

Sunghwan Kim

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Research Interests

My research interests lie in computer vision. I aim to develop efficient approaches for robust feature representations in vision models. Currently, I am exploring methods to leverage pre-trained Foundation Models (FMs) in vision to enhance downstream tasks. Additionally, I am passionate about optimizing vision models with hardware efficiency.

Education

Korea Advanced Institute of Science and Technology (KAIST) Feb 2017-Feb 2021
B.S. in Electrical Engineering and Mathematics (double major) Advisor: Steven E. Whang
GPA: overall 3.62/4.3; major 3.67/4.3

Korea Science Academy of KAIST Mar 2014-Feb 2017
High school for gifted students in mathematics and science

Publications

2. Texture Learning Domain Randomization for Domain Generalized Segmentation [[paper](#)]
Sunghwan Kim, Dae-hwan Kim, and Hoseong Kim
International Conference on Computer Vision (ICCV), 2023
1. Data Gathering Trials for the Development of Military Imaging Systems
Maria Niebla, Duncan L. Hickman, Eunjin Koh, Chanyong Lee, Hoseong Kim, Chaehyoen Lim, **Sunghwan Kim**
Proc. SPIE Vol. 12737, 2023

Patent

1. Method and System for Detecting Target Using Time Series Images
Chaehyeon Lim, **Sunghwan Kim**, Hoseong Kim, and Eunjin Koh
KR Patent, 2023 (Reg. Num. 10-2023-0031087)

Work Experience

Agency for Defense Development (ADD) Jun 2021-Present
First Lieutenant and Machine Learning Research Engineer Daejeon, Republic of Korea

- Selected as one of the exclusive 25 military officers nationwide for the ADD, Korea's counterpart to DARPA, dedicated to advancing national defense through science and technology research.
- Object detection in defense systems: implemented real-time object detection algorithms for defense systems. Constructed and processed infrared imagery datasets, and established the learning pipeline.
- Edge device acceleration: responsible for accelerating deep learning models on edge devices such as FPGA and Nvidia Orin board, and integrating them into the system.

Bluepoint Partners Aug 2020-Mar 2021
Research Assistant Seoul, Republic of Korea

- Bluepoint Partners is an early stage venture capital firm targeting technology sectors.
- Supported investments in tech-based startups and conducted market research for these investments.
- Major areas of interest: AI, Robotics

Paple Jun 2019-May 2020
Co-founder and Software Engineer Seoul, Republic of Korea

- Paple is a software platform equipped with a community feature that allows for the meta-review of AI papers and the exchange of insights on them.
- Developed the backend using Django and built the database system with MySQL.

Neosapience
Machine Learning Engineer

Dec 2017-Feb 2018
Seoul, Republic of Korea

- Neosapience is a Series B startup that operates deep learning-based audio and video synthesis technology and has launched an AI-powered virtual actor service.
- Developed a Korean text-to-speech (TTS) system.

Research Experience

Agency for Defense Development (ADD)
Researcher in missile IR seeker team

Jun 2022-Mar 2023
Daejeon, Republic of Korea

- Domain generalization in object recognition: researched methods to train robust vision models that learn from synthetically generated source data and perform well on diverse unseen real-world data.

Korea Advanced Institute of Science and Technology (KAIST)
Undergraduate researcher in Intelligent Network Architecture (INA) lab

Oct 2018-Apr 2019
Daejeon, Republic of Korea

- Super-resolution in edge device: Implemented method that combines neural super resolution with traditional video codecs to maximize streaming quality on edge devices

Korea Advanced Institute of Science and Technology (KAIST)
Invited researcher in Center for Axion and Precision Physics Center

Jun 2016-Aug 2016
Daejeon, Republic of Korea

- Researched on the detection of axion using resonant frequency measurements in a cylindrical cavity.

Honor

Korea Army Startup Challenge Gold Prize (\$3000)
Korea Student Aid Foundation (KOSAF) Scholarship (\$1500)
Korea National Scholarship of Science and Technology (\$10000)
KAIST scholarship (\$5000)

Community Involvement

KAIST Freshman Coach Senior
Samsung Semiconductor Education Program and Scholarship
Research Officers for National Defense (ROND) cadat
KAIST Electrical Engineering Department Student Council
KAIST Cyber Tutoring Program
KAIST Foreign Buddy Program
KAIST Automobile Maker Club

Feb 2020-Feb 2021
Jun 2019-Present
Dec 2018-May 2021
Mar 2018-Feb 2019
Feb 2018-Jun 2018
Sep 2017-Dec 2017
Mar 2017-Aug 2018

Skills

Electrical Engineering Courses: Deep Learning, Database and Bigdata System, Signal Processing, Computer Architecture, Operating System, Computer Network, Digital System, Electrical Circuits

Mathematics Courses: Linear Algebra, Mathematical Analysis, Probability theory, Statistics, Convex optimization, Numerical Analysis, Discrete Mathematics, Mathematical Modeling, Differential Geometry, Algebra

Programming Languages: Python, C/C++, MATLAB

Frameworks & Tools: Pytorch, NumPy, OpenCV, Docker, Git

References

Dr. Hoseong Kim

Senior Reseacher at Agency for Defense Development (ADD), **Email:** hoseongkim@add.re.kr.

Dr. Dae-hwan Kim

Senior Reseacher at Agency for Defense Development (ADD), **Email:** dhkim7@add.re.kr.

Dr. Steven E. Whang

Professor of Electrical Engineering at KAIST, **Email:** swhang@kaist.ac.kr.