

SANGWOO LEE

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Education

Hanbat National University (Advisor: Prof. Dong-Geol Choi)

MS in Department of Information and Communication Engineering

Mar. 2021 – Feb 2023

Daejeon, Republic of Korea

Hanbat National University

BS in Department of Information and Communication Engineering

Mar. 2015 – Feb 2021

Daejeon, Republic of Korea

International Publications(* indicates equal contribution)

A Lightweight Sampler for Efficient Action Recognition via Self-supervised Learning in surveillance system ICRA-RAL, 2022
SICE, IF = 5.43

*Sangwoo Lee**, *Minseok Seo**, *Donghyeon Cho**, *Jongchan Park*, *Daehan Kim*, *Jaemin Lee*,
Jingi Ju, *Hyeoncheol Noh* and *Dong-Geol Choi*

Keyword : Action recognition, Frame sampler, Self-supervised learning, Object detection

Exploiting Features with Split-and-Share Module MDPI Electronics, 2022
SCIE, IF = 2.69

*Jaemin Lee**, *Minseok Seo**, *Daehan Kim**, *Sangwoo Lee*, *Jongchan Park*, *Dong-Geol Choi*

Keyword : Feature ensemble, Convolutional neural network

Multi-task Learning with Task-specific Feature Filtering in Low-data Condition MDPI Electronics, 2021
SCIE, IF = 2.69

*Sangwoo Lee**, *Ryong Lee**, *Minseok Seo*, *Jongchan Park*, *Hyeoncheol Noh*, *Jingi Ju*,
Rae-young Jang, *Gunwoo Lee*, *Myung-seok Choi*, *Dong-Geol Choi*

Keyword : Multi task learning, Feature filtering, Image classification

Domestic Publications(* indicates equal contribution)

Domain Adaptation Method based on Semi-supervised Learning using Cross-domain Mixed Sampling Technique KINGC 2021
KCI

*Sangwoo Lee**, *Deahan Kim**, *Dong-Geol Choi*, *Seomin Seok*, *Jaemin Lee*, *Jangrae Young*,
Gunwoo Lee, *Myungseok Choi* and *Ryong Lee*

Keyword : Domain adaptation, Semantic segmentation, Data sampling

Spatial-temporal Ensemble Method for Action Recognition KROS 2020
KCI

Minseok Seo, *Sangwoo Lee*, *Dong-geol Choi*

Keyword : Action recognition, Spatial Ensemble, Temporal Ensemble

Road semantic segmentation systems in outdoor environments for robot driving KINGC 2020
KCI

Jaemin Lee, *Minseok Seo*, *Sangwoo Lee*, and *Dong-Geol Choi*

Keyword : Semantic segmentation, Autonomous driving

Patent

Apparatus of Thermal Pattern, Method and Apparatus for Thermal Camera Calibration Apr. 2022
Sangwoo Lee, *Dong-geol Choi* 1023854610000

Honors and Awards

Capstone Design Competition

Sangwoo Lee

Hanbat National University 2020

2nd

Keyword : Video anomaly detection, Surveillance Camera

Practical Problem Research Competition

Team AirLab(team member)

Hanbat National University 2019

2nd

Keyword : Text detection, Text recognition, Logistics management

(Project) Action Recognition, Anomaly Detection

Development of Spatio-temporal Video Feature Learning-based Action Recognition Technology.

ETRI

- **Project Goal** : Development of 3D CNN model for action recognition, research on SOTA 3D CNN model
- **Contribute** : Implementation of test time argumentation for 3D CNN recognition performance, Implementation of output ensemble technique
- **Keyword** : Action Recognition, Model Ensemble
- **Project Duration** : Apr. 2019 - Nob. 2019

Development of Spatio-temporal Multi-task Deep Learning Technology for Action Recognition.

ETRI

- **Project Goal** : Improving the inference speed of action recognition.
- **Contribute** : Proposed frame sampler model based on self-supervised learning.
- **Keyword** : Video Anomaly Detection, Super Resolution, Representation Learning
- **Project Duration** : Apr. 2021 - Nob. 2021

Development of Deep Learning-based Action and Surrounding Information Learning Modeling Technology.

ETRI

- **Project Goal** : research of video anomaly detection model, research of open set situation in video anomaly detection.
- **Contribute** : implement semi supervised learning based video anomaly detection, Improving recognition performance by changing the feature extractor.
- **Keyword** : Semantic Segmentation, Video Propagation, Semi-supervised Learning
- **Project Duration** : May. 2020 - Nob. 2020

Research on Abnormal Behavior Recognition and Tracking in CCTV Environment.

