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Ayoung Kim

EDUCATION

University of Michigan *Dec. 2012*
Ph.D. in Mechanical Engineering
Dissertation: "Visual SLAM with Exploration for Autonomous Underwater Navigation"
Advised by Dr. Ryan M. Eustice

University of Michigan *Dec. 2011*
M.S. in Electrical Engineering (Systems)

Seoul National University (SNU) *Feb. 2007*
M.S. in Mechanical and Aerospace Engineering (MAE)
Dissertation: "Stiffness Analysis and Hybrid Control for Parallel Manipulator"
Advised by Dr. Frank C. Park

Seoul National University (SNU) *Feb. 2005*
B.S. in Mechanical and Aerospace Engineering (MAE)
Graduated *Summa cum laude*

POSITIONS

Associate Professor *Sep. 2021 - present*
Dept. of Mechanical Engineering (ME)
Seoul National University (SNU)

Associate Professor *Mar. 2020 - Aug. 2021*
Dept. of Civil and Environmental Engineering (CEE) & KI Robotics
Korea Advanced Institute of Science Technology (KAIST)

Associate Professor (Adjunct) *Mar. 2020 - Aug. 2021*
School of Computing
Korea Advanced Institute of Science Technology (KAIST)

Assistant Professor *Sep. 2014 - Feb. 2020*
Dept. of Civil and Environmental Engineering & KI Robotics
Korea Advanced Institute of Science Technology (KAIST)

Senior Researcher *Nov. 2013 - Aug. 2014*
IT Convergence Technology Research Laboratory
Electronics and Telecommunications Research Institute (ETRI)

Post-doctoral Research Fellow *Oct. 2012 - Sep. 2013*
Perceptual Robotics Laboratory (PeRL)
Naval Architecture and Marine Engineering Department, University of Michigan

Graduate Student Research Assistant *Sep. 2007 - Aug. 2012*
Perceptual Robotics Laboratory (PeRL)
Naval Architecture and Marine Engineering Department, University of Michigan

Graduate Student Research Assistant *Mar. 2005 - Feb. 2007*
Robotics Lab
Mechanical and Aerospace Engineering (MAE), Seoul National University (SNU)

Graduate Student Teaching Assistant *Spring 2005*
Introduction to Robotics
Mechanical and Aerospace Engineering (MAE), Seoul National University (SNU)

FIELD OF INTEREST

Visual simultaneous localization and mapping (SLAM), Navigation, 3D reconstruction, Structure from Motion, Computer vision, Autonomous vehicles, Mobile robotics, Robotic perception, Spatial AI

TEACHING & ADVISING

[M3228.000300] Sensor-based Spatial Intelligence *Fall*
Graduate Elective Major

[CE352] Signal and System for Construction IT *Spring, 2015–2021*
Undergraduate Elective Major
Provided as Education 3.0 (Flipped Learning) since 2016

[CE481] Special topics in CEE: *Spring/Fall 2015*
Optimal design and machine learning for construction IT
Graduate/Undergraduate Elective Major

[CE481] Special topics in CEE: *Spring 2020*
Sensor-based spatial intelligence
Graduate/Undergraduate Elective Major

[CE554] Mechanical Design of Civil Robot *Fall 2015–2020*
Graduate Elective Major
Provided as Education 4.0 (Active Learning) since 2018

Ph.D. Students

- Hyunchul Roh (Ph.D. in Robotics Program (RP), Feb 2017) — CEO of DYPHI.
- Youngsik Shin (Ph.D. in CEE/RP, Feb 2020) — KIMM
- Younggun Cho (Ph.D. in CEE/RP, Feb 2020) — Yeungnam Univ.
- Jinyong Jeong (Ph.D. in CEE, Aug 2020) — Motion2AI

· Youngji Kim (Ph.D. in CEE, Aug 2021) — Naver Labs
· Joowan Kim (Ph.D. in CEE, Feb 2021) — 2016–2021
· Yeong Sang Park (Ph.D. in CEE) — ETRI
· Giseop Kim (Ph.D. in CEE) — Naver Labs
· Sungho Yoon (Ph.D. in RP) — Naver Labs
· MyungHwan Jeon (Ph.D in RP) — 2020-
· Hyesu Jang (Ph.D in ME) — 2021-
· Seungsang Yun (Ph.D in ME) — 2022-
· DongGuw Lee (Ph.D in ME) — 2022-

