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   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.
- Developed a Korean text-to-speech (TTS) 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**: 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)   Oct 2018-Apr 2019
Undergraduate researcher in Intelligent Network Architecture (INA) lab   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

Honor

Korea National Scholarship of Science and Technology ($10000)
KAIST scholarship
Korea Army Startup Challenge (Gold Prize)

Community Involvement

KAIST Freshman Coach Senior   Feb 2020-Feb 2021
Samsung Semiconductor 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 Automobile Maker Club   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.