Xida Ren

Expert in x86, RISC, Systems, Security, and Reliability. Fullstack / Cloud / Machine Learning Hobbiest

Education

2019 - 2023 **PhD in Computer Architecture**; University of Virginia
GRE: Verbal: 167, Quant: 168 / *GPA:* 4.0 / All but Thesis

2016-2019 **BSc, Computer Science and Mathematics**; College of William and Mary *3.8*

Skills

Tools: *Expertise in:* C++, Python, C, Zig, SQL, MatLab, Haskell *Familiar with:* Pandas, Numpy, TensorFlow, PyTorch, sklearn, Linux

Specialities: CPU/GPU Performance, Machine Learning, Queuing Theory, Risk, Statistics

Interests: Security, Hardware Accelerators, Formal Verification, Hearthstone, FengShui

Experience

2023: MevLink (Informal Consulting for Low-Latency Etherium Data Company)

- Cut version interval by half by consulting with team to implement test-driven development and agile practices
- Cut RLPx cryptographic overhead by 10x using LLVM and hand-coded AVX512 Keccak-256 implementation.
- Lowered data latency (company's key competitive advantage) for distributed Eth data system by 2x in my first week by mastering Ziglang from scratch to optimizing a 70,000 LoC codebase.

Aug 2022-Jan 2023: Intel Labs, Research Intern

- Achieved <3% CPI and <10% MPKI error while speeding up benchmarking by 10^6x using SimPoints, measured over SPEC 2017 x86 workloads
- Sped up new-workload SimPoint generation 200x by sampling CPU performance counters to generate **SimPoints**, avoiding simulation and instrumentation overheads.
- Use differential privacy to enable trace-sharing across organizational boundaries without concern for leaking sensitive IP.

May 2022 - Aug 2022: NXP Semiconductors, Hardware Security ML Engineer

- Achieved 85% accuracy rate in generalizing detectors to zero-day attacks on edge hardware by training unsupervised ML algorithms.
- Compared supervised and unsupervised algorithms for Spectre Side-Channe Detection, including VAEs, logistic regression, perceptrons, time-convolutional neural networks, decision trees, k-nearest neighbors, random forests, and support vector machines.
- Designed system in close collaboration with the VP of Edge Software for usable tradeoffs between detection accuracy and performance.

Aug 2019-May 2023: UVA Computer Science Department, PhD Candidate (Exited All-But-Thesis)

- Unearthed two critical vulnerabilities in modern x86 processors, enhancing security and integrity, **published in ISCA 2021**
- Wrote LLVM / MLIR compiler passes for discovering vulnerabilities and optimizing / studying Machine Learning Models.
- Applied formal verification techniques to harden machine learning models against adversarial attacks.

Aug 2020 – Nov 2020: Lawrence Berkeley National Lab, Research Intern

- Contributed to the PARADISE++ Project, spearheading the development of a memory subsystem for a parallel discrete-event simulator with C++ and Valgrind.
- Engineered an optimistically synchronized parallel discrete-event simulator memory subsystem, elevating project efficiency and output.

Selected Projects

2023 LLM Quick Serverless Inference Project – Achieving Rapid Cold-Starts with Large Language Models

- Implement REST-based Upload-Your-Own-Model serverless inference infrastructure using **FastAPI** and **Docker**
- Achived cold-start latency 4x faster than **industry standard** (15s, down from 67s-3m59s for GPT Neo 1.3b) using **AWS SageMaker** (compute), **AWS S3** (model caching), **Docker-Compose** (orchestration), and **Ansible** (deployment)

2017 Int'l Genetically Engineered Machines Contest (iGEM 2017) Won Best Model award by modeling genetic circuit behaviors and designing novel gene expression rate control methods.

2017 React-HexLife – **Conway's Game of Life on Hexagonal Grid, Available on Github** - Developed a distinctive version of Conway's Game of Life using a hexagonal grid, innovating on a classic concept using **React.js** - Implement robust full-stack solution with **NodeJS** for backend development - Revisiting and enhancing the project with "bun" framework

Contact

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