Master Students

· Giseop Kim (Master in CEE) — 2017–2019
· Younghun Cho (Master in CEE) — 2018–2020
· MyungHwan Jeon (Master in RP) — 2018–2020
· Hyesu Jang (Master in CEE) — 2018–2020
· Seungsang Yun (Master in CEE) — 2020-2022
· Jungyun Kim (Master in CEE) — 2020-
· Sangwoo Jung (Master in ME) — 2021-
· Minwoo Jung (Master in ME) — 2021-
· Hyeonjae Gil (Master in ME) — 2022-

Undergraduate Students
KAIST Undergraduate Research Program (URP) & CEE URP

· Younghun Cho & Hyesu Jang (**Encouragement Prize**) — URP 2017
· Hyesu Jang (**Excellence Prize**) — URP 2018
· Chaemin Na & Jongwon Lee — CEE URP 2018

Thesis Committee
Chair / Co-chair

· Hyunchul Roh (Ph.D. in RP) — 2017
· Giseop Kim (Master in CEE) — 2019
· Younghun Cho (Master in CEE) — 2019
· MyungHwan Jeon (Master in RP) — 2019
· Youngsik Shin (Ph.D. in CEE/RP) — 2020
· Younggun Cho (Ph.D. in CEE/RP) — 2020
· Jinyong Jeong (Ph.D. in CEE/RP) — 2020
· Hyesu Jang (Master in CEE) — 2020
· Youngji Kim (Ph.D. in CEE) — 2021
· Joowan Kim (Ph.D. in CEE) — 2021
· Yeong Sang Park (Ph.D. in CEE) — 2022
· Giseop Kim (Ph.D. in CEE) — 2022
· Sungho Yoon (Ph.D. in RP) — 2022
· Seungsang Yun (Master in CEE) — 2022

PUBLICATIONS

International Journal

1. 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*, 2021. Accepted. To appear
2. Sungho Yoon and Ayoung Kim. Line as a visual sentence: Context-aware line descriptor for visual localization. *IEEE Robotics and Automation Letters (RA-L)*, 6(4):8726–8733, 2021
3. Yeong Sang Park, Young-Sik Shin, Joowan Kim, and Ayoung Kim. 3d ego-motion estimation using low-cost mmwave radars via radar velocity factor for pose-graph slam. *IEEE Robotics and Automation Letters (RA-L)*, 6(4):7691–7698, 2021
4. Youngji Kim, Sungho Yoon, Sujung Kim, and Ayoung Kim. Unsupervised balanced covariance learning for visual-inertial sensor fusion. *IEEE Robotics and Automation Letters (RA-L)*, 6(2):819–826, 2021
5. Joowan Kim, Myung-Hwan Jeon, Younggun Cho, and Ayoung Kim. Dark synthetic vision: Lightweight active vision to navigate in the dark. *IEEE Robotics and Automation Letters (RA-L)*, 6(1):143–150, 2020
6. Jinyong Jeong, Younggun Cho, and Ayoung Kim. Hdmi-loc: Exploiting high definition map image for precise localization via bitwise particle filter. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 5(4):6310–6317, 2020
7. MyungHwan Jeon and Ayoung Kim. Prima6d: Rotational primitive reconstruction for enhanced and robust 6d pose estimation. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 5(3):4955–4962, 2020
8. Kanghee Choi, Giyoung Byun, Ayoung Kim, and Youngchul Kim. Drivers' visual perception quantification using 3d mobile sensor data for road safety. *MDPI Sensors, Special Issue on Robotic Sensing for Smart Cities*, 20(10):2763, 2020
9. Joowan Kim, Younggun Cho, and Ayoung Kim. Proactive camera attribute control using bayesian optimization for illumination-resilient visual navigation. *IEEE Transactions on Robotics*, 36(4):1256–1271, 2020
10. Younggun Cho, Hyesu Jang, Ramavtar Malav, Gaurav Pandey, and Ayoung Kim. Underwater image dehazing via unpaired image-to-image translation. *International Journal of Control, Automation and Systems*, 18:605–614, 2020
11. Young-Sik Shin, Yeong Sang Park, and Ayoung Kim. DVL-SLAM: Sparse depth enhanced direct Visual-LiDAR SLAM. *Autonomous Robots*, 44(2):115–130, 2020
12. Jinyong Jeong, Younghun Cho, and Ayoung Kim. The road is enough! extrinsic calibration of non-overlapping stereo camera and LiDAR using road information. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 4(3):2831 – 2838, 2019
13. Young-Sik Shin and Ayoung Kim. Sparse depth enhanced direct thermal-infrared SLAM beyond the visible spectrum. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 4(3):2918–2925, 2019
14. Jinyong Jeong, Younggun Cho, Young-Sik Shin, Hyunchul Roh, and Ayoung Kim. Complex urban dataset with multi-level sensors from highly diverse urban environments. *International Journal of Robotics Research*, 38(6):642–657, 2019
15. 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 (RA-L) (with ICRA)*, 4(2):1948–1955, 2019

