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Ayoung Kim 김아영

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

Assistant Professor *Sep. 2014 - present*
Dept. of Civil and Environmental Engineering
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, Path planning, Computer vision, Autonomous vehicles, Mobile robotics, Robotic perception

PUBLICATIONS

International Journal

- 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
- 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
- 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
- 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
- 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
- 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
- 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

- 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*, Singapore, May. 2017. Accepted. To appear
- 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
- 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*, pages 1085–1092, Daejeon, S. Korea, Sep. 2016
- 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
- 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

- 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
- 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
- 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
- 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*, pages 3073–3080, Chicago, IL, USA, Sep. 2014
- 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*, pages 3181–3188, Karlsruhe, Germany, May. 2013
- 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
- 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*, pages 1647–1654, San Francisco, CA, USA, Sep. 2011
- 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
- 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*, pages 1559–1565, St. Louis, MO, USA, Oct. 2009
- 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
- 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
- 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

Domestic Journal

- 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.

Dissertations

- Ayoung Kim. *Active visual SLAM with exploration for autonomous underwater navigation.* PhD thesis, University of Michigan, Ann Arbor, MI, Aug. 2012

- Ayoung Kim. Stiffness analysis and hybrid control for parallel manipulator. Master's thesis, Seoul National University, Seoul, Korea, Dec. 2007

PRESENTATIONS

- Civil and Environmental Engineering, Hong Kong University of Science and Technology, Hong Kong, Jan., 2017.
- 특허청 (Korea Intellectual Property Office), Daejeon, Aug., 2016.
- 현대건설 (Hyundai Engineering & Construction), Jul., 2016.
- 한국건설기술연구원 (Korea Institute of Construction Technology), Seoul, Mar., 2016.
- Autonomous Systems Lab, ETH Zurich, Feb., 2016.
- 제어로봇시스템학회 (Institute of Control, Robotics and Systems), Daejeon, May., 2015.
- 한국전자통신연구원 (Electronics and Telecommunications Research Institute), Daegu, Korea, Feb., 2015.
- Mechanical Engineering, Busan National University, Busan, Korea, Oct., 2014.
- Digital Media Engineering, Busan University of Foreign Studies, Busan, Korea, Oct., 2014.
- Civil and Environmental Engineering, Korea Advanced Institute of Science and Technology, Daejeon, Korea, Apr., 2014.
- Korea Institute of Ocean Science and Technology, Daejeon, Korea, Nov., 2013.
- Mechanical Engineering and Aerospace Engineering, Seoul National University, Seoul, Korea, Sep., 2012.
- Samsung Heavy Industries Research Institute, Daejeon, Korea, Sep., 2012.
- Mechanical Engineering / Ocean and Resource Engineering, University of Hawaii, Honolulu, HI, USA, Sep., 2012.
- Ocean Systems Engineering, Korea Advanced Institute of Science and Technology, Daejeon, Korea, Nov., 2010.

RESEARCH GRANTS

Current research grants

- NAVER LABS "Lane Map Generation of Complex Urban Environment using SLAM", KRW 100M, 2017.01 – present, (PI: Ayoung Kim)
- KEIT, "Drone Development under Complex Disaster", KRW 250M, 2016.07 – present, (PI: Junho Oh, A. Kim: KRW 40M)
- LIG, "SLAM using Side Scanning Sonar", KRW 60M, 2016.08 – present, (PI: Ayoung Kim)
- NRF, "Real-time sonar and optical image enhancement for in-water structure monitoring using underwater robot", KRW 150M, 2015.11 – present, (PI: Ayoung Kim)
- KEIT, "Development of real-time localization and 3-D mapping system with cm-level accuracy based on digital maps and vision data for autonomous driving", KRW 500M, 2015.06 – present, (PI: Hyunchul Shim, A. Kim: KRW 250M)
- KIMST, "Hull Inspection Project", KRW 1,300M, 2015.08 – present, (PI: Jinwhan Kim, A. Kim: KRW 80M)

Past research grants

- NAVER, "Digital map and SLAM based 3D map building", KRW 100M, 2016.01 – 2016.12, (PI: Ayoung Kim)

- KAIST, "Dehazing for Dynamic Image Sequences", KRW 50M, 2016.04 – 2016.12, (PI: Ayoung Kim)
- NAVER, "Development of 3D Mapping Vehicle", KRW 200M, 2016.01 – 2016.06, (PI: Ayoung Kim)
- KAIST, "Efficient Dehazing with Spatial Sensor Information", KRW 50M, 2015.07 – 2015.12, (PI: Ayoung Kim)
- KRISO, "Imaging sonar based environment mapping and SLAM I", KRW 30M, 2015.02 – 2015.11, (PI: Ayoung Kim)
- KRISO, "Imaging sonar based environment mapping and SLAM II", KRW 30M, 2016.02 – 2016.11, (PI: Ayoung Kim)

AWARDS AND HONORS

2016	"Excellent Reviewer", The Institute of Control, Robotics and Systems (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	"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

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

· Publication Chair, IEEE Underwater Technology, 2017.
· 연구부회장, 수중로봇연구회, 한국로봇학회 (KROS), 2016-2017.
· 여성위원장, 제어로봇시스템학회 (ICROS), 2017.

Reviewer

· IEEE Transactions on Industrial Electronics.
· Journal of Field Robotics.
· AIAA Journal of Guidance, Control, and Dynamics.
· Elsevier Robotics and Autonomous Systems.
· Elsevier Ocean Engineering.
· IEEE/RSJ International Conference on Intelligent Robots and Systems.
· IEEE International Conference on Robotics and Automation.
· International Journal of Control, Automation and Systems.
· International Journal of Precision Engineering and Manufacturing.

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