

Sunghwan Kim

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Research Interests

Multimodal Learning, Visual Perception, Zero-shot Generalization, Embodied AI

Education

Korea Advanced Institute of Science and Technology (KAIST)

B.S. in Electrical Engineering and Mathematical Sciences (double major)
GPA: overall 3.61/4.00; major 3.66/4.00

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 [[paper](#)]
Maria Niebla, Duncan L. Hickman, Eunjin Koh, Chanyong Lee, Hoseong Kim, Chaehyoen Lim, **Sunghwan Kim**
SPIE Sensors+Imaging, 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 (1025640380000)

Work Experience

Agency for Defense Development (ADD)

First Lieutenant and Machine Learning Engineer

Jun 2021-Present

Daejeon, Republic of Korea

- Selected as one of the exclusive 20 military officers in Korea who fulfill military service as a research engineer at the ADD, Korea's counterpart to U.S. DARPA.
- **Object detection in infrared imagery:** Designed real-time object detection algorithms for UAVs. Generated synthetic infrared images using a 3D engine for training data, and established an end-to-end training pipeline.
- **Model acceleration on edge devices:** Implemented model compression techniques such as feature distillation and structural pruning to accelerate object detection models on edge devices like NPUs and FPGA boards.
- **ML-integrated software for UAVs:** Developed multi-threading C++ software that optimizes CPU and NPU resources during ML model inference, interfacing with the flight control unit of UAVs.

Bluepoint Partners

Research Assistant

Aug 2020-Mar 2021

Seoul, Republic of Korea

- Bluepoint Partners is an early-stage venture capital firm that invests in deep tech sectors, such as AI and robotics.
- Conducted market analysis on ongoing investments and researched overall technological trends.

Neosapience

Machine Learning Engineer

Dec 2017-Feb 2018

Seoul, Republic of Korea

- Neosapience is a Series B startup that operates an AI-powered virtual actor service, specializing in ML-based audio and video synthesis technology.
- Constructed a paired dataset of Korean audio and text for training Korean Text-to-Speech models.

Research Projects

Agency for Defense Development (ADD)

Machine Learning Researcher

Jun 2022-Present
Daejeon, Republic of Korea

- **Domain generalization on synthetic data:** Explored methods for training robust models on images generated by 3D rendering engines, aiming to ensure effective performance on diverse real-world images.
- **Language models for dense vision tasks:** Designed semantic segmentation models with domain invariance capabilities by leveraging pre-trained language models.

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 ML-based 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 axion detection 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 (Full tuition)

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 Cyber Tutoring Program

Feb 2018-Jun 2018

KAIST Foreign Buddy Program

Sep 2017-Dec 2017

KAIST Automobile Maker Club

Mar 2017-Aug 2018

Selected Coursework

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

Mathematics: Linear Algebra, Mathematical Analysis, Probability Theory, Statistics, Convex Optimization, Numerical Analysis, Discrete Mathematics, Mathematical Modeling, Differential Geometry, Modern Algebra

Skills

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

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

References

Dr. Steven E. Whang, Associate Professor at KAIST

Email: swhang@kaist.ac.kr

Dr. Eunjin Koh, Principal Researcher at ADD

Email: eikoda@add.re.kr

Dr. Hoseong Kim, Senior Reseacher at ADD

Email: hoseongkim@add.re.kr