이 준 호 Alex Junho Lee

Senior Researcher
Robotics Lab.
Hyundai Motor Company

Website
alexjunholee@gmail.com
Google Scholar

Education

Korea Advanced Institute of Science and Technology (KAIST)
Ph.D., Civil and Environmental Engineering, 2023
- Robotics Program, Smart City Program
Bachelor of Engineering, Mechanical Engineering, Feb 2017 GPA: 3.58 / 4.3
- Double Major in Business and Technology Management (BTM)

Field of Interests

Visual Localization, Multimodal sensor fusion, SLAM, Place Recognition, Spatial AI

Publications

Alex Junho Lee, Ayoung Kim, "Event-based Real-time Optical Flow Estimation". In Proceedings of the *IEEE International Conference on Control, Automation and Systems (ICCAS)*, 2017.

Alex Junho Lee, Younggun Cho, Sungho Yoon, Joowan Kim, Ayoung Kim, "ViViD: Vision for Visibility Dataset". In Proceedings of the *IEEE International Conference on Robotics and Automation (ICRA) Workshop: Dataset Generation and Benchmarking of SLAM Algorithms for Robotics and VR/AR, Best Paper*, 2019.

Alex Junho Lee, Ayoung Kim, "EventVLAD: Visual Place Recognition with Reconstructed Edges from Event Cameras". In Proceedings of the *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021.

Alex Junho Lee, Hyun Myung, "Natural Language Representation as Features for Place Recognition". In Proceedings of the *IEEE International Conference on Ubiquitous Robots (UR)*, 2022.

Alex Junho Lee, Younggun Cho, Young-sik Shin, Ayoung Kim, Hyun Myung, "ViViD++ : Vision For Visibility Dataset". *IEEE Robotics and Automation Letter (RA-L)*, 7(3):6282-6289, 2022.

Alex Junho Lee, Younggun Cho, Hyun Myung, "Low-cost Thermal Mapping for Concrete Heat Monitoring". In Proceedings of the *IEEE International Conference on Robotics and Automation (ICRA) Workshop: Future of Construction: Build Faster, Better, Safer - Together with Robots*, 2022.

Alex Junho Lee, Hyungtae Lim, Minho Oh, Wonho Song, Hyun Myung, "Volumetric Vegetation Monitioring from LiDAR Scans with Ground Estimation.". In Proceedings of the *IEEE International Conference on Control, Automation and Systems (ICCAS)*, 2022

Alex Junho Lee, Wonho Song, Byeongho Yu, Duckyu Choi, Christian Tirtawardhana, Hyun Myung, "Survey of Robotics Technologies for Civil Infrastructure Inspection" In *Journal of Infrastructure Intelligence and Resilience (JIIR)*, 2022.

Alex Junho Lee, Seungwon Song, Hyungtae Lim, Woojoo Lee, Hyun Myung, "$(LC)^2$: LiDAR-Camera Loop Constraints For Cross-Modal Place Recognition". *IEEE Robotics and Automation Letter (RA-L)*, 2023.

Seungwon Song, Hyungtae Lim, Alex Junho Lee, Hyun Myung "DynaVINS: A Visual-Inertial SLAM for Dynamic Environments". *IEEE Robotics and Automation Letter (RA-L)*, 2022.

건축물 진단을 위한 안전 로봇 기술 동향 (ICROS, Sep. 2022)

Achievements

Young Researcher Fellowship, *Institute of Control, Robotics and Systems (ICROS)*, 2024.

Best Paper, *IEEE Int. Conf. Robotics and Automation (ICRA) Workshop: Dataset Generation and Benchmarking of SLAM Algorithms for Robotics and VR/AR*, 2019.

Co-Chair, Localization II, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021.

2nd Cash Award, *HILTI SLAM CHALLENGE*, 2022.

Experiences

Robust visual place recognition for location authentication (Project, 2022)
- Deep learning-based VPR, participated as project leader.

Last-mile delivery robot in urban crowded areas (Project, 2021-2022)
- LiDAR-based SLAM for UGV, participated as SLAM engineer.

Visual SLAM on racing drones (Final Stage, 2021)
- Korean DARPA Challenge, participated as SLAM part engineer.
- Stereo VIO and LiDAR map building on embedded device (Jetson TX2)

Future directions of robotics research (Project, 2021)
- Investigation project for robotics research plans, participated as team member.

Outdoor SLAM in unstructured environment (Project, 2019-2021)
- Autonomous map building in construction sites, participated as project leader.
- Active SLAM, Long-term mapping, Sensor Integration

Indoor SLAM with dynamic obstacles (Project, 2019)
- Indoor service robot for general uses, participated as SLAM part engineer
- SLAM in dynamic environment and obstacles, Obstacle avoidance.

Encoder frame device and vehicle odometry measurement system (Patent, 2019)
- High-resolution encoder frame for vehicle odometry, suggested and built hardware.

Indoor SLAM under complex disaster (Project, 2018)
- SLAM under environmental disturbances (Dust, Heat), participated as team member.

4th Industrial revolution and autonomous driving (Project, 2017)
- Investigation project for autonomous driving, participated as team member.

Intern in safety design department (Doosan Heavy Industries, 2016)

International student exchange program (National University of Singapore, 2016)

Teacher (KAIST Global Center for Gifted Children, 2015-2018)

Education volunteering (Daejeon Yuseong-gu, 2013-2015)

Invited Talks

Dept. Mechanical Engineering, Pusan Univ. (Nov. 2024)

Dept. Electrical Engineering, Inha Univ. (Nov. 2024)

ICROS young researchers sessions (Jul. 2024)

Dept. Mechanical Engineering, Kookmin University (May. 2024)

Dept. Mechanical Engineering, Ajou University (Apr. 2024)

Dept. Robotics and Mechatronics Engineering, DGIST (Jan. 2024)

Dept. Electrical Engineering, Pusan Univ. (Dec. 2023)

SLAM KR (Nov. 2023)

Dept. Electrical Engineering, Inha Univ. (Nov. 2023)

Korea Electronics Technology Institute (KETI) (Oct. 2023)

Language Korean (Native), English (Fluent)

C++, Python