16. 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
17. Seonghun Hong, Dongha Chung, Jinwhan Kim, Youngji Kim, Ayoung Kim, and Hyeon Kyu Yoon. In-water visual ship hull inspection using a hover-capable underwater vehicle with stereo vision. *Journal of Field Robotics*, 36(3):531–546, 2019
18. Younggun Cho and Ayoung Kim. Channel invariant online visibility enhancement for visual SLAM in a turbid environment. *Journal of Field Robotics*, 35(7):1080–1100, 2018
19. Younggun Cho, Jinyong Jeong, and Ayoung Kim. Model assisted multi-band fusion for single image enhancement and applications to robot vision. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 3(4):2822–2829, 2018
20. Hyunchul Roh, Jinyong Jeong, and Ayoung Kim. Aerial image based heading correction for large scale SLAM in an urban canyon. *IEEE Robotics and Automation Letters (RA-L) (with IROS)*, 2(4):2232–2239, 2017
21. Hyunchul Roh, Jinyong Jeong, Younggun Cho, and Ayoung Kim. Accurate mobile urban mapping via digital map-based SLAM. *MDPI Sensors*, 16(8):1315, Aug. 2016
22. Stephen M. Chaves, Ayoung Kim, Enric Galceran, and Ryan M. Eustice. Opportunistic sampling-based active visual SLAM for underwater inspection. *Autonomous Robots*, 40(7):1245—-1265, Jul. 2016
23. Paul Ozog, Nicholas Carlevaris-Bianco, Ayoung Kim, and Ryan M. Eustice. Long-term mapping techniques for ship hull inspection and surveillance using an autonomous underwater vehicle. *Journal of Field Robotics, Special Issue on Safety, Security and Rescue Robotics*, 33(3):265–289, May. 2016
24. Ayoung Kim and Ryan M. Eustice. Active visual SLAM for robotic area coverage: Theory and experiment. *International Journal of Robotics Research, Special Issue on Robot Vision*, 34(4-5):457–475, Apr. 2015
25. Ayoung Kim and Ryan M. Eustice. Real-time visual SLAM for autonomous underwater hull inspection using visual saliency. *IEEE Transactions on Robotics*, 29(3):719–733, Jun. 2013
26. Franz S. Hover, Ryan M. Eustice, Ayoung Kim, Brendan Englot, Hordur Johannsson, Michael Kaess, and John J. Leonard. Advanced perception, navigation and planning for autonomous in-water ship hull inspection. *International Journal of Robotics Research, Special Issue on 3D Exploration, Mapping, and Surveillance*, 31(12):1445–1464, Oct. 2012
27. Hunter C. Brown, Ayoung Kim, and Ryan M. Eustice. An overview of autonomous underwater vehicle research and testbed at PeRL. *Marine Technology Society Journal*, 43(2):33–47, 2009

International Conference Proceedings

1. Giseop Kim and Ayoung Kim. Lt-mapper: A modular framework for lidar-based lifelong mapping. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Philadelphia, May. 2022. Accepted. To appear
2. 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)*, pages 2247–2252, Prague, Sep. 2021
3. Youngji Kim and Ayoung Kim. Robust sensor fusion with pairwise dynamic covariance scaling for localization in urban areas. In *Proceedings of the IEEE International Conference on Ubiquitous Robots (UR)*, pages 547–552, Jeju, July 2021
4. Hyesu Jang, SungHo Yoon, and Ayoung Kim. Multi-session underwater pose-graph slam using inter-session opti-acoustic two-view factor. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 11668–11674, Xian, May 2021

