

Taejoo Kim

PH.D. STUDENT (M.S./PH.D. INTEGRATED PROGRAM) · SEJONG UNIVERSITY

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Education

Sejong University

PH.D. CANDIDATE (M.S./PH.D. INTEGRATED PROGRAM) IN INTELLIGENT MECHATRONICS
ENGINEERING

- Overall GPA : 4.43/4.5
- Supervised by Prof. Yukyung Choi

Seoul, South Korea

Mar.2021 - Current

Sejong University

B.S IN INTELLIGENCE MECHATRONICS ENGINEERING

- Honors: Magna cum laude (Overall GPA : 3.71/4.5)

Seoul, South Korea

Mar.2019 - Feb.2021

Publications

INTERNATIONAL CONFERENCE

[C1] MLPD : Multi Label Pedestrian Detection in Multispectral Domain

Oct, 2021

JIWON KIM*, HYEONGJUN KIM*, **TAEJOO KIM***, NAMIL KIM, YUKYUNG CHOI.

- IEEE Robotics and Automation Letters (RA-L) with IROS, October 2021
- Q2 69.64 / IF 3.856

INTERNATIONAL JOURNAL

[J1] INSANet: INtra-INTER Spectral Attention Network for Effective Feature Fusion of Multispectral Pedestrian Detection

Fep, 2024

SANGIN LEE*, **TAEJOO KIM**, , JEONGMIN SHIN, NAMIL KIM AND YUKYUNG CHOI

- Sensors
- Q2 / IF 3.847

[J2] Multispectral Benchmark Dataset and Baseline for Forklift Collision Avoidance

Sep, 2022

HYEONGJUN KIM*, **TAEJOO KIM***, WON JO, JIWON KIM, JUNGMIN SHIN, DAECHAN HAN, YUJIN HWANG AND YUKYUNG CHOI

- Sensors
- Q2 / IF 3.847

[J3] Crop Growth Monitoring System in Vertical Farms Based on Region-of-Interest Prediction

July, 2022

YUJIN HWANG*, SEUNGHYEON LEE, **TAEJOO KIM**, KYEONGHOON BAIK AND YUKYUNG CHOI

- Agriculture
- Q1 78.33 / IF 3.408

[J4] Instance-Aware Plant Disease Detection by Utilizing Saliency Map and Self-Supervised Pre-Training

July, 2022

TAEJOO KIM*, HYEONGJUN KIM, KYEONGHOON BAIK, YUKYUNG CHOI

- Agriculture
- Q1 78.33 / IF 3.408

Research Experience

ONGOING PROJECTS

Development of robotic manipulation task learning based on Foundation model to understand and reason about task situations

Sejong Univ

FUNDED BY THE TECHNOLOGY INNOVATION PROGRAM UNDER THE MINISTRY OF TRADE, INDUSTRY & ENERGY (MOTIE)

Sep. 2024 - Current

- Developing a manipulator for interpreting ambiguous commands and executing autonomous actions.
- Research on a Language Model Program for understanding ambiguous commands and generating context-aware robotic tasks.
- Developing a 3D Language Field for embedding language-based task information directly into spatial representations.

Development of artificial intelligence software for unseen object manipulation that integrates prompt and situation-specific unseen object recognition and arbitrary gripper shape analysis through gripper self-observation

Sejong Univ

FUNDED BY THE TECHNOLOGY INNOVATION PROGRAM UNDER THE MINISTRY OF TRADE, INDUSTRY & ENERGY (MOTIE)

Apr. 2024 - Current

- Development of a segmentation model for unseen object manipulation.
- Developing robust open-world object segmentation through continuous learning for unseen objects.

Development of core technology for indoor unmanned platform and leakage blocking for accident response at operating nuclear power plants

Sejong Univ

FUNDED BY THE NATIONAL RESEARCH FOUNDATION OF KOREA (NRF) AND THE UNMANNED VEHICLE ADVANCED RESEARCH CENTER (UVARC) UNDER THE MINISTRY OF SCIENCE AND ICT

Mar. 2023 - Current

- Development of robust 3D object detection and 6D pose estimation for workspace recognition and panel operation in low-light and high-density aerosol environments during nuclear accidents.

