Taejoo Kim

Ph.D. Student (M.S./Ph.D. Integrated Program) · SEJONG UNIVERSITY

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Education

Sejong University — *Seoul, South Korea*

Ph.D. Candidate (M.S./Ph.D. Integrated Program) in Intelligent Mechatronics Engineering — *Mar.2021 - Current*

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

Sejong University — *Seoul, South Korea*

B.S in Intelligence Mechatronics Engineering — *Mar.2019 - Feb.2021*

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

Publications

INTERNATIONAL CONFERENCE

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

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

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

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

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

DOMESTIC CONFERENCES

Towards Robust 3D Perception in Emergency Condition: An Analysis on Commercial Depth Sensors *May, 2024*

Geonhaw Son, Sangin Lee, **Taejoo Kim**, Yukyung Choi

- Transactions of the Korean Nuclear Society Spring Meeting (TKNS)

6-DOF Object Pose Estimation in Aerosol Conditions: Benchmark Dataset and Baseline *May, 2024*

Heejin Yang, Seunghyeon Lee, **Taejoo Kim**, Yukyung Choi,

- Journal of Institute of Control, Robotics, and Systems (IJCAS)

Pseudo-RGB based Place Recognition through Thermal to RGB Image Translation *Feb, 2023*

Geonhaw Son, Sangin Lee, **Taejoo Kim**, Yukyung Choi

- The Journal of Korea Robotics Society (JKRS)

Defect Detection for Electrical Facilities based on Multispectral Imagery *Mar, 2022*

Hyeongjun Kim*, **Taejoo Kim***, Yukyung Choi

- Journal of Institute of Control, Robotics, and Systems (IJCAS)

DOMESTIC CONFERENCES

Research Trends in Manipulator Control Policies Based on LLM and VLM *Feb, 2025*

Jaechan Lee, **Taejoo Kim**, Yukyung Choi

- Korea Robotics Society Annual Conference (KRoC 2025)

Cross-and-Parallel Attentions for Multispectral Pedestrian Detection *Feb, 2024*

Sangin Lee, **Taejoo Kim**, Yukyung Choi

- Korea Robotics Society Annual Conference (KRoC 2024)

Attention-Based Multispectral Pedestrian Detection under Varying Illumination Conditions *Feb, 2023*

Sangin Lee*, Dogyeung Kim, Hyeongjun Kim, **Taejoo Kim**, Yukyung Choi

- 35th Workshop on Image Processing and Image Understanding (IPIU 2023)

3rd Place Solution to NAVER LABS Mapping & Localization Challenge 2020: Outdoor Track *Feb, 2021*

Jiwon Kim*, **Taejoo Kim***, Yujin Hwang*, Yukyung Choi

- 33rd Workshop on Image Processing and Image Understanding (IPIU 2021)

R2T2: RGB-Thermal-Depth Dataset for Pedestrian Detection *Feb, 2020*

Taejoo Kim, Jungmin Shin, Won Jo, Daechan Han, Jiwon Kim, Byungjoo Kim, Hyunho Nam, Yujin Hwang, Namhoon Kim, Yukyung Choi

- 32rd Workshop on Image Processing and Image Understanding (IPIU 2020)

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.

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.

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.

Patents

Object detection method and apparatus in multispectral domain using multi-label learning *Oct. 2023*

YuKyung Choi, **Taejoo 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*

YuKyung Choi, **Taejoo 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