5. Giseop Kim and Ayoung Kim. Remove, then revert: Static point cloud map construction using multiresolution range images. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 10758–10765, Las Vegas, Oct. 2020
6. Sungho Yoon and Ayoung Kim. Balanced depth completion between dense deep inference and sparse range measurements using kiss-gp. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 10468–10475, Las Vegas, Oct. 2020
7. Yeong Sang Park, Hyesu Jang, and Ayoung Kim. I-loam: Intensity enhanced lidar odometry and mapping. In *Proceedings of the IEEE International Conference on Ubiquitous Robots (UR)*, pages 455–458, Kyoto, Jun. 2020
8. Giseop Kim, Yeong Sang Park, Younghun Cho, Jinyong Jeong, and Ayoung Kim. Mulran: Multimodal range dataset for urban place recognition. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 6246–6253, Paris, May 2020
9. Younggun Cho, Giseop Kim, and Ayoung Kim. Unsupervised geometry-aware deep lidar odometry. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 2145–2152, Paris, May 2020
10. Yeong Sang Park, Young-Sik Shin, and Ayoung Kim. Pharao: Direct radar odometry using phase correlation. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 2617–2623, Paris, May 2020
11. Yeong Sang Park, Joowan Kim, and Ayoung Kim. Radar localization and mapping for indoor disaster environments via multi-modal registration to prior lidar map. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1307–1314, Macau, Nov. 2019
12. Younggun Cho, Ramavtar Malav, Gaurav Pandey, and Ayoung Kim. DehazeGAN: Underwater haze image restoration using unpaired image-to-image translation. In *IFAC Conference on Control Applications in Marine Systems, Robotics, and Vehicles (CAMS)*, volume 52, Daejeon, Sep. 2019
13. MyungHwan Jeon, Yeongjun Lee, Young-Sik Shin, Hyesu Jang, and Ayoung Kim. Underwater object detection and pose estimation using deep learning. In *IFAC Conference on Control Applications in Marine Systems, Robotics, and Vehicles (CAMS)*, volume 52, Daejeon, Sep. 2019
14. Sejin Lee, Byungjae Park, and Ayoung Kim. Deep learning based object detection via style-transferred underwater sonar images. In *IFAC Conference on Control Applications in Marine Systems, Robotics, and Vehicles (CAMS)*, volume 52, Daejeon, Sep. 2019
15. Sejin Lee, Byungjae Park, and Ayoung Kim. A deep learning based submerged body classification using underwater imaging sonar. In *Proceedings of the IEEE International Conference on Ubiquitous Robots (UR)*, pages 106–112, Jeju, Jun. 2019
16. Jongwon Lee and Ayoung Kim. Neural network-based long-term place recognition from omni-images. In *Proceedings of the IEEE International Conference on Ubiquitous Robots (UR)*, pages 189–193, Jun. 2019
17. Alex Junho Lee, Younggun Cho, Sungho Yoon, Youngsik Shin, and Ayoung Kim. ViViD : Vision for Visibility Dataset. In *ICRA Workshop on Dataset Generation and Benchmarking of SLAM Algorithms for Robotics and VR/AR*, Montreal, May. 2019. (**Best paper award**)
18. Sejin Lee, Byungjae Park, and Ayoung Kim. Deep learning from shallow dives: Sonar image generation and training for underwater object detection. In *ICRA Workshop on Underwater Robotics Perception*, Montreal, May. 2019. (**Best paper award**)
19. Ramavtar Malav, Ayoung Kim, Soumya Ranjan Sahoo, and Gaurav Pandey. DHSGAN: An end to end dehazing network for fog and smoke. In *Asian Conference of Computer Vision (ACCV)*, Perth, Dec. 2018

