YANG YANG

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EDUCATION

Jilin University, Changchun, China *Sept. 2019 – Jul. 2023*
B.S. in Computer Science and Technology
GPA: 3.69/4.0
Rank: 9%
Thesis: *The Design and Implementation of Binary Code Analysis Framework for NVIDIA GPU.* **[Score: 95/100]**
Advisor: Prof. Jingweijia Tan

University of Virginia, Charlottesville, USA *Aug. 2023 – Present*
Ph.D. in Computer Science
Interests: GPU · Storage · Energy-Efficiency · Security
Advisor: Prof. Adwait Jog

PUBLICATION

Facilitating Profile Guided Compiler Optimization with Machine Learning.
Yang Yang, Xueying Wang, Guangli Li*
SRC@CGO'23 [Poster]

- **Achieving an average of 1.03× and 1.95× speedups on representative real-world applications and *Polybench* benchmark suite over the baseline (i.e., the programs without PGO), respectively.**
- **The performance of our machine learning-aided PGO is very close to the classic PGO (1.05× and 1.97× speedups over the baseline) while reducing 58.3% and 94.8% optimization costs.**

RESEARCH EXPERIENCE

Emerging Technology Enabled Computer Architecture Lab *Feb. 2022 – Jul. 2023*
Jilin University, Changchun, Jilin, P.R.China
Research Assistant, Advisor: Prof. Jingweijia Tan
Research on: GPU Architecture & Reliability & Energy Efficiency & Accelerator
What We Do:

- **Explored the process variation of MCM-GPUs based on FinFET and state-of-the-art chiplet technology.**
- **Exploited the potential of FPGA for building open-sourced GPU like Vortex.**
- **Implemented a Low-Level Analysis and Modeling framework for NVIDIA Ampere GPU.**
- **Applied deep learning techniques for accurate power modeling.**
- **Examined the power-level effect of the instruction control flag when generating the SASS.**

State Key Laboratory of Processor *Jul. 2022 – Sept. 2023*
Institute of Computing Technology, Chinese Academy of Science, Beijing, P.R.China
Research Assistant, Advisor: Prof. Guangli Li
Research on: Compiler & Programming Systems & Deep Learning
Project: Facilitating Profile-Guided Compiler Optimization with Graph Neural Networks

- **Proposed a branch predictor using XGBoost based on static features.**
- **Explore the speedup sensibility of different programs towards different feature design.**
- **Utilize GNNs to build predictive profile-guided optimization framework and integrated it into LLVM.**
- **Released a new dataset for graph-related static analysis tasks.**

SKILLS

Languages	**C/C++ · Assembly (x86, RISC-V) · Python · Go**
Frameworks	**CUDA · Pytorch · LLVM**
Hardware	**Verilog · Vivado · FPGA**
Software	**LINUX · LaTeX · Markdown · GNU compiler (gcc, *etc.*) · gpgpu-sim · Varius-TC**

AWARDS

Undergraduate Academic Year Scholarship

- **The First Class Fellowship** *Sept. 2020*
- **The Second Class Fellowship** *Sept. 2021*
- **The Third Class Fellowship** *Sept. 2022*
- **The Third Class Fellowship** *Jun. 2023*

PROJECTS

***MapReduce Engine* is a Go language implementation of the paper[1].** *Apr. 2022*

- **Fault tolerance (failures like crash and communication-lose of workers) master and a worker cluster.**
- **Characterized cluster size and working functions (mapf & reducef).**
- **Communicate with the master through Remote Procedure Call.**

This Engine is a basic component for building a large-scale distributed system. [Codes here.]

***EOS* is a 32bit *nix operating system developed in C language.** *Sept. 2021*

- **Basic bootloader, 2-level paging, 4GB memory management and kernel multithreads.**
- **Provide a set of traditional shell programs and multi-process mechaism.**
- **Follow the x86 ABI, so it's easy to port those x86 applications.**

This project is still *active* and it will provide a library and compiler support in the future. [Codes here.]

***WYZ-BAR* is a bar management system developed in C language.** *Mar. 2020*

- **WYZ-BAR is a *collaborative project* (WYZ stands for 3 members and Y is for me) and I am the leader.**
- **Multi-process organization for effective system building.**
- **Re-implemented a simple sqlite style database.**
- **Used lots of parsing techniques for input checking.**

WYZ-BAR is my *first* course project in the university. [Codes here.]

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

OTHER INFORMATION

Chinese · Native proficiency.

English · Professional proficiency.

[1] Dean J, Ghemawat S. MapReduce: simplified data processing on large clusters. *Communications of the ACM*. 2008 Jan 1;51(1):107-13.