COMPLETED PROJECTS

Development of AI-based HD map building and crop image analysis for smart farm agricultural automation robots

Sejong Univ

FUNDED BY THE INSTITUTE OF INFORMATION & COMMUNICATIONS TECHNOLOGY PLANNING & EVALUATION (IITP) UNDER THE MINISTRY OF SCIENCE AND ICT

Jun. 2023 - May. 2024

- Development of 3D detection for crop recognition to automate harvesting in smart farm environments.
- Research on 3D detection techniques for estimating crop stem-axis heading considering harvesting methods. [J3, J4]

Development of a Precise Localization and Hazard Detection Algorithm for Electric Facility Monitoring Robots through Magnetic Map and Visual Information Fusion

Sejong Univ

FUNDED BY KOREA ELECTRIC POWER CORPORATION (KEPCO)

Jan. 2021 - Dec. 2023

- Development of an anomaly detection model for unmanned robots to identify defects in electrical facilities.
- Research on thermal-based fault detection for monitoring heat anomalies caused by aging and leakage in electrical facilities. [J1]

A Fault-tolerant Fusion Method for Robust Visual Localization

Sejong Univ

FUNDED BY THE NATIONAL RESEARCH FOUNDATION OF KOREA (NRF) UNDER THE MINISTRY OF SCIENCE AND ICT (MSIT)

Apr. 2020 - Feb. 2023

- Development of a fault-tolerant fusion method for precise visual-inertial odometry in disaster-stricken environments, ensuring robustness against low-light conditions, motion blur, and sensor failures.
- Research on RGB-IMU sensor fusion for resilient visual-inertial odometry, addressing sensor loss, synchronization slip, and adverse environmental factors affecting robotic navigation.

A Fault-tolerant Fusion Method for Robust Pedestrian Detection

Sejong Univ

FUNDED BY THE NATIONAL RESEARCH FOUNDATION OF KOREA (NRF) UNDER THE MINISTRY OF SCIENCE AND ICT (MSIT)

Sep. 2018 - Aug. 2020

- Development of an adaptive fusion method for pedestrian detection, ensuring robust performance under sensor failures and adverse environmental conditions using RGB-Thermal fusion.
- Research on multi-label pedestrian detection in the multispectral domain, leveraging deep learning-based RGB-Thermal fusion to improve recognition under sensor degradation, occlusions, and environmental noise. [C1, J2]

Patents

Object detection method and apparatus in multispectral domain using multi-label learning

Oct. 2023

YU KYUNG CHOI, **TAE JOO KIM**, JIWON KIM, HYEONGJUN KIM, NAMIL KIM

- Korea patent (patent application) No.10-2590622

Method and apparatus for multispectral pedestrian detection based on attentional-based illumination environment

Aug. 2023

YU KYUNG CHOI, **TAE JOO KIM**, SANGIN LEE, DOGYEUNG KIM, HYEONGJUN KIM

- Korea patent (applied) No.10-2023-0106387

Awards

2021 **Best Excellence Prize**, 13th IDIS-ETNEWS ICT Paper Contest, Republic of Korea

2020 **3rd Prize**, NAVER LABS MAPPING & LOCALIZATION CHALLENGE, Republic of Korea

Teaching Experience

GRADUATE COURSES

Introduction to Deep Learning

Spring, 2024. Fall, 2023

INSTRUCTOR: PROF. YUKYUNG CHOI

- Role: TA

Computer Vision

Fall, 2023

INSTRUCTOR: PROF. YUKYUNG CHOI

- Role: TA

UNDERGRADUATE COURSES

Deep Learning System

Spring, 2023. Fall, 2022

INSTRUCTOR: PROF. YUKYUNG CHOI

- Role: TA, Head TA

Artificial Intelligence

Fall, 2021

INSTRUCTOR: PROF. YUKYUNG CHOI

- Role: TA

Machine Learning

Spring, 2021. Fall, 2020

INSTRUCTOR: PROF. YUKYUNG CHOI

- Role: Head TA, TA