Dong-Uk **Seo**

Robotics Engineer, SLAM

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Summary

Ph.D. candidate researching the robotics field in KAIST Urban Robotics Lab. Research interests lie in LiDAR-Camera fusion-based SLAM for robust long-term autonomy. Additionally interested in the process collaborated with multi-agent and localization in the dense map representation.

Education

KAIST(Korea Advanced Institute of Science and Technology)
Daejeon, South Korea

Ph. D. candidate in Department of Electrical Engineering, Urban Robotics Lab
Mar. 2023 - Present

- GPA: 4.15 / 4.30

KAIST(Korea Advanced Institute of Science and Technology)
Daejeon, South Korea

M.S. in Department of Electrical Engineering, Urban Robotics Lab
Mar. 2021 - Feb. 2023

- GPA: 4.17 / 4.30

Yonsei University
Seoul, South Korea

B.S. in Department of Electrical & Electronic Engineering
Mar. 2014 - Aug. 2020

- GPA: 4.06 / 4.30
- National Science and Engineering Excellence Scholarship (2016 - 2019, Korea Scholarship Foundation)
- Undergraduate Research Assistant in Compiler Research Laboratory (CORELAB)
- Graduation Thesis: A Deep Learning Based Super-Resolution RF Map Reconstruction Scheme for Fingerprinting Localization

Experiences & Projects

Multi-robot collaboration for dense map reconstruction and localization
Daejeon, South Korea

KAIST Urban Robotics Lab & Yonsei University & Korea university & Naver Labs & Incheon Airport
July. 2023 - Present

- While removing dynamic objects, multi-robots collaborate to localize and map with a deep learning-based algorithm for reconstructing a dense representation.
- Participate as a team member.

Robust localization system in a challenging environment for last-mile delivery.
Daejeon, South Korea

KAIST Urban Robotics Lab & MOBINN
May. 2023 - Present

- An indoor/outdoor day/night localization system for an obstacle-overcoming delivery robot is researched. LiDAR-Visual-Inertial fusion-based SLAM frameworks with deep learning technology are implemented.
- Participate as a **team leader**.

Monocular RGB-D Camera and IMU sensor based Navigation Framework on a mobile robot
Daejeon, South Korea

KAIST Urban Robotics Lab & Hyundai KEFICO
April. 2022 - Jan. 2023

- Implemented Visual-Inertial SLAM using monocular RGB-D camera and IMU sensor. The global planner and local planner are also implemented on the map refined by Surfel, and finally the robot could proceed with autonomous navigation toward the destination.
- Participated as a **team leader**.

Autonomous Driving SLAM framework (Technology transfer)
KAIST URBAN ROBOTICS LAB & HILLSLOGIS

Daejeon, South Korea
Dec. 2021 - Mar. 2023

- Relatively inexpensive sensors such as 2D LiDAR, RGB-D camera, and wheel are used to perform accurate localization and map generation, helping mobile robots to automatically run processes in a factory-like environment. In this project, camera-LiDAR-wheel odometry fusion-based simultaneous localization and mapping (SLAM) was performed.
- **Awarded CES 2023 Innovation Award**
- Participated as a team member.

Visual SLAM on mobile smartphones for AR application
KAIST URBAN ROBOTICS LAB & ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE (ETRI)

Daejeon, South Korea
Mar. 2021 - Present

- For AR application, SLAM is performed on smartphones. To be more general applications, only monocular cameras and IMU sensors have been used, while point and line features are utilized. Also develop an algorithm to recognize planes.
- Participate as a team member.

Last-mile project
KAIST URBAN ROBOTICS LAB & KOREA ELECTRONICS TECHNOLOGY INSTITUTE (KETI)

Daejeon, South Korea
Nov. 2020 - Dec. 2021

- Development of self-driving robot technology capable of learning one's own driving experience and moving to the destination robustly in four seasons, day and night, using various sensor information for driving in indoor and outdoor urban living environments and using uncertain maps.
- Participated as a team member.

Development of big data intelligent information system
KOREA DATA AGENCY (KDA) & KOREA UNIVERSITY

Seoul, South Korea
June. 2019 - Sep. 2019

- Symptom-based Dentist Matching System using BiLSTM-attention.

Publications ─────────────────────────────────

* These authors contributed equally

International

Enhancing Robustness of Line Tracking Through Semi-Dense Epipolar Search in Line-based SLAM
   Dong-Uk Seo, Hyungtae Lim, EungChang Mason Lee, Hyunjun Lim, Hyun Myung
   2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS accepted)

2023

PaGO-LOAM: Robust ground-optimized LiDAR odometry
   Dong-Uk Seo*, Hyungtae Lim*, Seungjae Lee, Hyun Myung
   2022 19th International Conference on Ubiquitous Robots (UR)

2022

Struct-MDC: Mesh-refined unsupervised depth completion leveraging structural regularities from visual SLAM
   Jinwoo Jeon, Hyunjun Lim, **Dong-Uk Seo**, Hyun Myung
   IEEE Robotics and Automation Letters (RA-L) 7.3 (2022) pp. 6391–6398. IEEE

2022

QR-SCAN: Traversable Region Scan for Quadruped Robot Exploration using Lightweight Precomputed Trajectory
   EungChang Mason Lee, **DongUk Seo**, JinWoo Jeon, Hyun Myung
   2021 21st International Conference on Control, Automation and Systems (ICCAS)

2021

Domestic

Surfel-based Depth Image Update for Dynamic Object-Removed Map Generation
   Dong-Uk Seo, Sungjae Shin, Hyun Myung
   Korea Robotics Society Annual Conference (KRoC 2023)

2023

Optimal Path Planning System using Candidates from Road-Based Sliding Window
   Dong-Uk Seo, Hyun Myung
   Institute of Control, Robotics and Systems (ICROS) (2022) pp. 421–422

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