

RESEARCH INTEREST

Computer architecture and systems, with a focus on operating systems, memory systems, and applying machine learning, especially reinforcement learning (RL) to improve system performance and resource efficiency.

EDUCATION

Seoul National University (SNU)

B.S. in Computer Science and Engineering

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

Seoul, Republic of Korea

2021.03 - 2026.08 (expected)

PUBLICATIONS

1. **Junseo 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. **Junseo 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. **Junseo 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. **Junseo Chang**, Myeongjin Kang, and Daejin Park, “Low-Power On-Chip Implementation of Enhanced SVM Algorithm for Sensors Fusion-Based Activity Classification in Lightweight 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 dynamically 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.
- Accepted to **HPDC 2024 (Acceptance rate: 17%)**.

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
\$8,000 over two years.

2019.03 - 2021.02

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

2021.02

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), Computer Architecture, Compilers, Operating Systems, System Programming, Data Communications

ACADEMIC PROJECTS

Linux/Android Porting on ARM Cortex-A53 SoC Spring 2024

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

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 Pedestrian from Distraction Fall 2023

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

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

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.