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MinGyu Park

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EDUCATION

Seoul National University **Seoul, Korea**
BS in Electrical and Computer Engineering (CGPA: 3.95/4.0) *Mar. 2018 - Present*

Military Service: Honorary Discharge as a Sergeant, Republic of Korea Army *Aug. 2020 - Feb. 2022*

RESEARCH INTERESTS

Efficient Processing Hardware
- Energy-Efficient Accelerator and Related Operating System
- Design Space Exploration for Operation Mapping
- Software-Hardware Co-Design

Neural Network Model
- Quantization / Binarization of Deep Neural Network
- Graph Neural Network

RESEARCH EXPERIENCES

Bachelor's Thesis at SOR Lab, Seoul National University *Jun. 2022 - Present*
- Advisor: Prof. Yun-Heung Paek
- **Thesis in preparation:** "Hardware Logic-aware Design Space Exploration for DNN Accelerators"
  - Developed a programmable accelerator on FPGA that can support any spatial/temporal unrolling.
  - Analyzed a DSE framework considering the discrepancies in the results between a simulator and the actual operation.
  - Proposed a method that can achieve complete accelerator design automation with optimized hardware logic cost.

Research Student at VLSI Lab, Seoul National University *Feb. 2022 - Oct. 2022*
- Advisor: Prof. Jae-Joon Kim
- **Thesis in preparation:** "Binarization of sampling-free GNN"
  - Applied the current CNN binarization method on GNN and demonstrated incompatibility.
  - Demonstrated an importance of activation distribution and suggested a clear solution to overcome the limitation.
  - Suggested a scale factor training method for binarized GNN that can handle oversmoothing issue.

SCHOLARSHIPS

The Presidential Science Scholarship, Korea Student Aid Foundation *Spring 2020 - Spring 2023*
Scholarship for top students in science and technology with exceptional creativity and strong potential.
Full tuition and stipend support; 140 students are competitively selected nationwide.

Alumni Association Scholarship, Kwanak Corporation *Spring 2019*

Merit-Based Scholarship (60%), Seoul National University *Fall 2018*

PROFICIENCY IN SKILLS

Programming Languages	C, C++, Python
Machine Learning Framework	PyTorch, PyG
Hardware Description Languages	Verilog, Chisel
Languages	Korean (Native), English (Proficient)

TEACHING EXPERIENCES

Lab Session Lecturer / Programming Methodology, Seoul National University *Summer 2022*
Prepared and conducted lab sessions to develop undergraduate students' fundamental programming techniques.
Mainly used C++ languages and taught the usage of Java and GitHub.

Undergraduate Student Tutor / Digital Logic Design and Lab, Seoul National University *Fall 2022*
Conducted a Q&A session for undergraduates who are having difficulty understanding the course.
Gave advise about the progress/implementation of their final project.(Enigma project)

VOLUNTEER ACTIVITIES

Youth Education Volunteer, Book N Dream Library *Apr. 2022 - Aug. 2022*
Taught basic English reading and speaking to a child from a single-parent family.

Senior Welfare Center Volunteer, Gwanak Senior Welfare Service Center *Nov. 2019 - Feb. 2020*
Supported food service activities and assisted the elderly with reduced mobility.

Early Childhood Education Volunteer, Angels' Haven for Children *Mar. 2019 - Jul. 2019*
Conducted a self-planned creativity program on "What is the science" for orphans in the center.

Talent Sharing Volunteer Camp, Daejeon Science High School *Sep. 2015 - Jun. 2017*
Delivered a self-directed mentoring program for middle school students in underprivileged areas.

RELATED COURSEWORK

Hardware/Accelerator Design

- Digital Systems Design and Experiments *Fall 2022*
  - Built a CNN accelerator on FPGA with an optimal hardware design.
- Topics in Integrated Circuit Design (audit) *Fall 2022*
  - Learnt about the In-Memory Computing and read several theses.

Computer Systems

- Topics in System Software *Fall 2022*
  - Conducted several labs suggested by CS:APP authors.
  - (e.g. bomblab, buflab, malloclab, shlab, proxylab and additional gdblab)
- Introduction to Operating Systems *Spring 2022*
  - Implemented an Operating System that can support Context Switching, Priority Scheduling and Semaphores.
- Computer Organization *Spring 2020*
  - Developed a Multi-cycle, In-order CPU based on Chisel and a Cache system by modifying the RISC-V emulator.

Deep Learning and Neural Network

- Graph Convolution Network (Topics in Control and Automation) *Spring 2022*
  - Learnt about the several graph-related theory as well as GCN and GNN.
- Machine Learning Fundamentals and Applications in Electrical and Computer Engineering *Spring 2022*
  - Designed a Neural Network that can predict a next alphabet on the given sequence of image.

REFERENCES

Jae-Joon Kim, Professor
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