20. Giseop Kim and Ayoung Kim. Scan context: Egocentric spatial descriptor for place recognition within 3D point cloud map. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 4802–4809, Madrid, Oct. 2018
21. Youngji Kim, Jinyong Jeong, and Ayoung Kim. Stereo camera localization in 3D LiDAR maps. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1–9, Madrid, Oct. 2018
22. Giseop Kim, Byungjae Park, and Ayoung Kim. Learning scan context toward long-term lidar localization. In *ICRA Workshop on Long-term Autonomy and Deployment of Intelligent Robots in the Real-world*, Brisbane, May. 2018. (**Best paper award**)
23. Jinyong Jeong, Younggun Cho, Young-Sik Shin, Hyunchul Roh, and Ayoung Kim. Complex urban lidar data set. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 6344–6351, Brisbane, May. 2018
24. Joowan Kim, Younggun Cho, and Ayoung Kim. Exposure control using bayesian optimization based on entropy weighted image gradient. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 857–864, Brisbane, May. 2018
25. Young-Sik Shin, Yeong Sang Park, and Ayoung Kim. Direct visual slam using sparse depth for camera-lidar system. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 1–8, Brisbane, May. 2018
26. Alex J. Lee and Ayoung Kim. Event-based real-time optical flow estimation. In *Proceedings of the International Conference on Control, Automation and Systems*, Jeju, S. Korea, Oct. 2017
27. Youngji Kim and Ayoung Kim. On the uncertainty propagation: Why uncertainty on lie groups preserves monotonicity? In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, Canada, Sep. 2017. In print
28. Joowan Kim, Jinyong Jeong, Young-Sik Shin, Younggun Cho, Hyunchul Roh, and Ayoung Kim. LiDAR configuration comparison for urban mapping system. In *Proceedings of the IEEE Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 854–857, Jeju, S. Korea, Aug. 2017
29. Yeong Sang Park, Ayoung Kim, and Young Sam Lee. Path planning using flexible region sampling for arbitrarily-shaped obstacles. In *Proceedings of the IEEE Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 210–215, Jeju, S. Korea, Aug. 2017
30. Dae-Hyeon Gwon, Joowan Kim, Moon Hwan Kim, Ho Gyu Park, and Ayoung Kim Tae Yeong Kim. Development of a side scan sonar module for the underwater simulator. In *Proceedings of the IEEE Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 662–665, Jeju, S. Korea, Aug. 2017
31. Joowan Kim and Ayoung Kim. Light condition invariant visual SLAM via entropy based image fusion. In *Proceedings of the IEEE Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 529–533, Jeju, S. Korea, Aug. 2017
32. Jinyong Jeong, Younggun Cho, and Ayoung Kim. Road-SLAM : Road marking based SLAM with lane-level accuracy. In *Proceedings of the IEEE Intelligent Vehicle Symposium*, pages 1736–1473, Redondo Beach, CA, Jun. 2017
33. Younggun Cho and Ayoung Kim. Visibility enhancement for underwater visual SLAM based on underwater light scattering model. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 710–717, Singapore, May. 2017
34. Youngji Kim and Ayoung Kim. Comparison of point feature matching and graph matching for underwater scene matching. In *Proceedings of the International Conference on Control, Automation and Systems*, Gyeongju, S. Korea, Oct. 2016
35. Youngji Kim, Hwasup Lim, Sang Chul Ahn, and Ayoung Kim. Simultaneous segmentation, estimation and analysis of articulated motion from dense point cloud sequence. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1085–1092, Daejeon, S. Korea, Sep. 2016

36. Dae-Hyeon Gwon, Young-Sik Shin, Youngji Kim, Yeongjun Lee, Hyun-Taek Choi, and Ayoung Kim. Nontemporal relative pose estimation for opti-acoustic bundle adjustment. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–5, Monterey, CA, Sep. 2016
37. Younggun Cho, Young-Sik Shin, and Ayoung Kim. Online depth estimation and application to underwater image dehazing. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–7, Monterey, CA, Sep. 2016
38. Young-Sik Shin, Younggun Cho, Gaurav Pandey, and Ayoung Kim. Estimation of ambient light and transmission map with common convolutional architecture. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–7, Monterey, CA, Sep. 2016
39. Jinyong Jeong and Ayoung Kim. Adaptive inverse perspective mapping for lane map generation with SLAM. In *Proceedings of the IEEE Ubiquitous Robots and Ambient Intelligence (URAI)*, pages 38–41, Xian, China, Aug. 2016
40. Young-Sik Shin, Yeongjun Lee, Hyun-Taek Choi, and Ayoung Kim. Bundle adjustment from sonar images and SLAM application for seafloor mapping. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–6, Washington, DC, Oct. 2015
41. Stephen M. Chaves, Ayoung Kim, and Ryan M. Eustice. Opportunistic sampling-based planning for active visual SLAM. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 3073–3080, Chicago, IL, USA, Sep. 2014
42. Ayoung Kim and Ryan M. Eustice. Perception-driven navigation: Active visual SLAM for robotic area coverage. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 3181–3188, Karlsruhe, Germany, May. 2013
43. Ayoung Kim and Ryan M. Eustice. Next-best-view visual SLAM for bounded-error area coverage. In *IROS Workshop on Active Semantic Perception*, Vilamoura, Portugal, Oct. 2012
44. Ayoung Kim and Ryan M. Eustice. Combined visually and geometrically informative link hypothesis for pose-graph visual SLAM using bag-of-words. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1647–1654, San Francisco, CA, USA, Sep. 2011
45. Ayoung Kim and Ryan M. Eustice. Toward AUV survey design for optimal coverage and localization using the cramer rao lower bound. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–7, Biloxi, MS, USA, Oct. 2009
46. Ayoung Kim and Ryan M. Eustice. Pose-graph visual SLAM with geometric model selection for autonomous underwater ship hull inspection. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1559–1565, St. Louis, MO, USA, Oct. 2009
47. Hunter Brown, Ayoung Kim, and Ryan Eustice. Development of a multi-AUV SLAM testbed at the University of Michigan. In *Proceedings of the IEEE/MTS OCEANS Conference and Exhibition*, pages 1–6, Quebec City, Quebec, Canada, Sep. 2008
48. Ryan M. Eustice, Hunter C. Brown, and Ayoung Kim. An overview of AUV algorithms research and testbed at the University of Michigan. In *Proceedings of the IEEE/OES Autonomous Underwater Vehicles Conference*, pages 1–9, Woods Hole, MA, USA, Oct. 2008
49. A-Young Kim, Sitae Kim, Jay-Il Jeong, Jongwon Kim, and F.C. Park. Exploiting redundant actuation to enhance the static stiffness of parallel mechanisms. In *The 13th International Conference on Advanced Robotics*, Jeju, Korea, Aug. 2007

