Youngwoo Jeong

Hardware Engineer · Architecture Team

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Personal Profile

Hello! I'm Youngwoo (Ray) Jeong, and I received my master degree in Electronic Engineering at Seoul University of Science and Technology in February 2024. My research focused on computer architecture, security architecture, domain-specific accelerator, FPGA prototyping. Currently, I am working at MangoBoost, a DPU startup company, where I joined the architecture team in March 2024.

Education

Seoul National University of Science and Technology *Seoul, Repulic of Korea*

M.S in Electronic Engineering *Mar 2022 - Feb 2024*

- Advisor: Prof. Seung Eun Lee
- Thesis: Approximate Arithmetic Circuits for Embedded Fuzzy Logic Controller
- Research Interest: Computer Architecture, Domain-specific Accelerator, Security Architecture, Energy-Efficient Computing, HW/SW Co-Design

Seoul National University of Science and Technology *Seoul, Repulic of Korea*

B.S in Electronic and IT Media Engineering *Mar 2015 - Feb 2022*

- Advisor: Prof. Seung Eun Lee

Work Experience

MangoBoost *Seoul, Repulic of Korea*

Hardware Engineer *Mar 2024 - present*

- Worked on an architecture team focused on efficiently offloading the NVMe/TCP protocol.
- Designed the module which analyzes NVMe commands from the host, and the block which facilitates compatibility between NVMe and TCP.
- Designed the feature to ensure that NHI and NHTB function correctly when physical functions (PF) and virtual functions (VF) are dynamically configured on the host (referred to as multi-PF and multi-VF).
- Validated the system performance through Flexible I/O Tester (FIO) benchmarks, achieving a guaranteed maximum throughput of 200Gbps.

Publications

[Conference Proceedings]

[C8] **The Design of Embedded Fuzzy Logic Controller for Autonomous Mobile Robots**
Youngwoo Jeong, Won Sik Jeong, Jin Young Shin, Seung Eun Lee
*International SoC Design Conference **(ISOCC)***, Jeju, Korea, Oct., 2023, **[URL]**

[C7] **Embedded Monitoring System for Preventing Lonely Death based on Edge AI**
Soohee Kim, Joungmin Park, **Youngwoo Jeong**, Seung Eun Lee
*International Conference on Consumer Electronics **(ICCE)***, Las Vegas, USA, Jan., 2023, **[URL]**

[C6] **A Real-Time Reconfigurable AI Processor based on FPGA**
Yue Ri Jeong, Kwonneung Cho, **Youngwoo Jeong**, Sun Beom Kwon, Seung Eun Lee
*International Conference on Consumer Electronics **(ICCE)***, Las Vegas, USA, Jan., 2023, **[URL]**

[C5] **An Architecture for Resilient Federated Learning through Parallel Recognition**
Jeongeun Kim, **Youngwoo Jeong**, Suyeon Jang, Seung Eun Lee
*The 31st International Conference on Parallel Architectures and Compilation Techniques **(PACT)***, Chicago, USA, Oct., 2022, **[URL]**

[C4] **Robot-Specific Processor for Autonomous Driving**
Youngwoo Jeong, Kwang Hyun Go, Soohee Kim, Seung Eun Lee
*1st Workshop on Robotics Acceleration with Computing Hardware **(RoboARCH)** (Co-located with the IEEE/ACM International Symposium on Microarchitecture **(MICRO)**)*, Chicago, USA, Oct., 2022, **[URL]**

[C3] **Intelligent Transportation System based on an Edge AI**
Young Woo Jeong, Hyun Woo Oh, Su Yeon Jang, Seung Eun Lee
*International Conference on Future Information & Communication Engineering **(ICFICE)***, Jeju, Korea, Jan., 2022, **[URL]**

[C2] **A Local Interconnect Network Controller for Resource-Constrained Automotive Devices**
Kwonneung Cho, Hyun Woo Oh, Jeongeun Kim, **Young Woo Jeong**, Seung Eun Lee
*International Conference on Consumer Electronics **(ICCE)***, Online, Jan., 2022, **[URL]**

[C1] **Robot-on-Chip: Computing on a Single Chip for an Autonomous Robot**
Young Woo Jeong, Kwang Hyun Go, Seung Eun Lee
*International Conference on Consumer Electronics **(ICCE)***, Online, Jan., 2022, **[URL]**

[Journal]

[J7] **SEAM: A synergetic energy-efficient approximate multiplier for application demanding substantial computational resources**
Youngwoo Jeong, Joungmin Park, Raehyeong Kim, Seung Eun Lee
Integration. vol.101, 2025. **[URL]**

[J6] **Lightweight and Error-Tolerant Stereo Matching with a Stochastic Computing Processor**
Seongmo An, Jongwon Oh, Sangho Lee, Jinyeol Kim, **Youngwoo Jeong**, Jeongeun Kim, Seung Eun Lee
Electronics. vol.13, no.11, 2024. **[URL]**

[J5] **Accelerating Strawberry Ripeness Classification Using a Convolution-Based Feature Extractor along with an Edge AI Processor**
Joungmin Park, Jinyoung Shin, Raehyeong Kim, Seongmo An, Sangho Lee, Jinyeol Kim, Jongwon Oh, **Youngwoo Jeong**, Soohee Kim, Yue Ri Jeong, Seung Eun Lee
Electronics. vol.13, no.2, 2024. **[URL]**

[J4] **Intelligent Monitoring System with Privacy Preservation Based on Edge AI**
Soohee Kim, Joungmin Park, **Youngwoo Jeong**, Seung Eun Lee
Micromachines. vol.14, no.9, 2023. **[URL]**

