

# Hanbeen Lee

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## AI Research Scientist

### EDUCATION

#### **SUNGKYUNKWAN UNIVERSITY | MASTER'S DEGREE PROGRAM**

Expected March 2020 – August 2022 | Suwon-si, Republic of Korea

- Department of Artificial Intelligence (Expected graduation date: 2022. 8.)
- Advisor: Simon S. Woo. (Assistant Professor in SKKU)

#### **HALLYM UNIVERSITY | BACHELOR**

March 2014 – February 2020 | Chuncheon-si, Republic of Korea

- Department of Big-data (Department of Computer Engineering)
- Advisor: Baek-seop Kim (Professor in Hallym University)
- Graduation Honors.

### PROJECT

#### **SAR IMAGE OBJECT DETECTION | DEEP LEARNING RESEARCHER**

March 2022 – Current | Hanhwa System

The goal of this project is to detect objects in large-size synthetic aperture radar image. (SAR) Detailed description is not allowed because of confidentiality pledge.

#### **SEMI-LABELING TOOL FOR HUMAN DETECTION | DEEP LEARNING ENGINEER**

March 2022 – Current | Personal

Co-work with Jae-Hwan Heo (Hallym Univ.) and Seung-Hyun Lim. (Hallym Univ.) Our purpose is to make a website for semi-labeling. Users can download the label files without human-effort.

#### **OBJECT DETECTION RESEARCH UNDER LOW QUALITY VIDEO CONDITIONS | PROJECT LEADER**

January 2022 – Current | IITP

In partnership with Kyunghee University (MLVC Lab, Prof. Sung-ho Bae) and Sungkyunkwan University (IRIS Lab, Prof. Jong-hwan Ko), lead a project to develop an object detection which is robust on natural (Foggy, Rainy, Snowing, etc.) and artificial noise (JPEG Compression and Adversarial Attacks).

#### **RESEARCH ON ABNORMAL BEHAVIOR DETECTION TECHNOLOGY USING EDGE DEVICE | PROJECT LEADER**

January 2021 – December 2021 | IITP

In partnership with Kyunghee University (MLVC Lab, Prof. Sung-ho Bae) and Sungkyunkwan University (IRIS Lab, Prof. Jong-hwan Ko), lead a project to develop an anomalous behavior detector that works on edge devices.

#### **ABNORMAL BEHAVIOR DETECTION IN CCTV USING OBJECT DETECTION ALGORITHM | PROJECT LEADER**

August 2020 – December 2020 | IITP

Lead a project to build an advanced solution for abnormal behavior detection. In this project, for the first time in the world, we created a large-scale dataset for detecting deviant behavior. Also, I developed a post-processing algorithm suitable for real-time processing.

#### **MACHINE LEARNING MENTORING | MENTOR**

March 2019 – July 2019 | Hallym University

Taught about Python programming and machine learning for freshmen. Each student was able to undertake a self-directed project through this mentoring and developed interests in machine learning.

#### **DEVELOPMENT OF LICENSE PLATE RECOGNIZER BASED ON DEEP LEARNING FOR MOBILE DEVICES | INDUSTRY-ACADEMIA COOPERATION**

March 2018 – August 2019 | Hallym University

This is my first project to lead the overall deep learning development workflow from data collection and preprocessing to model development and mobile deployment. This was supervised by Professor Baekseop Kim and Cheon-deok Park (Ph.D) in Hallym University.

## AWARDS

### **SKKU AI GRADUATE SCHOOL BEST STUDENT | BEST STUDENT AWARD**

December 2021 | Sungkyunkwan Univ.

I received an award given to students with outstanding achievements at the AI graduate school.

### **4TH AI GRAND CHALLENGE PHASE 3 | 1ST PRIZE (MINISTER'S AWARD), TEAM LEADER**

December 2021 | MSIT (Ministry of Science and ICT of Korea Government)

The challenge was to detect a fallen persons at a limited computational cost in real time. Our team won the competition with companies and research institute and received a research grant of 475 million won (\$400,000).

