Dong-Won Shin

SLAM & Perception Software ENGINEER
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Career

Mar. 2022 – present	StradVision **VSLAM Algorithm Engineer**
Aug. 2019 – Feb. 2022	SOSLAB (Smart Optics Sensor LAB) **Research Engineer** in LiDAR Application Team

Education

Mar. 2015 – Aug. 2019	GIST (Gwangju Institute of Science and Technology) **Ph.D. degree** in School of Electronic Engineering and Computer Science
Mar. 2013 – Feb. 2015	GIST (Gwangju Institute of Science and Technology) **M.S. degree** in School of Information and Communications
Mar. 2006 – Feb. 2013	KIT (Kumoh National Institute of Technology) **B.S. degree** in Computer Engineering (Including two years of military service)

Research Interest

- Simultaneous Localization and Mapping
- Multi View Geometry
- Visual Localization
- Computer Vision and Image Processing
- Machine Learning and Deep Learning
- Autonomous Driving System
- Mobile Robotics

Technical Skills & Experience

- Programming language: C/C++, Python
- Robotics: Robot Operating System 1&2
- Image processing: OpenCV
- 3D geometry: Point Cloud Library, Open3D
- Machine learning: Numpy, Scipy, Scikit-learn
- Deep learning: Tensorflow, Pytorch, Keras
- Development: Github, Docker

Projects

3차원 고정형 라이다 센서를 이용한 SLAM 맵핑 장비 개발

→ 3D 솔리드 스테이트 라이다를 이용한 핸드-헬드 맵핑 소프트웨어 개발

(주)에스오에스랩 Nov. 2021 – present

야지환경 3D SLAM 소프트웨어 및 환경변화에 강인한 학습기반 물체인식 소프트웨어 개발

→ 야지환경에 적합한 다중 센서 융합 SLAM 소프트웨어 개발

Mar. 2020 – present

스마트 팩토리의 공장 자동화를 위한 2차원 라이다 객체 인지 알고리즘 개발

→ 2차원 라이다 센서를 이용한 선반 자세 추정, 충전 스테이션 자세 추정

EXIS Software Engineering Dec. 2021 – Jan. 2022

실내 자율주행 로봇을 위한 2차원 주행 지도 작성

→ 2차원 라이다 SLAM 알고리즘을 이용한 실내 주행 지도 작성 수행

AIDL Nov. 2021

고정형 3차원 라이다 센서를 이용한 모빌리티용 객체 인지 모델 개발

→ 주행 환경에서의 3차원 라이다 데이터셋 수집, 정제, 가공, 학습

(주)에스오에스랩 Feb. 2021 – Aug. 2021

실내 라이다 및 AR/VR 인공지능 학습용 데이터 구축 사업

→ 인공지능 데이터 구축 및 인공지능 모델 학습

한국지능정보사회진흥원 Sep. 2020 – Feb. 2021

스마트 팩토리의 공장자동화를 위한 Bolt Picking 로봇의 인지 소프트웨어 개발

→ 2D 라이다를 이용한 3차원 스캐닝 데이터로부터 볼트의 자세 및 위치 추정 알고리즘 개발

ZEUS Engineering Feb. 2020 – March. 2020

Side Projects

NaverLabs Visual Localization Challenge

→ Visual Localization의 baseline 알고리즘 구현/ 결과 정리하여 영상형태로 경험 공유

SLAM KR April 2020 – June 2020

Visual SLAM 책 번역

→ Visual SLAM 기술의 대중화/민주화에 대한 첫걸음으로 해외 원서 기술서적 번역

SLAM KR Oct. 2018 - Feb. 2019

Publications

Ph.D. Dissertation

"Local and Global Correspondence Establishing Techniques for Simultaneous Localization and Mapping" advised by Prof. Moongu Jeon, Gwangju Institute of Science and Technology, August 2019.

Master Thesis

"3D Object Reconstruction Using Multiple Kinect Cameras" advised by Prof. Yo-Sung Ho, Gwangju Institute of Science and Technology, February 2015.

International Journal

In total: 2 papers

- **Dong-Won Shin**, Yo-Sung Ho, and Eun-Soo Kim, "Loop Closure Detection in Simultaneous Localization and Mapping Using Descriptor from Generative Adversarial Network," Journal of Electronic Imaging, vol. 28, issue 1, Jan. 2019.
- **Dong-Won Shin** and Yo-Sung Ho, "3D Scene Reconstruction Using Colorimetric and Geometric Constraints on Iterative Closest Point Method," Multimedia Tools and Applications, vol. 77, issue 11, Aug. 2017.

