Sanghoon **Lee**

ELECTRONICS ENGINEER · HARDWARE

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Education

Kyungpook National University *Daegu, S.Korea*
PH.D. IN ELECTRONICS ENGINEERING *Mar. 2011 – Aug. 2021*
- Thesis : Efficient Power Control Using Variable Resolution Algorithm for LiDAR Sensor-based Autonomous Vehicle

Kyungpook National University *Daegu, S.Korea*
M.S. IN ELECTRONICS ENGINEERING *Mar. 2009 – Feb. 2011*
- Thesis : Design of the Hybrid 4-bits A/D Converter

Dong-A University *Busan, S.Korea*
B.S. IN ELECTRONICS ENGINEERING *Mar. 2005 – Feb. 2009*

Job Carrier

Kyungpook National University(KNU) *Daegu, S.Korea*
PROFESSOR FOR INDUSTRY COLLABORATION PURPOSE *Mar. 2022 – Present*
- Industrty-University Collaboration Purpose
- Hardware design / verification of circuit & system
- Coding & design for FPGA

CARNAVICOM Co., Ltd. *Incheon, S.Korea*
HARDWARE ENGINEER (SENIOR RESEARCHER) *Jun. 2018 – Feb. 2022*
- System architecture design of LiDAR sensor
- Hardware design / verification of LiDAR sensor
- Software design for efficient power control of LiDAR sensor
- System architecture design of domain control unit (DCU)
- Hardware design and verification of domain control unit (DCU)

Gyeongbuk Institute of IT Convergence Industry Technology *Gyeongsan, S.Korea*
HARDWARE ENGINEER (RESEARCHER) *Nov. 2015 – May. 2018*
- Hardware design of circuit & system
- Application test of LiDAR sensor

Skills

Design	PCB & Artwork, ASIC Simulation & Design
Programming	C/C++, LaTeX, Verilog
Languages	Korean, English

Extracurricular Activity

ASIC (Application Specific Integrated Circuit) Lab. *S.Korea*
MEMBER *Mar. 2009 - Feb. 2023*
- Analog Circuit & A/D Converter design
- Write several paper about A/D Converter

AI-SoC (AI-Embedded System-Software-on-Chip Platform) Lab. *S.Korea*
MEMBER *Jun. 2019 - PRESENT*
- LiDAR sensor in Hardware design & Algorithm
- Write several paper about LiDAR sensor

Publications

International Journal Paper

Accuracy-Power Controllable LiDAR Sensor System with 3D Object Recognition for Autonomous Vehicle

Sensors

S. H. Lee, D. K. Lee, P. Choi, and D. J. Park

Oct. 2020

- SCI(E), Q1

Domestic Journal Paper (KCI)

Run-time Current/Voltage-level Pattern Monitoring and Comparison System for Detecting Malfunctions by Embedded System Software Errors

Journal of the Korea Institute of Information and Communication Engineering (JKIICE)

S. H. Lee, and D. J. Park

Sep. 2023

Dynamic Object Detection Architecture for LiDAR Embedded Processors

Journal of Platform Technology (JPT)

M. W. Jung, S. H. Lee, and D. Y. Kim

Dec. 2021

Efficient Power Reduction Technique of LiDAR Sensor for Controlling Detection Accuracy Based on Vehicle Speed

IEMEK Journal of Embedded Systems and Applications

S. H. Lee, M. W. Jung, D. K. Lee, P. Choi, and D. J. Park

Oct. 2020

Preliminary study of Angle sensor module for Vehicle Steering System Based on Multi-track Encoder

Journal of Sensor Science and Technology (JSST)

S. T. Woo, C. S. Han, J. B. Baek, S. H. Lee, M. W. Jung, S. J. Choo, J. R. Park, J. H. Yoo, S. H. Jung, and J. Y. Kim

Nov. 2017

Algorithm of Modified Single-slope A/D Converter with Improved Conversion Time for CMOS Image Sensor System

Journal of Sensor Science and Technology (JSST)

S. H. Lee, J. T. Kim, J. K. Shin, and P. Choi

Nov. 2015

Design of 8-bit Single Slope ADC for Signal Processing of Multiple Image Sensors

Journal of Sensor Science and Technology (JSST)

J. C. Lee, S. H Lee, J. T. Kim, J. R. Park, J. K. Shin, and P. Choi

Oct. 2015

Presentation

International Conference

ISOCC2021 (18th International SoC Design Conference)

Jeju Island, S.Korea

Poster Presentation

Oct. 2021

- Efficient Power Control Using Variable Resolution Algorithm for LiDAR Sensor-based Autonomous Vehicle

