JUNESEO CHANG

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http://jschang0215.github.io

RESEARCH INTEREST

Computer architecture and systems, operating systems, memory systems, and **machine learning for systems,** especially **reinforcement learning (RL)** to improve system performance and resource efficiency.

EDUCATION

Seoul National University (SNU)   Seoul, Republic of Korea
B.S. in Computer Science and Engineering   2021.03 - 2026.08 *(expected)*

- **GPA: 4.16/4.30**
- Including 18 months of mandatory military service.

PUBLICATIONS

1. **Juneseo Chang**, Wanju Doh, Yaebin Moon, Eojin Lee, and Jung Ho Ahn, "IDT: Intelligent Data Placement for Multi-tiered Main Memory with Reinforcement Learning", *International Symposium on High-Performance Parallel and Distributed Computing (HPDC)*, 2024

2. **Juneseo Chang** and Daejin Park, "Work-in-Progress: Searching Optimal Compiler Optimization Passes Sequence for Reducing Runtime Memory Profile using Ensemble Reinforcement Learning", *International Conference on Embedded Software (EMSOFT)*, 2023

3. **Juneseo Chang**, Sejong Oh, and Daejin Park, "Work-in-Progress: Accuracy-Area Efficient Online Fault Detection for Robust Neural Network Software-Embedded Microcontrollers", *International Conference on Embedded Software (EMSOFT)*, 2022

4. **Juneseo Chang**, Myeongjin Kang, and Daejin Park, "Low-Power On-Chip Implementation of Enhanced SVM Algorithm for Sensors Fusion-Based Activity Classification in Lightweighted Edge Devices", *Electronics*, 2022

RESEARCH EXPERIENCE

Scalable Computer Architecture Lab, SNU   2023.01 - 2024.06

- Advisor: Jung Ho Ahn
- Proposed an **RL-based OS-level multi-tiered memory management** solution. Designed an RL model that adjusts demotion policies at runtime with low overhead. Developed an OS-level region-granularity memory access monitoring technique with statistical region reconfiguration. Achieved a 2.08× speedup over the default Linux kernel and 11.2% performance improvement over the state-of-the-art solution.
- **First author** paper accepted to **HPDC 2024 (Acceptance rate: 17%)**, a top-tier system conference.

AI-SoC Lab, Kyungbook National University   2019.03 - 2022.10

- Advisor: Daejin Park
- Proposed **ensemble RL model for LLVM transform passes sequence optimization** for runtime memory profile reduction. Developed an LLVM IR analysis pass to extract static program features at compile time (EMSOFT 2023 WiP).
- Proposed data-analysis-based online soft errors and control flow errors detection model for deep learning applications. Implemented LLVM IR-level data assertion code injection and a hybrid detection mechanism combining rule-based checks and a sliding-window SVM. (EMSOFT 2022 WiP).

SCHOLARSHIPS AND AWARDS

Semiconductor Specialized University Scholarship, SNU   2024.03 - 2026.08
$8,000 over three semesters.

Presidential Science Scholarship, Korea Student Aid Foundation   2021.03 - 2026.08
Full tuition and stipend for eight semesters, total $34,000.

Hansung Scholarship, Hansung Son Jae Han Foundation   2019.03 - 2021.02
$8,000 over two years.

Alumni Association Award, Daegu Science High School   2021.02
Graduated with the highest honors.

RELEVANT COURSEWORK

Hardware System Design, Scalable High Performance Computing, Mobile Computing and Applications, Mathematical Foundations of Deep Neural Networks, Advanced Computer Architecture (Graduate), Advanced Compilers (Graduate), Data Communications, Abstract Algebra

ACADEMIC PROJECTS

Linux/Android Porting on ARM Cortex-A53 SoC   Spring 2024
Coursework Project for SNU M1522.000300 (Creative Integrated Design 2)

Ported mainline `U-Boot` bootloader, `Linux` kernel, and `Android AOSP` on custom ARM Cortex-A53 SoC. Supported custom peripherals and display panels by configuring device tree source files and kernel modules. Implemented `Mobilenet v1` with `GStreamer` and `NNStreamer`.

CNN Accelerator   Spring 2024
Coursework Project for SNU 4190.309A (Hardware System Design)

Implemented convolution module and compiler for a CNN accelerator using `Amaranth`. Optimized performance using zero-skipping 2D systolic array, quantization, and pruning for the convolution module.

WalkGuard: Protecting Child Pedestrians from Distraction   Fall 2023
Coursework Project for SNU 4190.406B (Mobile Computing and Its Applications)

Developed an `Android` application for protecting child pedestrians from distractions. Designed and implemented deep learning models for outdoor activity detection with accelerometer, RSSI, and sound data. Optimized models with quantization, pruning, and neural architecture search. (https://bit.ly/4hv7beG)

Accelerating Sequence-to-Sequence Machine Translation Model   Spring 2023
Coursework Project for SNU M1522.006700 (Scalable High Performance Computing)

Accelerated Sequence-to-Sequence machine translation model throughput on multiple NVIDIA GPUs using `CUDA` and `MPI`.

SKILLS

Programming: `C++`, `C`, `Python`, `Verilog`, `Java`, `PyTorch`, `TensorFlow`, `Bash`, `CUDA`, `RLLib`, `Amaranth`, `TFLite`, `Linux` kernel, `DAMON`, `LLVM`

Languages: English (TOEFL 109/120), Korean

TALKS

1. "IDT: Intelligent Data Placement for Multi-tiered Main Memory with Reinforcement Learning", **Oral Presentation**, *HPDC*, Pisa, Italy, 2024

2. "Searching Optimal Compiler Optimization Passes Sequence for Reducing Runtime Memory Profile using Ensemble Reinforcement Learning", Short Talk (Work-in-Progress), *EMSOFT*, Hamburg, Germany, 2023

3. "Accuracy-Area Efficient Online Fault Detection for Robust Neural Network Software-Embedded Microcontrollers", Short Talk (Work-in-Progress), *EMSOFT*, Shanghai, China (Virtual), 2022

MANDATORY MILITARY SERVICE

Defense Communication Command, Republic of Korea Army   2024.07 - 2026.01

Operated the military microwave wireless communication system in the middle of nowhere. Served as a squad leader and was awarded the exemplary soldier by the command.