국내 저널

- 정민우, 정상우, 장혜수, 김아영, 비정형의 건설환경 매핑을 위한 레이저 반사광 강도와 주변광을 활용한 향상된 라이다-관성 슬램, *로봇공학회 논문지*, 16(3):179–188, 2021.

- 정상우, 정민우, 김아영, 라이다 점군 밀도에 강인한 맵 오차 측정 기구 설계 및 알고리즘, *로봇공학회 논문지*, 16(2):189–198, 2021.
- 조영훈, 김아영, 도시환경 매핑 시 SLAM 불확실성 최소화를 위한 강화 학습 기반 경로 계획법, *로봇공학회 논문지*, 16(2):122–129, 2021.
- 장혜수, 이영준, 김기섭, 김아영, 수중에서의 특징점 매칭을 위한 CNN 기반 Opti-Acoustic 변환, *로봇공학회 논문지*, 15(1):1–7, 2020.
- 전명환, 이영준, 신영식, 장혜수, 여태경, 김아영, 강건한 CNN기반 수중 물체 인식을 위한 이미지 합성과 자동화된 Annotation Tool, *로봇공학회 논문지*, 14(2):139–149, 2019.
- 김주완, 권대현, 김아영, 급격한 광조건 변화 극복을 위한 영상 처리 기법 연구, *제어로봇시스템학회 논문지*, 23(1):22–25, 2017.
- 신영식, 이영준, 최현택, 김아영, 수중 영상 소나의 번들 조정과 3 차원 복원을 위한 운동 추정의 모호성에 관한 연구, *로봇공학회 논문지*, 11(2):52–59, 2016.
- 신영식, 조영근, 이영준, 최현택, 김아영, 항법 적용을 위한 수중 소나 영상 처리 요소 기법 비교 분석, *한국해양공학회지*, 30(3):214–220, 2016.

학회지

- 조영근, 정진용, 김아영, ICRA SLAM 동향 분석, *로봇과 인간, 한국로봇학회*, 14(3):3–10, 2017.
- 김아영, IROS SLAM 동향 분석, *로봇과 인간, 한국로봇학회*, 15(1):4–10, 2018.
- 김아영, 로봇의 눈으로 보는 도시, *기계저널 (로봇의 지각), 대한기계학회*, 59(5):38–42, 2019.

Books

- 김아영, 인프라 모니터링을 위한 비전 기반 로봇 기술 *KAIST U-City Program Book Series*, p.153, 2019. ISBN 979-11-963039-1-4.

Interview & Media

- 서울대학교 기계공학부 임용 인터뷰, “서울대 공대도 ‘유리천장’ 속속 깨진다” *매일경제*, 2021-08-13.
- Education 3.0 강의 방식 소개 인터뷰, “강의 없앤 강의실... 학생들이 떠들썩해졌다” *조선일보*, 2017-05-04.

Dissertations

1. Ayoung Kim. *Active visual SLAM with exploration for autonomous underwater navigation.* PhD thesis, University of Michigan, Ann Arbor, MI, Aug. 2012
2. Ayoung Kim. Stiffness analysis and hybrid control for parallel manipulator. Master's thesis, Seoul National University, Seoul, Korea, Dec. 2007

PATENTS

국내 특허

- 김주완, 조영근, 김아영, 베이지안 최적화를 이용한 카메라 속성 제어 방법 및 장치, 출원 *10-2019-0010600* (2019-01-28).
- 김아영, 김기섭, 김영철, 3차원 센서 데이터를 활용한 도심 속 관측자 중심의 시각 영역 분석 자동화 방법 및 장치, 출원 *10-2018-0086409* (2018-07-25), 등록 *10-1973903* (2019-04-23).
- 김아영, 이준호, 조영근, 김기섭, 노현철, 엔코더 프레임 장치 및 이를 이용한 차량 위치 측정 시스템, 출원 *10-2017-0099614* (2017-08-07), 등록 *10-1994339* (2019-06-24).
- 김아영, 신영식, 조영근, CNN을 이용한 이미지 디헤이징 방법 및 그 시스템, 출원 *10-2016-0147352* (2016-11-07), 등록 *10-1938945* (2019-01-09).