Domestic Journal

In total: 5 papers

- **Dong-Won Shin**, Ji-Hun Mun, and Yo-Sung Ho, "3-Dimensional Calibration and Performance Evaluation Method for Pupil-labs Mobile Pupil Tracking Device", Smart Media Journal, vol. 7, no. 2, pp. 15-22, 2018
- **Dong-Won Shin** and Yo-Sung Ho, "Robust Semi-auto Calibration Method for Various Cameras and Illumination Changes," Journal of Broadcast Engineering, vol. 21, no.1, pp. 36-42, 2016.
- **Dong-Won Shin** and Yo-Sung Ho, "Implementation of 3D Object Reconstruction Using Multiple Kinect Cameras," Smart Media Journal, vol. 3, no. 4, pp. 22-27, 2015.
- **Dong-Won Shin** and Yo-Sung Ho, "Temporally-Consistent High-Resolution Depth Video Generation in Background Region," Journal of Broadcast Engineering, vol. 20, no. 3, pp. 414-420, 2015.
- **Dong-Won Shin** and Yo-Sung Ho, "Real-time Depth Map Refinement using Hierarchical Joint Bilateral Filter," Journal of Broadcast Engineering, vol. 19, no. 2, pp. 140-147, 2014.

International Conference

In total: 11 papers

- **Dong-Won Shin**, Jun-Yeong Park, Chan-Yeong Son, and Yo-Sung Ho, "Exploring Variants of Fully Convolutional Networks with Local and Global Contexts in Semantic Segmentation Problem," Electronic Imaging (EI), IRIACV-457, pp. 457.1-457.8, 2019, San Francisco, USA.
- **Dong-Won Shin** and Yo-Sung Ho, "Loop Closure Detection in Simultaneous Localization and Mapping Using Learning Based Local Patch Descriptor," Electronic Imaging (EI), AVM-284, pp. 1-4, 2018, San Francisco, USA.
- **Dong-Won Shin** and Yo-Sung Ho, "Local Patch Descriptor Using Deep Convolutional Generative Adversarial Network for Loop Closure Detection in SLAM," Asia-Pacific Signal and Information Processing Association (APSIPA), pp. 1-4, 2017, Kuala Lumpur, Malaysia.
- **Dong-Won Shin** and Yo-Sung Ho, "Multiple View Depth Generation Based on 3D Scene Reconstruction Using Heterogeneous Cameras," Electronic Imaging (EI), COIMG-444, pp. 179-184, 2017, San Francisco, USA.
- **Dong-Won Shin** and Yo-Sung Ho, "Iterative Closest Points Method based on Photometric Weight for 3D Object Reconstruction," Asia-Pacific Signal and Information Processing Association (APSIPA), pp. 145.1-145.4, 2016, Jeju, South Korea.
- **Dong-Won Shin** and Yo-Sung Ho, "Pattern Feature Detection for Camera Calibration Using Circular Sample," Pacific-

Rim Conference on Multimedia (PCM), Part II, LNCS 9315, pp. 608-615, 2015, Gwangju, South Korea.

- **Dong-Won Shin** and Yo-Sung Ho, "Color Correction Using 3D Multiview Geometry," Electronic Imaging (EI), pp. 9395-24 (1-8), 2015. San Francisco, USA.
- **Dongwon Shin** and Yo-Sung Ho, "Elimination of Background Flickering in Depth Video," International Workshop on Advanced Image Technology (IWAIT), pp. 73(1-4), 2015, Tainan, Taiwan. **(Best Paper Award)**
- **Dong-Won Shin** and Yo-Sung Ho, "Implementation of 3D Object Reconstruction Using a Pair of Kinect Cameras," Asia-Pacific Signal and Information Processing Association (APSIPA), pp. FA1-5.5(1-4), 2014, Siem Reap, Cambodia.
- **Dong-Won Shin**, Sang-Beom Lee, and Yo-Sung Ho, "Real-time Depth Image Refinement Using Hierarchical Joint Bilateral Filter," International Conference on Embedded Systems and Intelligent Technology (ICESIT), pp. 123-126, 2014, Gwangju, South Korea.
- **Dong-Won Shin**, Yun-Seok Song, and Yo-Sung Ho, "Joint Bilateral Filter for Warped Depth Data in Real-time," US-Korea Conference (UKC), EEC16, pp. 1-2, 2014, San Francisco, USA.

