SANGHO HA

20, Daehak-ro 75 road, Yuseong-gu, Daejeon, Republic of Korea
[T] +82-010-3833-5509 **[M]** sangho.ha.0804@gmail.com **[B]** sangho0804.gitbub.io

RESEARCH INTERESTS

HW/SW co-design, Deep Learning, Model compression, Model Optimization,
embedded AI computing, On-device Training, real-time Systems.

EDUCATION

Master of Science (M.S.) in Computer System & Software Mar. 2024 - Feb. 2026
Chungnam National University – Daejeon in Korea GPA: 4.31 /4.5

Bachelor of Science (B.S.) in Computer Science and Engineering Mar. 2018 - Feb. 2024
Chungnam National University – Daejeon in Korea GPA: 3.2 /4.5

RESEARCH EXPERIENCE

Research Student Jan. 2022 - Feb. 2026
(Advisor: Prof. Hyungshin Kim) ***Embedded Systems Lab*** – Daejeon, Korea

M.S. Student (Mar. 2024 – Feb. 2026)
During my master's studies, I have conducted research on efficient on-device training and lightweight computer vision models for edge intelligence. I first proposed Elastic Layer Selection, an enhanced version of ElasticTrainer that improves arithmetic intensity and GPU utilization, reducing training time by up to 25% with negligible accuracy loss [1]. In the area of disaster monitoring, I developed a lightweight semantic segmentation model for UAV on-device intelligence by incorporating compact backbones, lightweight attention modules, quantization, and knowledge distillation. This approach reduced inference time by 84.2% while slightly improving accuracy compared to the baseline [2]. I also investigated Automatic Compressing Subset Pruning (ACoSP) for semantic segmentation, identifying optimal sparsity ratios that balance computational efficiency and model accuracy in UAV disaster applications [3]. In addition, I participated in research on on-device AI frameworks for surveillance satellites, proposing design strategies for deploying efficient AI computing in space-based, resource-constrained environments [4].

Undergraduate Research Intern (Jan. 2022 – Feb. 2024)
To enable real-time analysis of disaster imagery in edge computing environments, I applied the Structured Knowledge Distillation for Semantic Segmentation (SKDS) method to the FANet model for model compression. This study resulted in a 45% reduction in parameters and a 20.4% reduction in FLOPs, while maintaining accuracy [5].

PUBLICATIONS

[1] **Sangho Ha**, Hyungshin Kim, *"Accelerated ElasticTrainer With Elastic Layer Selection"*, **IEEE Access**, vol. 13, pp. 133025–133034, 2025.

[2] Hanbin Lee, Gihwan Kim, **Sangho Ha**, Hyungshin Kim, *"Lightweight Disaster Semantic Segmentation for UAV On-Device Intelligence"*, IEEE International Geoscience and Remote Sensing Symposium **(IGARSS)**, pp. 8821–8825, 2024.

[3] Jingyung Choi, Yunsik Ham, **Sangho Ha**, Hyungshin Kim, *"Pruning Techniques for Efficient Image Segmentation"*, Korea Software Congress **(KSC)** Conference, pp. 1259–1261, 2024.

[4] Daeun Seo, Jinse Kwon, Jaemin Kang, Hanbin Lee, Gihwan Kim, **Sangho Ha**, Hyungshin Kim, *"On Device-AI Computing for Reconnaissance Satellites"*, The Korean Society for Aeronautical and Space Sciences **(KSAS)** Conference, pp. 470–471, 2024.

[5] **Sangho Ha**, Daeun Seo, Hanbin Lee, Hyungshin Kim, "Study on Lightweight Disaster Segmentation Model with Knowledge Distillation", Korea Software Congress **(KSC)** Conference, pp. 1612–1614, 2023.

PROJECTS

Heterogeneous Satellite Constellation Based ISR Research Center Mar. 2024 – Dec. 2025

Funded by Korea Research Institute for Defense Technology Planning and Advancement (KRIT) through the Defense Acquisition Program Administration (DAPA).

Onboard AI Computer Prototype Development (HW/SW Collaboration)

- Collaborated with Satrec Initiative to develop an onboard AI computer prototype, where I was responsible for the software development.
- Customized the MIPI CSI-2 driver on Jetson Xavier NX, conducted integration and validation tests on site.
- configured a DeepStream based preprocessing pipeline with NVIDIA modules (tiling, resizing, patch extraction) to enable efficient real-time satellite image streaming.

Onboard AI Training Acceleration

- Researched on-device Training methods for AI model updates to adapt to environmental changes such as new objects and optical conditions. improving both adaptability and security while minimizing external data transmission.

EXTRACURRICULAR ACTIVITIES

CNU SW/AI competition - *Chungnam National University* Sep. 2023 - Nov. 2023

3rd Prize, Works Competition (AI, SW, Security, Big Data, IoT) at the 2023 CNU Creative SW/AI Festival. Developed a UAV-based edge-device system for efficient disaster-area detection, with backend and frontend monitoring modules; conducted as a 3-member team.

Accelerator Programming Summer School - *Seoul National University* Aug. 2023

completed the Accelerator Programming Summer School. This course focused on understanding the principles and architecture of performance accelerators and on acquiring foundational skills in CUDA programming. (1week course)

Low Power Computer Vision (LPCV) Challenge – *Online* Feb. 2023 – Aug. 2023

Participated as a 3-member team in a competition on semantic segmentation for disaster-scene UAV datasets (1,700 samples), targeting deployment on NVIDIA Jetson Nano by developing lightweight models through network re-architecture, knowledge distillation, TensorRT optimization, integration of SE mechanisms into attention modules, and image processing; achieved 7th out of 60 teams.

volunteer club – *Chungnam National University* Feb. 2021 - Jun. 2023

Provided educational assistance to high school students in need, focusing on coding and mathematics, while also planning and leading volunteer programs through an active student club.

Coursera Machine Learning Course – *Online* Nov. 2022 – Dec. 2022

Completed Andrew Ng's Coursera Machine Learning and Deep Learning Specializations, covering supervised learning, neural networks, CNNs, and model optimization techniques.

Summarized key concepts through regular presentations to mentor, reinforcing theoretical understanding and practical applications.

fire station – Daejeon, Korea Jan. 2019 - Nov. 2020
Assisted in and conducted fire safety training for vulnerable populations, including CPR and fire response.

SKILLS

Programming	Python
Language	KOREAN (Native language)
	ENGILSH (Basic)
	JAPANESE (Proficient)
Others	Pytorch, Tensorflow

TEACHINGS

System Programing (TA) Fall 2024
Logic Circuit (TA) Spring 2024