Sunghwan Kim

Website: ssssshwan.github.io   **Email:** ssshwan@add.re.kr / ssshwan.korea@gmail.com   **Mobile:** +82-10-4305-1311

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)   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 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   Aug 2020-Mar 2021
Research Assistant   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   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   Dec 2017-Feb 2018
Machine Learning Engineer   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)   Jun 2022-Mar 2023
Researcher in missile IR seeker team   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)   Oct 2018-Apr 2019
Undergraduate researcher in Intelligent Network Architecture (INA) lab   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)   Jun 2016-Aug 2016
Invited researcher in Center for Axion and Precision Physics Center   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   Feb 2020-Feb 2021
Samsung Semicoductor Education Program and Scholarship   Jun 2019-Present
Research Officers for National Defense (ROND) cadat   Dec 2018-May 2021
KAIST Electrical Engineering Department Student Council   Mar 2018-Feb 2019
KAIST Cyber Tutoring Program   Feb 2018-Jun 2018
KAIST Foreign Buddy Program   Sep 2017-Dec 2017
KAIST Automobile Maker Club   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 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.