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GISEOP KIM

POSITIONS

PI of Autonomy and Perceptual Robotics Lab (APRL), DGIST Dec. 2024 – Present
Assistant Professor *Department of Robotics and Mechatronics Engineering, DGIST*
Joint Appointment *Department of Artificial Intelligence, DGIST*
Joint Appointment *Mechanical Engineering Track, Undergraduate School, DGIST*

Research Scientist, NAVER LABS Dec. 2021 – Dec. 2024
Autonomous Driving Group (2021 – 2023) and Vision Group (2024), NAVER LABS *Seongnam, South Korea*

Graduate Student Researcher, KAIST Mar. 2017 – Aug. 2021
Intelligent Robotic Autonomy and Perception (IRAP) Lab
Civil and Environmental Engineering Department, Korea Advanced Institute of Science Technology (KAIST) *Daejeon, South Korea*

RESEARCH INTERESTS

Simultaneous localization and mapping (SLAM), 3D reconstruction, Digital twin, Mobile robot navigation, Visual-language navigation, Neural map representation, Sensor-fusion, Inertial-aided navigation, Autonomous vehicles, 3D perception, Spatial AI, Physical AI, etc.

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST) Feb. 2022
Ph.D. in Civil and Environmental Engineering (CEE)
Dissertation: "LiDAR-based Lifelong Robotic Mapping in Changing Environments"
Advised by Dr. Youngchul Kim and Dr. Ayoung Kim

Korea Advanced Institute of Science and Technology (KAIST) Feb. 2019
M.S. in Civil and Environmental Engineering (CEE)
Dissertation: "Isovist-induced Robust LiDAR Localization"
Advised by Dr. Ayoung Kim

Korea Advanced Institute of Science and Technology (KAIST) Feb. 2017
B.S. in Civil and Environmental Engineering (CEE)

ACADEMIC SERVICES

- Reviewer
  - Journals: T-RO (2021–2024), RA-L (2021–2024), IJRR (2020, 2023), IJCV (2023), T-ASE (2024), T-II (2023)
  - Conferences: ICRA (2020–2024), IROS (2019-2024), RSS (2023–2024), CVPR (2025), ICCV (2025), ECCV (2024), UR (2020–2021, 2023)
- Organizing committee of the domestic conference ICROS 2026 (Daegu, South Korea)
- Conference Associate Editor: International Conference on Ubiquitous Robots (UR) (2022–2024)
- Open-sources: github.com/gisbi-kim

RESEARCH SUPERVISION

- Integrated M.S.–Ph.D. Students: Bokeon Suh (2025 Fall–)
- Ph.D. Students: Doyeon Kim (2026 Spring–)
- M.S. Students: Jiseon Kim (2025 Fall–), Yumin Lee (2025 Fall–), Hyo-seok Joo (2025 Fall–), Hoyoon Kim (2026 Spring–), Beomsoo Kim (2026 Spring–)

SELECTED PUBLICATIONS

International Journal

7. Minsu Kim, Giseop Kim, and Sunwook Choi. Addressing diverging training costs using local restoration for precise bird's eye view map construction. *IEEE Robotics and Automation Letters*, 9(11):10700–10707, 2024
6. Hogyun Kim, Jiwon Choi, TaeHu Sim, Giseop Kim, and Younggun Cho. Narrowing your fov with SOLiD: Spatially organized and lightweight global descriptor for fov-constrained lidar place recognition. *IEEE Robotics and Automation Letters*, pages 9645–9652, 2024

5. Minwoo Jung, Wooseong Yang, Dongjae Lee, Hyeonjae Gil, Giseop Kim, and Ayoung Kim. Helipr: Heterogeneous lidar dataset for inter-lidar place recognition under spatiotemporal variations. *The International Journal of Robotics Research*, 43(12):1867–1883, 2024
4. Giseop Kim, Sunwook Choi, and Ayoung Kim. Scan context++: Structural place recognition robust to rotation and lateral variations in urban environments. *IEEE Transactions on Robotics*, 38(3):1856–1874, 2022
3. Younghun Cho, Giseop Kim, Sangmin Lee, and Jee-Hwan Ryu. Openstreetmap-based LiDAR global localization in urban environment without a prior LiDAR map. *IEEE Robotics and Automation Letters*, 7(2):4999–5006, 2022
2. Giseop Kim, Byungjae Park, and Ayoung Kim. 1-day learning, 1-year localization: Long-term LiDAR localization using scan context image. *IEEE Robotics and Automation Letters*, 4(2):1948–1955, 2019
1. Giseop Kim, Ayoung Kim, and Youngchul Kim. A new 3D space syntax metric based on 3D isovist capture in urban space using remote sensing technology. *Computers, Environment and Urban Systems*, 74:74–87, 2019