Domestic Conference

In total: 11 papers

- **신동원**, 최준호, 이규만, 김동원, 김일한, 김석환, "야지환경에 강인한 다중 주행 거리계 융합 기반 3차원 동시적 위치 추정 및 지도 작성," 제32회 영상처리 및 이해에 관한 워크샵, pp. 474-477, 2021.
- **Dong-Won Shin** and Yo-Sung Ho, "Evaluation Dataset Generation for Loop Closure Detection Experiment," Korean Institute of Smart Media, Fall Conference, pp. 79-82, 2017. **(Best Paper Award)**
- **Dong-Won Shin** and Yo-Sung Ho, "Loop Closure Detection Using Variational Autoencoder in Simultaneous Localization and Mapping," Korean Institute of Broadcast and Media Engineers, Summer Conference, pp. 250-253, 2017.
- **Dong-Won Shin** and Yo-Sung Ho, "Multiview Depth Image Generation Using Heterogeneous Cameras," 29th Workshop on Image Processing and Image Understanding (IPIU), pp. 474-477, 2017.
- **Dong-Won Shin** and Yo-Sung Ho, "3D Scene Reconstruction Using Robust Surface Normal Vector Acquisition Method," Korean Institute of Broadcast and Media Engineers, Fall Conference, pp. 4-5, 2016.
- **Dong-Won Shin** and Yo-Sung Ho, "SIFT Weighting Based Iterative Closest Points Method in 3D Object Reconstruction," Korean Institute of Broadcast and Media Engineers, Summer Conference, pp. 309-312, 2016.
- **Dong-Won Shin** and Yo-Sung Ho, "Semi-auto Calibration Method Using Circular Sample Pixel and Homography Estimation," Korean Institute of Broadcast and Media Engineers, Fall Conference, pp. 1-4, 2015.
- **Dong-Won Shin** and Yo-Sung Ho, "Elimination Method of Flickering Effect on Background Region of Depth Image," Institute of Electronics and Information Engineers, Fall Conference, pp. 407-410, 2014.
- **Dong-Won Shin** and Yo-Sung Ho, "Multi-view Camera Color Correction using 3D Geometric Information," Korean Signal Processing Conference, pp. K14-01(1-4), 2014.
- **Dong-Won Shin** and Yo-Sung Ho, " Implementation of 3D Reconstruction using a Pair of Kinect Cameras," Korean Institute of Broadcast and Media Engineers, Summer Conference, T2.2-2, pp. 1-4, 2014.
- **Dong-Won Shin** and Yo-Sung Ho, "Real-time Depth Image Refinement Using Joint Bilateral Filter," Korean Institute of Broadcast and Media Engineers, Fall Conference, pp. A3-2(3~6), 2013.

Patent

- **Dong-Won Shin** and Yo-Sung Ho, Method of Depth Image Generation, Patent Registration No. 10-2015-0120746, 2016 (KR)

Award

- Modu-Labs Embedded AI Hackathon 2018, 1st Prize Winner
- Korean Institute of Smart Media, Fall Conference 2017, Best Paper Award.
- International Workshop on Advanced Image Technology 2015, Best Paper Award.

Presentation

- 인공지능 학습용 라이다 데이터 라벨러 전문 교육, Oct. – Dec. 2021, 한국지능정보사회진흥원
- Visual SLAM Workshop, April, 2021, 대전정보문화산업진흥원, 대전
- RGBD SLAM Workshop, May, 2021, 대전정보문화산업진흥원, 대전
- ModuCon 2019, Dec. 2019, Seoul National University, Seoul
- Lidar Institute, Nov. 2019, Bloom Vista Hotel, Yang-Pyeong
- Deep Learning Summer School – Autonomous Vehicle Section, Aug. 2019, GIST, Gwangju
- Introduction to SLAM Technology and Future Direction, June 2019, KAIST ARRC Colloquium, Daejeon
- Science Language and Message in Daedeok, May 2019, Institute for Basic Science (IBS), Daejeon
- SLAM KR Offline Seminar, Apr. 2019, CNN the Biz, Seoul.
- ROS, SLAM Workshop, Apr. 2019, FastCampus, Seoul.
- LiDAR SLAM Seminar, Mar. 2019, Korea Electric Power Research Institute, Daejeon.
- Introductory Level of SLAM Seminar, Jan. 2019, Samsung R&D Campus, Seoul.
- SLAM Seminar, Oct. 2018, VIRNECT, Seoul.
- SLAM Workshop, Aug. 2018, FastCampus, Seoul.

Study Club

- 2021 SLAM Study Club (https://bit.ly/31RpZn6)
- 2020 SLAM DUNK (SLAM Research Review) (https://bit.ly/3dAOY0r)
- SLAM Night Live! (SNL) Season 2 (https://bit.ly/32xy3tu)
- 2019 Autonomous Driving Online Study (https://bit.ly/3pGtZiv)
- SLAM Night Live! (SNL) Season 1 (https://bit.ly/3ssSC50)
- 2019 SLAM Online Study (https://bit.ly/3GuTfz2)

Media

- 자율주행시대 '라이다'로 이끌다 '에스오에스랩' (https://youtu.be/IBVsK6U_IFk)
- [에스오에스랩] KES 2020 한국전자전(12/9~12, 코엑스) 참가! (https://youtu.be/_XdJR9tdJcI)