### **LG AI HACKATHON | 2ND PRIZE, TEAM LEADER**

July 2021 | LG AI Research

Worked with Jeong-ho Kim (SKKU), Jae-ju Ahn (SKKU) and Jeong-myeong Choi (Hallym University) to develop a generative model to improve camera image quality degraded by light bleed.

### **NAVER CLOVA AIRUSH | 3RD PRIZE, INDIVIDUAL**

July 2021 | NAVER Corp.

Won the 2nd place by designing an image hierarchical classification model and algorithm in the first round of the competition. In the second (final) round, I devised an algorithm to extract from text and match data from numerous classes, winning 3rd place.

### **4TH AI GRAND CHALLENGE PHASE 2 | 3RD PRIZE (IITP AWARD), TEAM LEADER**

December 2020 | MSIT (Ministry of Science and ICT of Korea Government)

Built a large-scale dataset to detect a fallen persons and developed an algorithm to infer full-HD images in real time. Situations that were more difficult than the previous phase were presented and inferences had to be completed in a more limited time.

Received 576 million won (\$490,000) for research funding.

### **4TH AI GRAND CHALLENGE PHASE 1 | 1ST PRIZE, TEAM LEADER**

July 2020 | MSIT (Ministry of Science and ICT of Korea Government)

Led the entire project in the challenge to develop a model that detects a person who has fallen in real time. We won the first place and received 200 million won (\$170,000) for research funding.

### **HALLYM SW CAPSTONE DESIGN PRESENTATION | SILVER PRIZE, TEAM LEADER**

May 2019 | Hallym University

A project was built in collaboration with Jeong-ro Seok, an undergraduate student in Hallym University, that employs deep learning to identify floating populations and use the information obtained to plot real-time in a web page.

### **COMPETITION ON PYTHON PROGRAMMING | GRAND PRIZE, INDIVIDUAL**

May 2019 | Hallym University

Won the grand prize in the intramural programming competition for excellent grades.

## INTERNSHIP

### **GEOMEX SOFT** June 2019 - August 2019 | Chuncheon-si, Republic of Korea

Worked on upgrading the license plate recognition application using deep learning.

## PATENT

### **MISCLASSIFICATION CORRECTION ALGORITHM IN HIERARCHICAL CLASSIFICATION MODEL | INVENTOR**

December 2021 | Domestic patent

Presented an algorithm for correcting the hierarchical relationship inconsistency that may be occurred in the inference of hierarchical deep learning classification model.

## PUBLICATION

### **VFP290K: A LARGE-SCALE BENCHMARK DATASET FOR VISION-BASED FALLEN PERSON DETECTION | 2ND AUTHOR**

September 2021 | NeurIPS 2021

## UNDER REVIEW & PREPARING PAPER

### **IMF: INTEGRATING MATCHED FEATURES USING ATTENTIVE LOGIT IN KNOWLEDGE DISTILLATION** | Co-1ST AUTHOR

CIKM 2022 (Preparing)

We proposed a novel flexible knowledge distillation approach, IMF, integrating matches features using attentive logit. I co-worked with Jeong-ho Kim.

### **SLIDING CROSS ENTROPY FOR SELF-KNOWLEDGE DISTILLATION** | 1ST AUTHOR

CIKM 2022 (Preparing)

We presented Sliding Cross Entropy (SCE), a novel method for self-KD that utilizes the entire probability distribution of the classes in the data, in order to improve the self-KD performance. I wrote this paper as a first author and co-worked with Jeong-ho Kim.

### **RELATION-AWARE LABEL SMOOTHING FOR SELF-KNOWLEDGE DISTILLATION** | 2ST AUTHOR

ECCV 2022 (Under review)

Relation-aware Label Smoothing regularizes the student model itself by utilizing the inter-class relationships between class representative vectors. I joined this project as second author and co-worked with Jeong-ho Kim (SKKU).

## RESEARCH INTERESTS

- Knowledge Distillation, Self-distillation
- Model Generalization
- Representation Learning
- Object Detection, Classification

### **SPOKEN & WRITTEN**

Native fluency:

Korean

Intermediate fluency:

English

## SKILLS

• Python • Pytorch • Tensorflow • Android • C • Docker