

Sungwon Woo

AI RESEARCH SCIENTIST

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PROFILE

I am an alum of Sogang University, where I earned a Master's degree in Artificial Intelligence with a specialization in Computer Vision in 2025, advised by Prof. Jongho Nang. I also received my B.S. in Computer Science and Engineering in 2023. My research lies at the intersection of **computer vision** and **deep learning**, with a special interest in building intelligent visual systems that are beyond supervised learning and data-memory efficient. My primary research interests include **continual learning**, **few-shot learning**, **self(semi)-supervised learning**, while I also have experience in image retrieval and lightweight model design.

EDUCATION

Sogang University

Seoul, Korea

M.S. IN DEPARTMENT OF ARTIFICIAL INTELLIGENCE

Mar 2023 - Aug 2025

- Advisor: Prof. Jongho Nang
- Thesis: "Neural Collapse-Driven, Uncertainty-Aware Framework for Few-shot Class-Incremental Learning" [\[link\]](#)

Sogang University

Seoul, Korea

B.S. IN COMPUTER SCIENCE AND ENGINEERING

Mar 2017 - Feb 2023

- Graduated with major coursework in Algorithms, Operating Systems, and AI

PUBLICATIONS

CONFERENCE

* Co-first Authors. † Corresponding Author.

Does Prior Data Matter? Exploring Joint Training in the Context of Few-Shot Class-Incremental Learning [\[link\]](#)

Shiwon Kim*, Dongjun Hwang*†, **Sungwon Woo***, Rita Singh†

ICCV Workshop on Continual Learning in Computer Vision (CLVision), 2025.

Relational Self-supervised Distillation with Compact Descriptors for Image Copy Detection [\[link\]](#)

Juntae Kim*, **Sungwon Woo***, Jongho Nang†

IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2025.

Semi-supervised learning Knowledge Distillation with feature Augmentation (KDA) [\[link\]](#)

Sungwon Woo, Jeongae Lee, Jung Lee, Hojune Kim, Jinjyeong Bae, Young Choi, Jongho Nang†

Korean Institute of Information Scientists and Engineers (KCC), 2024.

Autoencoder-based CNN LSTM drowsy driving detection model and safe driving system using YOLOv7(5) road front object recognition [\[link\]](#)

Sungwon Woo, Moonhae Kang, Junseok Lee

Korean Institute of Information Scientists and Engineers (KCC), 2022.

Research Projects & Experience

Multimedia System Lab, Sogang University
GRADUATE RESEARCHER, UNDERGRADUATE INTERN

Seoul, S. Korea
Sep 2022 - Aug 2025

- Development of Efficient Networks for Image Copy Detection**
Developed a lightweight network using knowledge distillation to address high computational overhead in image retrieval and copy detection.
Developed a compact image descriptor that improves database search efficiency and achieves competitive results across diverse benchmarks.
- Capstone Design 2 Project** [\[video\]](#)
Developed safety features by leveraging road sign object detection to model the surrounding driving environment, and implemented driver drowsiness detection using a CNN-LSTM.

Carnegie Mellon University
VISITING SCHOLAR

Pittsburgh, USA
Aug 2024 - Feb 2025

- A New Benchmark for Few-Shot Class-Incremental Learning: Redefining the Upper Bound** [\[report\]](#) [\[video\]](#)
Introduced a new joint training benchmark tailored for few-shot class-incremental learning by integrating imbalanced learning, and contributed to standardizing inconsistencies in current experimental setups within a unified framework.
(advised by [Prof. Rita Singh](#))
- Artificial Intelligence on the Edge with Robotics (AIER)** [\[slide\]](#) [\[video\]](#)
Developed an AI Cannon system on Jetson Orin Nano that detects stationary and moving zombies using an object detection model, determines shooting order through LLM-based speech input, and manages uncertainty by requesting user confirmation for ambiguous targets.
(advised by [Stephen Beck](#))
- Invisible Watermarks: Attacks and Robustness** [\[report\]](#) [\[video\]](#)
Improved watermark robustness via cascaded image and latent space techniques, and enhanced attacks with a custom remover network.

Smilegate
STUDENT RESEARCHER

Pangyo, S. Korea
Jun 2024 - Jul 2024

- Generating Yua Han's SNS Images and Reels** [\[video\]](#)
Created virtual human Yua Han's Instagram images and reels video with Dreambooth and Face Reenactment

Awards, Fellowships, & Grants

2025	Awarded 2nd place (2/34) in the Academic Excellence Award, CMU	
2024	Carnegie Mellon University AI Intensive Training Program Fellowship, IITP	45,000 USD
2023-2025	Smilegate AI Major (DHE) Scholarship, Smilegate	7,100 USD per semester
2023	5th place on Video Similarity Challenge, CVPRW2023, VCDW by META	
2022	4th place on Food Classification Challenge, KT GenieLabs	

Teaching Experience

Fall 23'	Discrete Structure(AIE2070-01), Teaching Assistant	Sogang University
Spring 23'	Computer Programming I(AIE2050-02), Teaching Assistant	Sogang University