs: **LLAM**. It analyses the **SASS** codes of the original CUDA program and then uses deep learning techniques to predict whether the **performance** or **power consumption** of it. Also, this is the first work that studied both the power-level effect of **reuse** flag and **yield** flag when generating the assembly. Finally, we optimize the program based on **DVFS** and **LLAM**.

SKL Computer Architecture

State Key Laboratory of Computer Architecture *Jul. 2022 – Present*
Institute of Computing Technology, Chinese Academy of Science, Beijing, P.R.China
Research Assistant, Advisor: Prof. Guangli Li
Research on: Computer architecture & Programming Systems

- Improved the **optimization** ability of compilers based on application's **run-time** characteristics.
- Devised an lightweight method for **extracting** and **compressing** application's static **features**.
- Using **machine learning** methods to instruct the compiler for better machine code **generation** and integrate it to **LLVM**.

SKILLS

Languages C/C++ · Assembly (x86, RISC-V) · Python · Go

Frameworks CUDA · Pytorch · LLVM

Hardware Verilog · Quartus · Basic analog circuit design

Software LINUX/Windows · LaTeX · Markdown · GNU compiler (gcc, *etc.*) · gpgpu-sim-v3.x

OTHER INFORMATION

Languages

Chinese · Native proficiency.

English · Professional proficiency.

Interests

Literature (Latin-American, magic realism) · Physics · NBA (Golden State Warriors) · Classical (Chopin)

Characteristic

Strong patience · Highly self-motivated · Creative · Communication and collaboration skilled.

PROJECTS

MapReduce Engine

MapReduce Engine is a **Go** language implementation of the paper.[1] *Apr. 2022*
This engine consists of a **fault tolerance** (failures like crash and communication-lose of workers) master and a worker cluster. Users can specify their cluster size and working functions (mapf & reducef). With a simulated distributed file system, the workers can communicate with the master through **Remote Procedure Call**. This MapReduce Engine is a basic component for building a distributed system used for operations over large-scale datasets. You can find the codes here.

EOS

EOS is a 32bit ***nix** operating system developed in **C** language. *Sept. 2021*
Till now EOS contains a basic **bootloader**, 2-level **paging**, 4GB **memory management** and **kernel multithreads**. For user environment, it provide a set of traditional shell programs and **multi-process** mechaism. It follows the x86 ABI, so it's easy to port those x86 applications. This project is still *active* and it will provide a *GNU C Project* like library and compiler support in the future. You can find the codes here.

CUDA-FFT

CUDA-FFT is a CUDA implementation of the **Fast Fourier Transform** algorithm. *Dec. 2021*
This project implemented 3 algorithms to do the *polynomials multiplication*, including ordinary multiplication, **recursive-FFT** and **gpu-FFT**. The performance was well tested and the contrast was shown in the report. This is my first time doing heterogeneous computing and this project leads me to the research of **HPC & GPGPU**. You can find the codes, slide, and report here.

WYZ-BAR

WYZ-BAR is a bar management system developed in **C** language. [**Supervised** by Prof. Shaui Lü] *Mar. 2020*
WYZ-BAR is a *collaborative project* (WYZ stands for 3 members and Y is for me) and I am the leader. With the **multi-process** organization and a simple builtin **sqlite style database**, WYZ-BAR is my *first* course project in the university and it made me a minor celebrity. The development flow follows the modern **open source** software's way. A lot of **parsing** techniques are used to deal with all kinds of data input, this system is purposely optimized for unqualified input like the real world. You can find the codes here.

Others

You can find more projects including course labs (like MIT 6.828), Android application (SmogDetector), *etc.*, in GitHub.

[1] J. Dean and S. Ghemawat, "MapReduce: simplified data processing on large clusters," ***Commun. ACM***, vol. 51, no. 1, pp. 107–113, Jan. 2008, doi:10.1145/1327452.1327492.