ZIKUN LI

Mobile: (+1)4248320069 ⋄ Email: zikunl@andrew.cmu.edu ⋄ GitHub: zikun-li

Homepage: https://zikun-li.github.io

EDUCATION

School of Computer Science, Carnegie Mellon University (CMU) Pittsburgh, PA, US
Doctoral student in Computer Science Aug 2022 - Present

- Advised by Prof. Zhihao Jia
- Research interests include: Deep Reinforcement Learning, Machine Learning systems

School of Electronic Engineering and Computer Science, Peking University (PKU) Beijing, China
Bachelor of Science in Computer Science Sep 2017 - Jul 2021

PUBLICATION

1. **Zikun Li**, Jinjun Peng, Yixuan Mei, Sina Lin, Yi Wu, Oded Padon, and Zhihao Jia, "Quarl: A Learning-Based Quantum Circuit Optimizer" (under review).

2. **Zikun Li**, Zhuoming Chen, and Zhihao Jia, "QBX: A Compiler for 2-local Qubit Hamiltonian Simulation on Quantum Chiplets" (under review).

3. Mingkuan Xu, **Zikun Li**, Oded Padon, Sina Lin, Jessica Pointing, Auguste Hirth, Henry Ma, Jens Palsberg, Alex Aiken, Umut A.Acar, and Zhihao Jia, 2022, "Quartz: Superoptimization of Quantum Circuits", PLDI '22.

4. Zheng Zhong*, Shen Yan*, **Zikun Li***, Decheng Tan, Tong Yang, Bin Cui, 2021, "BurstSketch: Finding Bursts in Data Streams", SIGMOD '21 (* indicates equal contribution).

5. Jizhou Li*, **Zikun Li***, Yifei Xu*, Shiqi Jiang, Tong Yang, Bin Cui, Yafei Dai, Gong Zhang, 2020, "WavingSketch: An Unbiased and Generic Sketch for Finding Top-k Items in Data Streams", KDD '20 (* indicates equal contribution).

RESEARCH EXPERIENCES

A reinforcement learning quantum program optimizer PA, USA
Research assistant, CMU, Advisor: Prof. Zhihao Jia Mar 2022 - Oct 2022

- Designed an reinforcement learning algorithm to optimize quantum circuits which supports multiple metrics and achieves up to **62%** improvement rate, exceeding the SOTA solution up to **20%**.
- Implemented a distributed framework that utilize multiple GPUs for training ($\sim$ **2k LOC in Python**).

A compiler for Hamiltion simulation on quantum chiplets PA, USA
Research assistant, CMU, Advisor: Prof. Zhihao Jia Jun 2023 - Nov 2023

- Identified the problem, designed and implemented a compiler for Hamiltonian simulation on quantum chiplets which outperforms general-purpose industry compilers up to **53** times on circuit depth and is on average **19** times faster than existing domain-specific compiler. (**6k LOC in Python**).

Quartz: A quantum program optimizer PA, USA
Research assistant, CMU, Advisor: Prof. Zhihao Jia Sep 2021 - Apr 2022

- Designed and implemented a quantum program optimizer that automatically generate verified rules for quantum circuit optimization ($\sim$**3k LOC in C++**).

A Sketch-Based Burst Detection Algorithm in High-Speed Data Streams Beijing, China
Research assistant, PKU, Advisor: Prof. Tong Yang Mar 2020 - Nov 2020

- Designed a fast, accurate and memory-efficient algorithm for real-time detection of bursts in high-speed streams.

An Unbiased and Generic Data Structure for Finding Top-K Items in Data Streams Beijing, China
Research assistant, PKU, Advisor: Prof. Tong Yang Jun 2019 - Feb 2020

- Proposed and implemented a data structure which provides unbiased and accurate estimation of frequency of items in a data stream, achieving on average **2e4** lower error rate and **4.5** $\times$ faster insertion speed compared to prior solution ($\sim$ **2k LOC in C++**).

TECHNICAL SKILLS

Programming Languages	C/C++, Python, Java, SQL
Tools	Git, GitHub, Weights & Biases, Docker
Frameworks	Pytorch, Tensorflow, CUDA, Numpy, Cython

TEACHING EXPERIENCE

Teaching assistant 15-418/618 Parallel Computer Architecture and Programming   Aug 2023 - Present