

Sunghwan Kim

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Research Interests

My research interests are in computer vision, especially efficient algorithms for visual perceptions. 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.

Keywords: Visual Perceptions, Foundation Models, Knowledge distillation, Network Pruning

Education

Korea Advanced Institute of Science and Technology (KAIST)

B.S. in Electrical Engineering and Mathematics (double major)

GPA: overall 3.62/4.3; major 3.67/4.3

Feb 2017-Feb 2021

Advisor: Steven E. Whang

Korea Science Academy of KAIST

High school for gifted students in mathematics and science

Mar 2014-Feb 2017

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)

First Lieutenant and Machine Learning Research Engineer

Jun 2021-Present

Daejeon, Republic of Korea

- Selected as one of the exclusive 25 military officers in Korea who conduct military service as research engineer at the ADD, Korea's counterpart to DARPA.
- Developed real-time object detection algorithms for defense systems, including the construction and processing of infrared imagery datasets, and establishment of the learning pipeline.
- Implemented the acceleration of deep learning models on edge devices like FPGAs and Nvidia Orin boards, and their seamless integration into the system.

Bluepoint Partners

Research Assistant

Aug 2020-Mar 2021

Seoul, Republic of Korea

- Bluepoint Partners is an early stage venture capital firm targeting tech sector, such as AI and robotics.
- Supported investments in tech-based startups and conducted market research for these investments.

Paple

Co-founder and Software Engineer

Jun 2019-May 2020

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.
- Conducted data processing for the development of a Korean text-to-speech 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: Explored methods for training robust models that learn from synthetically generated source images and perform effectively on diverse real-world images.

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 on edge devices: Implemented an algorithm that combines neural super resolution with traditional video codecs to enhance 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) cadet
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

Selected Course

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

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

Skills

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

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

References

Dr. Hoseong Kim

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

Dr. Dae-hwan Kim

Senior Researcher 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.