[J3] **Parallel Stochastic Computing Architecture for Computationally Intensive Applications**
Jeongeun Kim, Won Sik Jeong, **Youngwoo Jeong**, Seung Eun Lee
Electronics. vol.12, no.7, 2023. **[URL]**

[J2] **Photoplethysmography-Based Distance Estimation for True Wireless Stereo**
Youngwoo Jeong, Joungmin Park, Sun Beom Kwon, Seung Eun Lee
Micromachines. vol.14, no.2, 2023. **[URL]**

[J1] **An Edge AI Device Based Intelligent Transportation System**
Youngwoo Jeong, Hyun Woo Oh, Soohee Kim, Seung Eun Lee
Journal of Information and Communication Convergence Engineering (JICCE). vol.20, no.3, 2022. **[URL]**

Awards & Honors

Excellent Thesis Award — *Seoul, South Korea*
Seoul National University of Science and Technology — *February 2024*
- **Topic: Approximate Arithmetic Circuits for Embedded Fuzzy Logic Controller**

Corporate (LX Semicon) Special Award — *Seoul, South Korea*
Korea Semiconductor Industry Association — *October 2022*
- **Topic: AI Processor employing Stochastic Computing for Embedded Systems**

Department Chair Award — *Seoul, South Korea*
Seoul National University of Science and Technology — *February 2022*
- **Topic: Design of an Autonomous Indoor Robot for Robot-on-Chip**

Corporate (Silicon Mitus) Special Award — *Seoul, South Korea*
Korea Semiconductor Industry Association — *November 2021*
- **Topic: In-Vehicle Network Processor based on LIN and CAN-FD Controller**

Patents

Federated Learning Method and System Using Shared Learning Data — *United States*
Seung Eun Lee, Jeongeun Kim, **Youngwoo Jeong** — *December 2023*
patent application

Method and System for Determining Final Result Using Federated Learning — *United States*
Seung Eun Lee, Jeongeun Kim, **Youngwoo Jeong** — *December 2023*
patent application

Research Project

Development for Processing Software on AI Semiconductor Devices — *South Korea*
Ministry of Science and ICT — *2024 - 2022*
- Analyzed various AI models to standardize the input for AI systems.
- Proposed an architecture for a hardware scheduler optimized for multi-AI core architecture.

Development of Proximity/Healthcare Convergence Sensor SoC for TWS — *South Korea*
Ministry of Trade, Industry and Energy — *2023 - 2021*
- Designed a test environment for photoplethysmography sensors to evaluate their performance.
- Developed a waveform adjustment filter to enhance signal processing accuracy.
- Proposed an AI-based distance estimation algorithm for improved sensor accuracy.

Embedded AI Module Based on Neuromorphic Computing *South Korea*

Ministry of Trade, Industry and Energy *2021 - 2020*

- Designed various applications utilizing multiple embedded AI modules.
- Developed a testbed for evaluating multi-AI core controllers.
- Proposed methodologies to enhance accuracy in federated learning with multi-AI core systems.

Teaching Experience

Advanced AI Processor *Seoul, South Korea*

Seoul National University of Science and Technology *Fall 2022*

Teaching Assistant

Computer Architecture *Seoul, South Korea*

Seoul National University of Science and Technology *Fall 2022*

Teaching Assistant

Digital System Design *Seoul, South Korea*

Seoul National University of Science and Technology *Spring 2022*

Teaching Assistant

Resilient Processor Design *Seoul, South Korea*

Seoul National University of Science and Technology *Spring 2022*

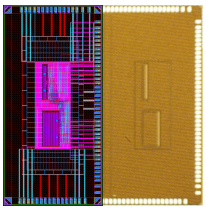
Teaching Assistant

Skills

Hardware Description Languages	Verilog
High-Level Computer Languages	SystemC, C, C++, Python, Matlab
Design and Implementation Tools	Design Compiler, IC Compiler II, Quartus II, Vivado
Verification and Analysis Tools	VCS, Verdi, ModelSim, PSpice, PrimeTime, Formality, StarRC

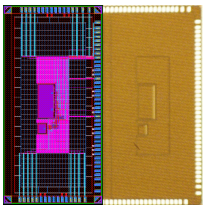
Chip Design

Design of Robot-Specific Processor for Autonomous Driving



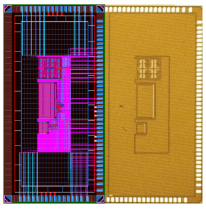
- Technology: Samsung 28nm RFCMOS
- Designer: **Youngwoo Jeong**, Yue Ri Jeong, Hyun Woo Oh, Kwang Hyun Go
- Gate Counts: 1062K @ 50MHz
- Memory: Code region (16KB), Data region (128KB)
- Date: 2022. 07. 18

A Vehicular Embedded Network Processor based on Cortex-M0



- Technology: Samsung 28nm RFCMOS
- Designer: Kwang Hyun Go, Soohee Kim, Kwonneung Cho, **Youngwoo Jeong**
- Gate Counts: 862K @ 50MHz
- Memory: Code region (16KB), Data region (128KB)
- Date: 2022. 07. 18

Programmable Embedded AI Processor based on Cortex-M0



- Technology: Samsung 28nm RFCMOS
- Designer: Kwonneung Cho, **Youngwoo Jeong**, Hyun Woo Oh, Chang Yeop Han
- Gate Counts: 1238K @ 50MHz
- Memory: Code region (16KB), Data region (128KB), AI region (16KB)
- Date: 2021. 07. 19

References available upon request.