PRESENTATIONS

1. Agency for Defense Development (ADD), Jan., 2022.
2. Samsung Advanced Institute of Technology, Dec., 2021.
3. The School of Civil, Architectural Engineering, and Landscape Architecture Sungkyunkwan University (SKKU), Nov., 2021.
4. Hanwha Defense, Nov., 2021.
5. 삼성미래기술연구회, Oct., 2021.
6. Keynote speech, 한국로봇학회, May., 2021.
7. KAUST Research Conference on Robotics and Autonomy, Mar., 2021.
8. Keynote speech, 대한기계학회, Dec., 2020.
9. Keynote speech, Workshop on Emerging Learning and Algorithmic Methods for Data Association in Robotics, ICRA, Paris, May, 2020.
10. KAIST School of Computing Colloquium, Apr., 2020.
11. 인공지능 워크샵, 충남대학교, Jan., 2020.
12. Australian Centre for Field Robotics (ACFR), Sydney, Austrailia, Nov., 2019.
13. Keynote speech, AutoNUE Workshop International Conference on Computer Vision (ICCV), Seoul, Korea, Nov., 2019.
14. Keynote speech, International Conference on Control, Automation and Systems (ICCAS), Jeju, Korea, Oct., 2019.
15. Mechanical Engineering, KAIST, Daejeon, Korea, Oct., 2019.
16. Keynote speech, A Robotic State of Mind Workshop, Holomatic, Wuhan, China, Jun., 2019.
17. KAIST–NAVER Clova AI Workshop, KAIST, Daejeon, Korea, Jun., 2019.
18. Keynote speech, Workshop on Underwater Robotics Perception, ICRA, Montreal, Canada, May, 2019
19. AI+X Forum, School of Computing, KAIST, Daejeon, Korea, May., 2019.
20. SW Contents Research Laboratory, ETRI, Daejeon, Korea, May., 2019.

21. Mechanical Engineering, SNU, Seoul, Korea, May., 2019.
22. Czech technical university in Prague, Prague, Czech Republic, Apr., 2019.
23. Department of Naval Architecture & Ocean Engineering, Pusan National University (PNU), Busan, Korea, Feb., 2019.
24. Edu4.0 적용사례소개, KAIST 신임교원워크샵, KAIST, Nov., 2018
25. Keynote speech 국제 필드로봇 포럼, 한국로봇산업진흥원, Nov., 2018
26. 기조강연, 추계학술대회 한국수중수상로봇기술연구회, Nov., 2018
27. 카이스트 대학 진로탐색캠프 특강, 과학영재교육연구원, Oct., 2018
28. Keynote speech, IEEE International Conference on Ubiquitous Robots, Honolulu, USA, Jun., 2018.
29. Women in Science and Engineering Session, ICROS Spring Conference, Institute of Control, Robotics and Systems (ICROS), May., 2017.
30. Civil and Environmental Engineering, Hong Kong University of Science and Technology (HKUST), Hong Kong, Jan., 2017.
31. Invited talk, Korea Intellectual Property Office, Daejeon, Aug., 2016.
32. Hyundai Engineering & Construction, Jul., 2016.
33. Korea Institute of Construction Technology (KICT), Seoul, Mar., 2016.
34. Autonomous Systems Lab, ETH Zurich, Feb., 2016.
35. Keynote speech, ICROS-KROS Joint Spring Conference, ICROS, Daejeon, May., 2015.
36. Daegu-Gyeongbuk Research Center, ETRI, Daegu, Korea, Feb., 2015.
37. Mechanical Engineering, PNU, Busan, Korea, Oct., 2014.
38. Digital Media Engineering, Busan University of Foreign Studies, Busan, Korea, Oct., 2014.
39. Civil and Environmental Engineering, KAIST, Daejeon, Korea, Apr., 2014.
40. Korea Institute of Ocean Science and Technology (KRISO), Daejeon, Korea, Nov., 2013.
41. Mechanical Engineering and Aerospace Engineering, SNU, Seoul, Korea, Sep., 2012.
42. Samsung Heavy Industries Research Institute, Daejeon, Korea, Sep., 2012.
43. Mechanical Engineering / Ocean and Resource Engineering, University of Hawaii, Honolulu, HI, USA, Sep., 2012.
44. Ocean Systems Engineering, KAIST, Daejeon, Korea, Nov., 2010.

