

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, high-level synthesis (HLS), domain-specific accelerator, FPGA prototyping, HW/SW co-design, data processing unit (DPU). 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, Republic 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

Seoul National University of Science and Technology

Seoul, Republic of Korea

B.S in Electronic and IT Media Engineering

Mar 2015 - Feb 2022

- Advisor: Prof. Seung Eun Lee

Work Experience

MangoBoost

Seoul, Republic of Korea

Hardware Engineer

Mar 2024 - present

- Architected an efficient NVMe/TCP initiator (NTI) capable of offloading NVMe-over-TCP protocol processing to either an ARM core or an FPGA accelerator, with dynamic selection logic that optimizes for hardware function availability and seamlessly falls back to the ARM software path when FPGA resources are constrained (e.g., in large-scale Ceph deployments).
- Implemented and validated core components of the architecture, including the Mango NVMe Host Interface (for analyzing host-side NVMe commands) and the Mango NVMe/TCP Bridge Engine (for bridging NVMe operations to the TCP/IP network), while ensuring support for dynamic multi-function configurations with multiple Physical Functions (PFs) and Virtual Functions (VFs) to enable multi-tenant and virtualized deployments.
- Performed extensive functionality and performance testing using Flexible I/O Tester (FIO) and validated real-world performance by running PostgreSQL workloads (pgbench) across diverse configurations (from single-disk setups to multi-disk RAID arrays on XFS file systems).
- Support designing internal simulation framework for the NTI.

Publications

[JOURNAL]

- [J7] **SEAM: A synergetic energy-efficient approximate multiplier for application demanding substantial computational resources**
Youngwoo Jeong, Jounghmin 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**
Jounghmin Park, Jinyoung Shin, Raehyeong Kim, Seongmo An, Sangho Lee, Jinyeol Kim, Jongwon Oh, Youngwoo Jeong, Soohye 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**
Soohye Kim, Jounghmin 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, Jounghmin 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, Soohye Kim, Seung Eun Lee
Journal of Information and Communication Convergence Engineering (JICCE). vol.20, no.3, 2022. [URL]

[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, Jounghmin 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]

Awards & Honors

Excellent Thesis Award Seoul National University of Science and Technology • Topic: Approximate Arithmetic Circuits for Embedded Fuzzy Logic Controller	Seoul, South Korea February 2024
Corporate (LX Semicon) Special Award Korea Semiconductor Industry Association • Topic: AI Processor employing Stochastic Computing for Embedded Systems	Seoul, South Korea October 2022
Department Chair Award Seoul National University of Science and Technology • Topic: Design of an Autonomous Indoor Robot for Robot-on-Chip	Seoul, South Korea February 2022
Corporate (Silicon Mitus) Special Award Korea Semiconductor Industry Association • Topic: In-Vehicle Network Processor based on LIN and CAN-FD Controller	Seoul, South Korea November 2021

Patents

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

Research Project

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

Catapult HLS, Design Compiler, IC Compiler II, Quartus II, Vivado

Verification and Analysis Tools

Verdi, VCS, ModelSim, PSpice, PrimeTime, Formality, StarRC

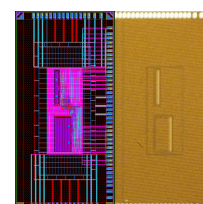
Benchmark Tools

Flexible I/O (FIO), PGbench

Chip Design

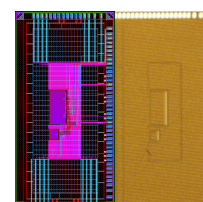
Design of Robot-Specific Processor for Autonomous Driving

- 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



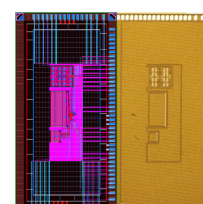
A Vehicular Embedded Network Processor based on Cortex-M0

- 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.