

# Sunghwan Kim

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## Research Interests

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Computer Vision, Multimodal Learning, Embodied AI, Efficient ML

## Education

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### Korea Advanced Institute of Science and Technology (KAIST)

Bachelor of Science in Electrical Engineering  
Bachelor of Science in Mathematical Sciences  
GPA: 3.62/4.3 (92.4/100, 141 credits)

Mar 2017-Feb 2021

Advisor: Steven E. Whang

### Korea Science Academy of KAIST

Specialized high school for students talented in math and science

Mar 2014-Feb 2017

## Publications

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### 1. Texture Learning Domain Randomization for Domain Generalized Segmentation [\[paper\]](#)

Sunghwan Kim, Dae-hwan Kim, Hoseong Kim  
International Conference on Computer Vision (ICCV), 2023

### 2. Data Gathering Trials for the Development of Military Imaging Systems [\[paper\]](#)

Maria Niebla, Duncan L. Hickman, Eunjin Koh, Chanyong Lee, Hoseong Kim, Chaehyeon Lim, Sunghwan Kim  
Proc. SPIE, Electro-Optical and Infrared Systems, 2023

## Works in Progress

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### 1. Context-Enhanced Decoder via Language Guidance for Domain Generalized Segmentation

Sunghwan Kim, Byunghyun Pak, Byungju Woo, Hoseong Kim  
In preparation for the European Conference on Computer Vision (ECCV), 2024  
- Designed a decoder to enhance the capture of contextual information, leveraging pre-trained language models.

## Patent

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### 1. Method and System for Detecting Target Using Time Series Images

Chaehyeon Lim, Sunghwan Kim, Hoseong Kim, Eunjin Koh  
KR Patent, 2023 (1025640380000)

## Work Experience

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### Republic of Korea Army (ROKA)

First Lieutenant

Jun 2021-Present

Daejeon, Republic of Korea

- Selected as one of the 20 officers in Korea dedicated to science and technology research for national defense.
- Assigned to ADD, the South Korean counterpart to the U.S. DARPA, for the development of defense technology.
- Mentored a number of junior officers and advised them on their research projects on machine learning.

### Agency for Defense Development (ADD)

Machine Learning Engineer

Jun 2021-Present

Daejeon, Republic of Korea

- **Object detection in infrared imagery:** Designed real-time object detection models 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 ML models on edge devices, including NPU, FPGA board, and edge GPU.
- **ML-integrated software for UAVs:** Developed multi-threading C++ software that optimizes CPU and NPU resources during the inference phase of ML models, interfacing with the flight control system of UAVs.
- **UAVs Flight Test:** Conducted various 3D simulations that emulate actual operation environments, along with real-world flight tests of UAVs, to verify the stability of ML models for deployment.

**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.

**Intelligent Network Architecture (INA) Lab at KAIST***Machine Learning Engineer*Oct 2018-Apr 2019  
*Daejeon, Republic of Korea*

- Implemented a real-time super-resolution algorithm that combines ML-based super-resolution with traditional video codecs to achieve real-time capability on edge devices.

**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 an audio and text pair dataset for training Korean Text-to-Speech models.

**Honor**

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Korea Army Startup Challenge Gold Prize	Oct 2021
Korea Student Aid Foundation (KOSAF) Scholarship	Mar 2020
Korea National Scholarship of Excellence in Science and Technology	Mar 2019-Feb 2021
- Total \$ 20,000 (Full-Ride)	
National Scholarship for Undergraduate Study	Mar 2017-Feb 2019
- Total \$ 13,500 (Full-Tuition)	

**Community Involvement**

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KAIST Freshman Coach Senior	Feb 2020-Feb 2021
Samsung Undergraduate Semiconductor Educational Program (SUSEP)	Jun 2019-Present
Research Officers for National Defense (ROND) cadet	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**

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**Electrical Engineering:** Deep Learning, Database and Big Data System, Signal Processing, Computer Architecture, Operating System, Computer Network, Digital System, Electrical Circuits, Electromagnetics, Physical Electronics

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

**Skills**

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

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

**References**

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**Dr. Steven E. Whang**, Associate Professor at KAIST

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**Dr. Eunjin Koh**, Principal Researcher at ADD

Email: [eikoda@add.re.kr](mailto:eikoda@add.re.kr)

**Dr. Hoseong Kim**, Senior Researcher at ADD

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