Ronghao Ni

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Looking for Software Engineer internship in Summer 2023
Expected to graduate in December 2023

Education

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Information Networking; GPA: 4/4 — *Jan 2022 - Dec 2023*
Coursework: Intro to Computer Systems, Intro to Machine Learning, Intro to Deep Learning, Storage Systems

Hong Kong Baptist University — Hong Kong S.A.R.
Bachelor of Science in Computer Science; cGPA: 3.81/4, Ranking: top 2% — *Aug 2016 - Jul 2020*
Coursework: Software Design Development and Testing, Distributed and Cloud Computing, Adv Programming for Software Development, Data Communication and Networking, Database Management, Operating Systems

McGill University — Montreal, QC
Exchange, Computer Science; GPA: 3.92/4 — *Sep 2019 - Dec 2019*
Coursework: Theory of Computation, Numerical Computing, Functional Programming, NLP

Skills

Programming Languages: Java, C/C++, Python, SQL, OCaml

Frameworks and Tools: CUDA C, Git, Hadoop, LaTeX, Linux Bash, PyTorch, TensorFlow, OpenCV, AWS

Experience

Carnegie Mellon University, CyLab — Pittsburgh, PA
Research Intern: GANs for software test cases generation (GAN-based fuzzing) — *May 2022 - Aug 2022*

- **Contribution**: Researched SOTA GAN-based **fuzzing**. Solved compatibility issue of **RareGAN** with **TF** 2.X and long outputs generation problems. Constructed an edge coverage testing backend for **AFL** and **LLVM** instrumented binaries. Formulated metrics of 'rareness' to direct RareGAN to generate high coverage seeds.
- **Result**: Accelerated old backend **29x** (on average) for coverage testing tasks. Pushed GAN to generate seeds that can trigger **deeper** paths with designed metrics (compared with plain edge coverages)

MXNavi Ltd. — Shenyang, China
Software Engineer Intern: Autostereoscopic display for in-dash car navigation system — *May 2021 - Dec 2021*

- **Project**: Feasibility verification of autostereoscopic display for car navigation system.
- **Implementation**: Deployed **OpenGL** in **C** for graphical rendering and **MediaPipe** for eyes tracking. Manipulated Framebuffer to mix both eyes view. Rebuilt demo app in **Unity** for modern UI with customized dual-map shader to combine views from both eyes and updated view frustum based on eyes location to stabilize objects' positions.
- **Impact**: **Completed** demonstrations for feasibility assessments and as a **basis** for future iterations

Neusoft Corp. — Shenyang, China
Algorithm Engineer Intern: Efficient algorithms for lung CT images segmentation — *Jun 2020 - Sep 2020*

- **Project**: Devised algorithms for Neusoft's Carevault Research Cloud Platform for medical annotations on CT images.
- **Implementation**: Designed algorithms based on Canny edge detector with end-point connection algorithm to increase robustness and reduce noises. Improved algorithm's performance for immediate reactions. Filtered detected regions with decision trees. Implemented as a **3D Slicer** plugin with **OpenCV** and **ITK** in **Python**.
- **Impact**: Achieved **10.6%** precision and **42.5%** recall increasing (compared with vanilla Canny edge detector.) Deployed at **4 of top 100** hospitals in China as a package of Neusoft's Feibiao Medical Annotation Platform.

Projects

Malloc Lab: Writing a Dynamic Storage Allocator (Individual course project): Implemented a high-efficiency dynamic storage allocator in C. Optimized the implementation with segregated free list, mini-block, eliminated block footers to decrease both internal and external fragmentations in memory. Achieved 100% performance and 100% memory utilization scores.

Tech: C/C++, Memory allocation strategies

Cache Lab: Building a Cache Simulator and Optimize Matrix Transposes (Individual course project): Implemented a memory cache simulator in C. Optimized matrix transpose operations by adjusting cell read/write orders and reducing caching conflicts. Achieved 100% performance scores.

Tech: C/C++, Memory caching mechanism

Event Management System (Individual course project): A web application supporting events viewing, registration, and participants management. Later migrated to Android platform with Ionic framework.

Tech: HTML, JavaScript, Sails.js, Mongo DB, Ionic

ATMSS: an Automated Teller Machine Simulator System (Group Course Project): Developed a concurrent (different hardware components run on different threads) ATM simulator with GUI, supporting basic ATM functions. Different exceptions are appropriately handled to preserve consistency in case of server or clients fail.

Tech: Java, JavaFX, PHP

A Simple Fully Connected Neural Networks Framework (Individual Course Project): Built from scratch a FCNNs framework supporting customized network structures for training and inference on GPUs and on multi-core CPUs.

Tech: C++, CUDA C, OpenMP