International Conference Proceedings

10. Jeongyun Kim, Seunghoon Jeong, Giseop Kim, Myung-Hwan Jeon, Eunji Jun, and Ayoung Kim. 2D Gaussian Splatting-based Sparse-view Transparent Object Depth Reconstruction via Physics Simulation for Scene Update. In *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, 2025. Accepted, to appear
9. Hyeonjae Gil, Dongjae Lee, Giseop Kim, and Ayoung Kim. Ephemerality meets LiDAR-based Lifelong Mapping. In *2025 IEEE International Conference on Robotics and Automation (ICRA)*. IEEE, 2025
8. Minsu Kim, Giseop Kim, Kyong Hwan Jin, and Sunwook Choi. BroadBEV: Collaborative lidar-camera fusion for broad-sighted bird's eye view map construction. In *2024 IEEE International Conference on Robotics and Automation (ICRA)*. IEEE, 2024
7. Hyungtae Lim, Kawon Han, Gunhee Shin, Giseop Kim, Songcheol Hong, and Hyun Myung. Orora: Outlier-robust radar odometry. In *2023 IEEE International Conference on Robotics and Automation (ICRA)*, pages 2046–2053. IEEE, 2023
6. Seungsang Yun, Minwoo Jung, Jeongyun Kim, Sangwoo Jung, Younghun Cho, Myung-Hwan Jeon, Giseop Kim, and Ayoung Kim. Sthereo: Stereo thermal dataset for research in odometry and mapping. In *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, volume 9, pages 3857–3864. IEEE, 2022
5. Giseop Kim and Ayoung Kim. LT-mapper: A modular framework for LiDAR-based lifelong mapping. In *2022 International Conference on Robotics and Automation (ICRA)*, pages 7995–8002. IEEE, 2022
4. Giseop Kim and Ayoung Kim. Remove, then revert: Static point cloud map construction using multiresolution range images. In *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 10758–10765. IEEE, 2020
3. Giseop Kim, Yeong Sang Park, Younghun Cho, Jinyong Jeong, and Ayoung Kim. Mulran: Multimodal range dataset for urban place recognition. In *2020 IEEE International Conference on Robotics and Automation (ICRA)*, pages 6246–6253. IEEE, 2020
2. Younggun Cho, Giseop Kim, and Ayoung Kim. Unsupervised geometry-aware deep LiDAR odometry. In *2020 IEEE international conference on robotics and automation (ICRA)*, pages 2145–2152. IEEE, 2020
1. Giseop Kim and Ayoung Kim. Scan context: Egocentric spatial descriptor for place recognition within 3d point cloud map. In *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 4802–4809. IEEE, 2018

Book Chapters

1. Jens Behley, Maurice Fallon, Shibo Zhao, Giseop Kim, Ji Zhang, Fu Zhang, and Ayoung Kim. *Ch. LiDAR SLAM, SLAM Handbook. From Localization and Mapping to Spatial Intelligence*. Cambridge University Press

Dissertations

2. Giseop Kim. *LiDAR-based Lifelong Robotic Mapping in Changing Environments*. PhD thesis, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea, Mar. 2022
1. Giseop Kim. Isovist-induced Robust LiDAR Localization. Master's thesis, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea, Mar. 2019

AWARDS

· Best paper award at ICRA 2018 workshop of Long-term autonomy and deployment of intelligent robots in the real-world

Funded Projects

At DGIST (2024–)

4. 2025 (6 months, Jul to Dec). Title: N-HRHR (High-risk High-return project), DGIST. Funded by: DGIST. Role: PI.
3. 2025–2029. Title: InnoCORE Research Program (DGIST Team topic: Physical AI for Bio-Embodied Systems). Funded by: Ministry of Science and ICT, South Korea. Role: Core Researcher, DGIST.
2. 2025–2030. Title: AI Star Fellowship Program (Top-tier Young AI Researcher Support). Funded by: Ministry of Science and ICT, South Korea. Role: Core Researcher, DGIST.
1. 2025–2028. Title: Start-up Fund. Funded by: DGIST. Role: PI.

