Gungyu Lee

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Personal Profile

An undergraduate student at the Korea Advanced Institute of Science and Technology(KAIST), enrolled in the School of Electrical Engineering. Pursuing a career in the field of computer architecture, AI accelerators, digital circuit analysis, and full-stack processor design. Also interested in the field of computer vision, deep learning, and software development. Searching for a role as a hardware engineer or computer architect.

Education

Korea Advanced Institute of Science and Technology(KAIST) *Daejeon, Republic of Korea*

B.S. in Electrical Engineering (3.71 GPA) *Sep 2017 - Current*

- Minor in Computer Science
- **Courses:** Linear Algebra, Electronic Circuits, Digital Systems, Data Structure, Algorithms, Programming Languages, System Programming, Computer Organization, Probability and Statistics, Machine Learning, Big Data, Reinforcement Learning

Raha International School *Abu Dhabi, United Arab Emirates*

IB Diploma *Sep 2015 - May 2017*

- International Baccalaureate, Diploma Program - Final 42 Points
- High Level: Mathematics, Physics, Economics | Standard Level: Chemistry, Language & Literature, Spanish ab initio

Work Experience

Vertically Integrated Architecture Lab, KAIST *Daejeon, KAIST*

Research Internship *Sep 2022 - Current*

- Under the supervision of professor Minsoo Rhu, conducted research in the field of convolutional neural network acceleration, primarily based on the paper *SCNN: An Accelerator for Compressed-sparse Convolutional Neural Networks*(Parashar et al.).
- Implementing a configurable SCNN cycle-level simulator using C++, following the microarchitecture described in the original paper.

Intelligent Network and Architecture Lab, KAIST *Daejeon, KAIST*

Research Internship *Jul 2022 - Oct 2022*

- Under the supervision of Professor Dongsu Han, conducted research in the field of video super-resolution, primarily based on the paper *Efficient Video Compression via Content-Adaptive Super-Resolution*(Khani et al.).
- Fully implemented the model as described in the original paper using PyTorch, and performed various experiments for performance checking and hyperparameter tuning.

Samsung Electronics Co., Visual Display Business, DX Division *Suwon, Republic of Korea*

Software Development Internship *Jan 2022 - Feb 2022*

- Developed a TV Bixby Capsule (an application for the Bixby, the Samsung voice assistant) for delivering poll result statistics related to the Korean presidential election (candidate approval rating, etc.).
- Designed and implemented the basic structure and business logic of the capsule in JavaScript.
- Developed UI/UX for visual and oral interaction with the user, such as response to continual utterance. Also, trained the model with real example inputs with manual tagging procedure.

University Projects

CS492(A): SoftGroup for 3D Instance Segmentation on Point Clouds *Daejeon, Republic of Korea*

Korea Advanced Institute of Science and Technology *Mar 2022 - Jun 2022*

- Course Project for CS492(A): Machine Learning for 3D Data
- Read and implemented the deep learning model introduced in the paper *SoftGroup for 3D Instance Segmentation on Point Clouds*(Vu et al.) using PyTorch, and reproduced experimental data as introduced in the original paper.

EE488: Reinforcement Learning Agent for SuperMarioBros using Stable Baseline 3 *Daejeon, Republic of Korea*

Korea Advanced Institute of Science and Technology *Mar 2022 - Jun 2022*

- Course project for EE488: AI Capstone Design
- Using PyTorch-based reinforcement learning libraries such as Stable Baseline 3, implemented a RL agent that plays SuperMarioBros, based on models such as DQN and PPO.
- Performed training through tasks such as preprocessing of environment observations and policy neural network customizing with ResNets.

Single-Cycle, Multi-Cycle, Pipeline CPU Implementation & Simulation using Verilog *Daejeon, Republic of Korea*

Korea Advanced Institute of Science and Technology *Mar 2020 - Jun 2020*

- Course project for EE312: Introduction to Computer Architecture
- Throughout the course, I have implemented three 32-bit processors in Verilog - the single-cycle, multi-cycle, and pipeline CPU, each with its own microarchitecture, but all based on the RISC-V ISA.
- The processors were designed so that it supports basic instructions in machine language such as jump, store, move, arithmetic and logical operations within a limited number of clock cycles.

ButterflyD: Bipartite Graph Anomaly Detection using 4-node Clique Approximation *Daejeon, Republic of Korea*

Data Mining Lab, KAIST Graduate School of AI *Dec 2019 - Jun 2020*

- A data mining project under the supervision of Professor Kijung Shin, focused on anomaly detection in large-scale bipartite graphs within specific memory and time limitations.
- Devised algorithms for quickly approximating the number of 4-node cliques within the graph, and thus ensuring real-time detection of anomalous behavior in the graph.

Extracurricular Activities

JUNCTION ASIA 2022 *Busan, Republic of Korea*

Team *Chain Rule* of Track *Chainapsis* *Aug 2022*

- Participated in the global hackathon JUNCTION ASIA 2022.
- Developed a simple blockchain-based platform for safe real estate transactions using Ignite CLI and Cosmos SDK.

2071 - Dreaming a World where Technology is Toward Humans *Daejeon, Republic of Korea*

KAIST CVC Chairman's Award *Sep 2021 - Oct 2021*

- Participated in a competition for envisioning the future of KAIST and our society, and wrote an article about the impact of artificial intelligence, metaverse, and blockchain.
- Second place in the teams' category.

Teaching Assistant Experiences *Daejeon, Republic of Korea*

Undergraduate Teaching Assistant Roles *Dec 2018 - Jun 2022*

- Tutor for CS101: Introduction to Programming - *Mar 2022 - Jun 2022*
- Teaching assistant for 2019, 2020 Academic English Camp at KAIST - *Dec 2018, Dec 2019*

ICISTS (KAIST International Conference Organizing Committee) *Daejeon, Republic of Korea*

Head of Global Partnership *Sep 2017 - Aug 2019*

- Organize and operate the largest undergraduate conference in Asia, based on the theme of the integration of Science, Technology, and Society.
- Fundraise from KAIST, Microsoft, Amazon, IEEE, and Other Institutions.
- Mainly in charge of international promotion as well as participant management and general logistics of the event.

Skills

Programming Python (Pandas, PyTorch, NumPy, Scikit-learn. etc.), C/C++, Verilog, JavaScript, MySQL

Miscellaneous Linux, Shell (Bash/Zsh), LaTeX(Overleaf), Microsoft Office, Git

Languages

Korean Native fluency

English Bilingual fluency