NIA

- **Project Goal** : Implementation of abnormal action, abnormal object detection and tracking algorithm.
- **Contribute** : Development of abnormal action detection algorithm based on object detection and tracking.
- **Keyword** : Object Detection, Object Tracking, Re-Identification
- **Project Duration** : Sep. 2020 - Feb. 2021

Construction of Thermal Imaging CCTV Data for Industrial Facilities.

NIA

- **Project Goal** : Development of abnormal object detection algorithm for thermal imaging camera.
- **Contribute** : Development of anomaly detection algorithm based on Auto Encoder.
- **Keyword** : Object Detection, Anomaly Detection
- **Project Duration** : May. 2021 - Dec. 2021

A Study on Action Recognition Technology for Real World Video Analysis.

ETRI

- **Project Goal** : Research on video anomaly detection model in openset situation.
- **Contribute** : Research on video anomaly detection algorithm based on unsupervised learning, More than 10% AUC improvement over the existing SOTA model on the SHTech dataset
- **Keyword** : Video Anomaly Detection, Self-supervised Learning, Unsupervised Learning
- **Project Duration** : May. 2022 - Nob. 2022

(Projects) Autonomous Driving

Study on the Road Surface Recognition Based On Deep Learning Using Multiple Sensors.

ADD

- **Project Goal** : Development of CNN model for autonomous driving in outdoor environment
- **Contribute** : Implement semantic segmentation model, solve class imbalance problem to improve mIoU, convert TensorRT model
- **Keyword** : Semantic Segmentation, Video Propagation, Semi-supervised Learning
- **Project Duration** : Jan. 2019 - Sep. 2021

Development of Learning-Based Driving Area Recognition Methodology.

Hyundai Rotem

- **Project Goal** : Development of an algorithm that can distinguish driving and non-driving areas in outdoor environments.
- **Contribute** : DeepLab-v3 and PSP model training progress in custom dataset, solve mIoU drop problem due to data imbalance.
- **Keyword** : Semantic Segmentation, Domain Adaptation
- **Project Duration** : Jul. 2020 - Dec. 2021

Development of Learning-Based Driving Area Recognition Methodology.

Hyundai Rotem

- **Project Goal** : Development of semantic segmentation model based on multi modal input.
- **Contribute** : Development of multi model semantic segmentation model based on Swin transformer, processing for training data.
- **Keyword** : Domain Adaptation, Multi-Modal Semantic Segmentation
- **Project Duration** : Dec. 2021 - Dec. 2022

(Projects) Development of Deep Learning Based System

Development of Deep-Meta Extractor.

Cast.era

- **Project Goal** : Develop context extraction deep learning model in images and videos.
- **Contribute** : Person identification dataset collection and processing, person identification model learning, object detection, OCR and image classification model learning, development of multi thread-based system development.
- **Keyword** : Object Detection, Scene Classification, Face Detection, Face Identification
- **Project Duration** : Jul. 2020 - Jul. 2021

Research Service on The Preparation Method Of Reproduction Data.

KOSTAT

- **Project Goal** : Develop models that learn from real data to recreate virtual data.
- **Contribute** : Data processing for training, virtual data generation model learning.
- **Keyword** : Data generation, GAN
- **Project Duration** : Jun. 2021 - Nob. 2021

Development of Deep Learning-based Video Context Extraction Technology.

KISTI

- **Project Goal** : Developing a multi-context extraction model within an image.
- **Contribute** : Object detection model training, image classification model training, TensorRT model conversion, development of multi-thread based system.
- **Keyword** : OCR, Object Detection, Scene Classification, Face Detection, Facial Classification, TensorRT
- **Project Duration** : Jul. 2021 - Nob. 2021

Development of Real-time Object Detection and Tracking for Personal Information Protection.

NRF

- **Project Goal** : Development of object detection algorithm that can identify personal information, development of steganography-based encryption and decryption technique.
- **Contribute** : Train license plate detection model, train face detection model, train person instance segmentation, transform TensorRT model.
- **Keyword** : Face Detection, Person Detection, Object Detection, Object Tracking, TensorRT, ONNX
- **Project Duration** : Nov. 2021 - Jan. 2023

Development of drone Image-based Object 3D Spatial Information Restoration Technology.

ETRI

- **Project Goal** : Restoration of 3D location information of objects in images taken by drones.
- **Contribute** : Development of monocular camera-based depth estimation model, Object detection model robust to drone environment, Development of 3D location information (latitude, longitude) restoration algorithm.
- **Keyword** : Depth Estimation, Object Detection, Object Tracking, Transformation Function
- **Project Duration** : Aug. 2022 - Nov. 2022

Technical Skills

Languages : Python, C, C++, JAVA

Frameworks : Pytorch, TensorRT, Tensorflow, Numpy, OpneCV, Scikit-learn, ROS, ONNX

Developer Tools : Vim, GitHub, Docker, VSCode, Pycharm