AWARDS AND HONORS

2021	"Outstanding AE", RA-L, IEEE
2020	"Outstanding Lecturer Award", CEE, KAIST
2019	"Young Researcher Award", Korea Robotics Society (KROS)
2019	"Appreciation plaque", Korean marie robot technology society (KMRTS)
2016	"Excellent Reviewer", The ICROS
2016	"Young Scientist at Summer Davos Forum", The World Economic Forum (WEF)
2015	"Excellence Award", Ministry of Science, ICT and Future Planning (MSIP)
2015	"Best Presenter Award", KMRTS
2015	"Young Researchers Award", ICROS
2009, 2011	Rackham Travel Grant Award
2005 - 2007	Funding from Samsung Electronics, Inc.
2005	Graduated *Summa cum laude*, MAE, SNU.
2004	"Best Presentation Award of Bachelor Thesis", MAE, SNU.

PROFESSIONAL MEMBERSHIPS

2022 -	Korean Society of Mechanical Engineers (KSME)
2014 -	Institute of Control, Robotics and Systems (ICROS)
2014 -	Women in Science, Engineering and Technology (WISET), Guest Mentor
2014 -	Korean Society of Ocean Engineering (KSOE)
2014 -	Korea Robotics Society (KROS)
2011 -	IEEE Robotics and Automation Society
2011 -	IEEE Women in Engineering
2011 -	IEEE Oceanic Engineering Society
2008 -	Institute of Electrical and Electronics Engineers (IEEE)

SERVICES

Committee

Academic Societies

· Program Chair, 한국로봇학술대회 (KROC), 2022.
· 평의원, 제어로봇시스템학회 (ICROS), 2019-2022.
· Chapter Vice Chair, IEEE OES Korea Chapter, 2019-present.
· 연구회총무이사, 한국수중수상로봇기술연구회, 한국해양공학회 (KSOE), 2017-2018.
· Publication Chair, IEEE Underwater Technology, 2017.
· 여성위원장, 제어로봇시스템학회 (ICROS), 2017.
· 연구부회장, 수중로봇연구회, 한국로봇학회 (KROS), 2016-2019.
· 특허 및 실용신안등록출원심사 자문위원, 2016-2017.
· Activity Funding Committee, IFAC, 2020–2023.
· Senior Program Committee, IROS, 2020.
· IROS ICROS Best Application Paper Award Committee, 2019–2020.

Editorial Board

· Senior Editor, IEEE UR, 2020, 2021, 2022.
· Associate Editor, IEEE IROS, 2020, 2022.
· Associate Editor, IEEE Robotics and Automation Letters (RA-L) 2019–2021.
· Associate Editor, IEEE Transactions on Robotics (T-RO) 2020–2022.
· Editor, IFAC CAMS/WROCO, 2019.

Workshop & Tutorial

- Workshop on Radar Perception for All-Weather Autonomy, ICRA 2021
- Workshop on Reliable Deployment of Machine Learning for Long-Term Autonomy, ~~ICRA~~ IROS 2020 (Workshop has postponed to IROS 2020 due to COVID-19).
- Workshop on Acoustic based Navigation for Marine Robots, IROS 2017.

Reviewer

- IEEE Transactions on Robotics (T-RO).
- IEEE Transactions on Mechatronics (T-Mech).
- IEEE Transactions on Industrial Electronics (T-IE).
- IEEE Robotics and Automation Letters (RA-L).
- Field Robotics (FR)
- Science Report
- Journal of Field Robotics (JFR).
- AIAA Journal of Guidance, Control, and Dynamics.
- Elsevier Robotics and Autonomous Systems (RAS).
- Elsevier Ocean Engineering (OE).
- ASME Journal of Autonomous Vehicles and Systems.
- International Journal of Control, Automation and Systems (IJCAS).
- International Journal of Precision Engineering and Manufacturing.
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).
- IEEE International Conference on Robotics and Automation (ICRA).
- Robotics: Science and Systems (RSS).
- Conference on Robot Learning (CoRL).
- IEEE Intelligent Transportation Systems Conference (ITSC).
- International Conference on Control, Automation and Systems (ICCAS).

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