Before DGIST (–2021)

5. 2021. Title: Development of technology for analyzing and predicting disaster risks in urban spaces of urban regeneration areas. Funded by: KAIA, MOLIT of South Korea (in total 1,796,000,000 KRW). Role: Developing portable 3D mapping system and software.
4. 2020–2021. Title: Towards long-term autonomy through introduction of the temporal domain into spatial representations used in robotics. Funded by: Bilateral Research Exchange Support Program of NRF, South Korea (in total 40,000,000 KRW) and The Czech Science Foundation (GACR). Role: Joint research with Professor Tomas Krajnik of Czech Technical University in Prague.
3. 2018–2020, Title: Localization techniques on 3D SLAM maps using LiDAR and Camera sensors (2018), Development of SLAM technology based on LiDAR and Camera sensors using deep learning (2019), Localization in changing city (2020). Funded by: NAVER LABS. Role: Lead researcher.
2. 2018–2019. Title: Automated urban analysis techniques using 3D sensor data (creation of 100m scale perceptible regions and topological maps). Funded by: KAIA, MOLIT of South Korea (in total 370,000,000 KRW). Role: Lead researcher.
1. 2018. Title: 3A Localization – Anytime Anywhere Anyview Robot Localization at Complex Urban. Funded by Master's and Doctorate Adventure Research Project, KAIST (in total 4,500,000 KRW). Role: Lead researcher.

Patents

2. Title: Method and Apparatus for Automation of Urban Visibility Analysis Using 3D Sensor Data (Registered in South Korea, 2019, 10-1973903-0000)
1. Title: Encoder Frame Device And Vehicle Odometry Measurement System Using The Same (Registered in South Korea, 2019, 10-1994339-0000)

Teaching

- **Lectures at DGIST (2025–)**
  2. MECH307 Introduction to Artificial Intelligence (Fall 2025)
  1. BE203 Creative mechanical design (Spring 2025)
- Robotics hands-on tutorials on blog: gsk1m.github.io
- Teaching Assistant at KAIST
  - CE481 Sensor-based spatial intelligence (Spring 2020, CEE, KAIST)
  - CE352 Signal and System for Construction IT (Spring 2016, CEE, KAIST)
- Lecturer of KAIST Global Institute of Talented Education (2014–2017)

Leadership

- Mentor of Research Interns at NAVER LABS (2023)
- Department Student President of Civil and Environmental Engineering Dept., KAIST (2015)

Invited talks

- 2025.07.18: Joint Summer School by the Image Processing and Image Understanding Research Group, The Institute of Electronics and Information Engineers (IEIE) (Title: *Generative AI for Mobile Robot Navigation*)
- 2025.06.19: 2025 1st DeepTech Open Network Forum, Daegu Innopolis (Title: *Eyes and Brains of a Humanoid*)
- 2025.06.13: Robotics Lab Seminar on SLAM & Perception, Hyundai Motor Group (Title: *From Research to Service: Industrial Insights from Technology Commercialization*)
- 2025.06.05: Sonnet.AI Research Meetup (Title: *APRL Lab Research Introduction*)

- 2025.05.28: Daegu-Gyeongbuk Chapter, Korea Women Venture Association (Title: *Eyes and Brains of a Humanoid*)
- 2025.05.28: Mid-to-Long-Term Research Strategy Seminar, Daegu-Gyeongbuk Division, ETRI (Title: *Spatial AI, from the 2000s to 2025*)
- 2025.05.27: DeepTech Scale-up Valley Innovation Council & Industry-Academia Forum (Title: *Eyes and Brains of a Humanoid*)
- 2025.05.21/28: Special Lecture for Engineering Track, Posan High School Science Program (Topics: *Introduction to 3D Vision and Digital Twin*)
- 2025.04.26: Science Career Talk Concert, National Daegu Science Museum (Science Day) (Title: *By 2035, Will Robots Outnumber Humans?*)
- 2025.04.03: Technology Innovation Workshop, Technology Venture Leader Program (TVA), DGIST (Title: *Toward the Era of General-Purpose Robots in Everyday Life*)
- 2023.11.25: SLAM KR 2023 Offline Event (Why IMU Fusion for LiDAR SLAM?: Introduction to IMU+LiDAR Fusion) [Slide]
- 2023.10.26: Autonomous IoT Research Center, KETI (Robotic Mapping and Localization for Autonomous Driving in AI era) [Slide]
- 2022.11.09: AIGS, UNIST (Robotic Mapping and Localization for Autonomous Driving) [Slide]
- 2022.08.25: RPM Robotics Lab, SNU (Optimization Tutorial with Hands-on Experiences using SymForce) [Slide]
- 2022.07.14: SPARO Lab, Inha Univ. (LiDAR-based Lifelong Robotic Mapping in Changing Environments) [Slide]
- 2021.05.31: ICRA 21 Radar Workshop (MulRan Dataset for Urban Place Recognition) [Video], [Slide]
- 2020.10.22: SOS LAB (Robust LiDAR SLAM in Complex Urban Sites) [Slide]
- 2020.01.30: NAVER LABS (Structural Place Recognition in Complex and Changing Urban Sites) [Slide]

Revised July 4, 2025