

Hae Min Cho

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RESEARCH INTEREST

Mobile Robotics SLAM, Autonomous Driving Vehicle, Deep Learning.

EDUCATION

Yonsei University (Advisor: Prof. Euntai Kim)

Ph.D in Department of Electrical & Electronic Engineering

GPA: 4.10/4.50

Seoul, Korea

March, 2015-Now

Yonsei University

Bachelor in Department of Electrical & Electronic Engineering

GPA: 4.32/4.50

Seoul, Korea

March, 2010-February, 2015

Sunrin Internet High School

Seoul, Korea

March, 2007-February, 2010

PUBLICATIONS

○ International Journal

HM Cho, HG Jo, E Kim, "SP-SLAM: Surfel-Point Simultaneous Localization and Mapping," *IEEE/ASME Transactions on Mechatronics*(**IF:5.303 in JCR2020**), Oct. 2021. (Early Access)

HG Jo, **HM Cho**, S Jo, E Kim, "Efficient grid-based rao-blackwellized particle filter slam with interparticle map sharing," *IEEE/ASME Transactions on Mechatronics*(**IF:5.303 in JCR2020**), vol. 23, no. 2, pp. 714-724, Apr. 2018.

○ Domestic Journal

HG Jo, **HM Cho**, E Kim, "A deep convolutional neural network based 6-dof relocalization with sensor fusion system," *The Journal of Korea Robotics Society*, vol. 14, no. 2, pp. 87-93, Jun. 2019.

○ Conference

HM Cho, S Lee, E Kim, "A Hybrid SLAM in Complicated Indoor Environments for Mobile Robot on Low-Cost Platform," *Proc. of the 18th International Conference on Ubiquitous Robots (UR 2021)*, Gangneung, Korea, July, 2021.

HM Cho, HG Jo, S Lee, E Kim, "Odometry estimation via cnn using sparse lidar data," *Proc. of the 16th International Conference on Ubiquitous Robots (UR 2019)*, Jeju, Korea, June, 2019, pp. 124-127.

S Lee, HG Jo, **HM Cho**, E Kim, HG Jo, E Kim, "Visual Loop Closure Detection over Illumination Change," *Proc. of the 16th International Conference on Ubiquitous Robots (UR 2019)*, Jeju, Korea, June, 2019, pp. 77-80.

HG Jo, **HM Cho**, S Lee, E Kim, "Large Scale Representation of Volumetric Fusion using ICP," *Proc. of the 18th International Conference on Control, Automation and Systems (ICCAS 2018)*, Gangwon, Korea, October, 2018.

S Lee, HG Jo, **HM Cho**, E Kim, "Robust Visual Loop Closure Detection with Repetitive Features," *Proc. of the 15th International Conference on Ubiquitous Robots (UR 2018)*, Hawaii, United States, June, 2018, pp. 891-895.

HG Jo, **HM Cho**, S Lee, E Kim, "Robust 6-DOF Localization Using Sensor Fusion System in Indoor-Outdoor Environments," *Proc. of the 15th International Conference on Ubiquitous Robots (UR 2018)*, Hawaii, United States, June, 2018.

S Lee, HG Jo, **HM Cho**, E Kim, "Empty Area Search on Occupancy Grid Map for Mobile Robot Navigation," *Proc. of the 18th International Symposium on Advanced Intelligent Systems (ISIS 2017)*, Daegu, Korea, October, 2017.

HG Jo, **HM Cho**, S Lee, E Kim, "Multi-resolution point cloud generation based on heterogeneous sensor fusion system," *Proc. of the 2017 14th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI 2017)*, Jeju, Korea, June, 2017.

HG Jo, S Jo, **HM Cho**, E Kim, "Efficient 3D mapping with RGB-D camera based on distance dependent update," *Proc. of the 2016 16th International Conference on Control, Automation and Systems (ICCAS 2016)*, Gyeongju, Korea, October, 2016.

HM Cho, S Jo, HG Jo, E Kim, "A Simple Extrinsic Calibration Method of Color and Depth Camera," *Proc. of 2015 International Conference on Fuzzy Theory and Its Applications (iFuzzy2015)*, Yilan, Taiwan, November, 2015.

S Jo, HG Jo, **HM Cho**, E Kim, "Pose estimation and 3D environment reconstruction using less reliable depth data," *Proc. of The 2015 IEEE/ASME International Conference on Advanced Intelligent Mechatronic (AIM 2015)*, Busan, Korea, July, 2015.

Patents

E Kim, **HM Cho**, "Method and apparatus for estimating location of a moving object and generating map using fusion of point feature and surfel feature,"
Korea - Application No. 10-2021-0111212

E Kim, HG Jo, **HM Cho**, S Lee, "Apparatus for Building Grid Map and Method there of," Korea - Application No. 10-2017-0171099
Korea - Registration No. 10-2095842

E Kim, HG Jo, **HM Cho**, H. Jo, "Method and Apparatus for Estimating Location of a Moving Object and Generating Maps Sharing a Map between Particles,"
Korea - Application No. 10-2016-0161159
Korea - Registration No. 10-1965296

E Kim, **HM Cho**, H. Jo, HG Jo, "Method and apparatus for producing three-dimensional image,"
Korea - Application No. 10-2016-0060975
Korea - Registration No. 10-1748674

PROJECTS

Development of Hydraulic Robot Control Technology based on Accurate and Fast Force Control for Complex Task

Funded by Ministry of Trade, Industry and Energy

2013 - 2018

- Dense 3D Mapping of Using RGB-D Sensor
- Map update by reflecting moving objects in dynamic environments

Development of Robot Intelligence Technology for Mobility with Learning Capability Toward Robust and Seamless Indoor and Outdoor Autonomous Navigation

Funded by Ministry of Trade, Industry and Energy

2016 - 2020

- Moving object detection using deep neural network
- Map change detection using data search

Development of Robot Autonomous Driving Technology using Laser Scanner

Funded by Hitachi-LG Data Storage

2016 - 2017

- Joint SLAM of grid map and features using a low-resolution laser scanner
- Data saving by updating map size according to robot trajectory

13th Hyundai Motor Group Future Motor Technology Autonomous Vehicle Competition–Developed an System of Autonomous Vehicle

Funded by Hyundai Motor Group

2016

- Sensor data acquisition & fusion
- Test cite mapping using complex sensors
- Recognition of surrounding environment and location of vehicle

Development of Depth Map Generation using Continuous Stereo Images

Funded by Hyundai MNSoft

2019

- Visual odometry estimation
- Estimate 3D position of feature points using a monocular camera

Development of Forward-downward SLAM Algorithm using ToF Depth Sensor

Funded by LG Electronics

2020 - 2021

- Odometry estimation of mobile robot based on row resolution ToF sensor data

The Development of Robot-centric 3D SLAM based on RGB-D camera

Funded by Hyundai Motor Group

2020 - 2021

- Odometry estimation using multiple RGB-D sensors
- Dense 3D mapping of a large-scale environments

KEY SKILLS

Programming Skills

Python, C, C++, ROS

Language

Korean, English

CERTIFICATES

정보처리기사

Engineer Information Processing

Human Resources Development Service of Korea