XIAORUI HUANG

Always Fascinated

Availability: **From May 2024**
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EXPERIENCE

eAI Machine Learning Engineer

Qualcomm

May 2023 — Aug 2023 Markham, ON

- Led efforts on **Neural Architecture Search (NAS)** and model compression within the **Edge AI R&D** team.
- Developed a NAS framework, leveraging Qualcomm's patented NAS techniques, to optimize **arbitrary models**[1] for **any profiled hardware**, harnessing Pytorch's **torch.fx** extensively.
- Streamlined the NAS workflow for incoming client models, slashing **engineering time** by **80%**.
- Achieved a **50% reduction** in **model size** and a **60% drop in inference latency** without compromising accuracy across benchmark models[2].
- Engaged in lab meetings focused on cutting-edge model compression research, particularly **Quantization**.
- Delivered a comprehensive presentation on the NAS framework to the broader eAI team.

NAS | Quantization | Pytorch | torch.fx | ONNX | R&D

RPA Backend Developer

IBM

May 2022 — Apr 2023 Markham, ON

- Worked on backend development for IBM's Robotics Process Automation (RPA) platform.
- Augmented IBM RPA's *WAL* programming language, introducing a reflection feature resembling Java and **C#**.
- Collaborated with cross-functional teams, achieving a **15%** reduction in customer issues and defects per release.
- Employed **agile methodologies**, showed both independent and collaborative competencies in a hybrid environment.
- Articulated and presented solution strategies to RPA's senior architects and product teams.

C# | Pragramming Language Design | Agile | Visual Studio

EDUCATION

University of Toronto

Candidate for B.Sc. in Computer Science

2019 — Expected June 2024

Relevant Courses

- **CSC367 Parallel Computing (In Progress)** Parallel Arch & Algo, threading & OpenMP, Distributed Computing w/ MPI, **CUDA Arch & Reduction Algo**, Cloud Computing
- **CSC413 Deep Learning (96%)** Transformers, CNN, RNN, GAN, VAE, GNN, RL. **original research** on optimization strategy as final course project. RolandGao/pycls

Probabilistic Learning | CV | NLP | Computer Security

[1] NAS support is required for NN layers *E.g. nn.Conv2d is supported*
[2] Results vary; models include MobileNetV2, ResNet50, BERT

RESEARCH

ML Reseach Intern

embARC Research Group

Jan 2024 - Now University of Toronto

- Research on **3D Gaussian Splatting** with real-time SLAM systems on data captured from embedde devices.
- Supervised by Prof. Nandita Vijaykumar

3D Gaussian Splatting | SLAM | Pytorch | C/C++ | CUDA

Linearly Explored Learning Rate Scheduler

Apr 2022 RolandGao/pycls

- We introduced the LES method to automate and refine the resource-intensive task of **learning rate tuning**.
- LES achieves a final error rate of 8% on par with other commonly used optimizer and schedulers on pycls code base **without the need for learning rate tuning**.
- Developed a custom **SGD with momentum** algorithm to facilitate exploration of various backpropagation strategies during LES creation.

PROJECTS

CUDA Ray Tracing

Almost Real Time Ray Tracing

November 2023 Xiaorui-Huang/cuda-ray-tracing

- Implemented a **CUDA** ray tracer with **BVH** acceleration structure, with **Blinn-Phong** shading.
- Achieved **real-time** ray-tracing of **30 FPS** and **2000x Speedup** on RTX3060-Ti from CPU.
- Incorporated dynamically loaded Scene generation to allow for future interactivity.

CUDA | C/C++ | CMake

Woodoku Learn

Reinforcement Learning Model

Jul 2022 EdwardHaoranLee/WoodokuLearn

- Replicated the mobile game Woodoku for the terminal using **Python**, enabling both human and AI gameplay through dedicated environment APIs.
- Employed Q-Learning, a **Reinforcement Learning** approach with Pytorch, targeting top scores on the Woodoku leaderboard.

Pytorch | OOP | Agile

SKILLS

Programming Languages

Python | C/C++ | CUDA | C# | Rust | Java | LaTeX | R | TypeScript | HTML&CSS | SQL

Other Frameworks & Development Environments

Pytorch | torch.fx | Docker | WSL | git | Vim | VSCode

Idiomatic in English and in Mandarin Chinese