TENSYMP2021 (2021 IEEE Region 10 Symposium)

Jeju Island, S.Korea

Oral Presentation

Aug. 2021

- Accelerated Signal Processing of Burst-Mode Streamline Data for Low-Power Embedded Multi-Channel LiDAR Systems

GCCE2020 (2020 IEEE 9th Gloval Conference on Consumer Electronics)

Kobe, Japan

Oral Presentation

Oct. 2020

- Frequency Shift Keying and Error Correction Technique for Robust Electrostatic Coupling Intra-Body Communication

BIC2020 (The International Conference on Big data, IoT, and Cloud Computing)

Jeju Island, S.Korea

Oral Presentation

Aug. 2020

- Accuracy-Power Controllable LiDAR Sensor for Autonomous Vehicles using an Algorithm of Variable Resolution

AWAD2015 (2015 Asia-Pacific Workshop on Fundamentals and Applications of Advanced Semiconductor Devices)
ORAL PRESENTATION
Jeju Island, S.Korea

Jun. 2015
- Modified Single-slope A/D Converter with Improving Conversion Time for CIS System

ICEIC2015 (The 14th International Conference on Electronics, Information, and Communication)
POSTER PRESENTATION
Singapore

Jan. 2015
- Clock-Less 8-bit Pipeline-Like Novel A/D Converter

APCOT2014 (The 7th Asia-Pacific Conference on Transducers and Micro/Nano Technologies)
POSTER PRESENTATION
Daegu, S.Korea

Jul. 2014
- MODIFIED SINGLE-SLOPE A/D CONVERTER WITH IMPROVING CONVERSION TIME FOR CIS SYSTEM

DOMESTIC CONFERENCE

2023 IEMEK FALL CONFERENCE
POSTER PRESENTATION
Jeju, S.Korea

Nov. 2023
- Real-time Current-level Monitoring and Data Comparison System for Detecting Malfunctions in Embedded Systems

2017 IEIE FALL CONFERENCE
POSTER PRESENTATION
Incheon, S.Korea

Nov. 2017
- Object Perception Algorithm based on LiDAR for Autonomous Vehicle

ISET2017 (2017 IEMEK Symposium on Embedded Technology)
POSTER PRESENTATION
Busan, S.Korea

May. 2017
- Design of InGaAs quantum well laser diode for LiDAR application

ISET2017 (2017 IEMEK Symposium on Embedded Technology)
POSTER PRESENTATION
Busan, S.Korea

May. 2017
- Automatic Recognition System for Weld Bead Detection

ISET2016 (2016 IEMEK Symposium on Embedded Technology)
POSTER PRESENTATION
Daejeon, S.Korea

May. 2016
- Algorithm of Clock-less 8-bit Pipeline-like Novel A/D Converter for Bead Detection Image Sensor
- Best Paper AWARD

ISOCCC2014 (2014 IDEC SoC Congress Chip Design Contest)
POSTER PRESENTATION
Jeju Island, S.Korea

Nov. 2014
- Design of Clock-Less 8-bit Pipeline A/D Converter

2014 IEEK Summer Conference
ORAL PRESENTATION
Jeju Island, S.Korea

Jun. 2014
- Development of Ultraviolet Signal Processing Circuit System for Ultraviolet Image

2011 IEEK Fall Conference
POSTER PRESENTATION
Daejeon, S.Korea

Nov. 2011
- Design of the Hybrid 8-bits A/D Converter

Honors & Awards

DOMESTIC

2015   **Best Paper AWARD**, ISET2016 (2016 IEMEK Symposium on Embedded Technology)   *Daejeon, S.Korea*

National Project

Software Disaster Research Center
Ministry of Science and ICT (MSIT) and National Research Foundation of Korea (NRF), S.Korea

ROLE: R&D MANAGEMENT (KNU)
Mar. 2022 – Present

High-Resolution 3D Solid-Stat Lidar Development

Role: Signal processing module design (CARNAVICOM)

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Apr. 2021 – Feb. 2022

(Part2) Electric truck bus vehicle application technology and operation environment development using flexible rolling chassis

Role: Development of sensors for electric truck (CARNAVICOM)

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

May. 2020 – Feb. 2022

Development of automatic steering-based accident avoidance system for electric-driven port yard tractors operating at low speed (less than 30 km/h)

Role: Development of system (CARNAVICOM)

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Apr. 2020 – Feb. 2022

Development of Selfdriving Parts and Vehicle Mounting Technology for Large Bus

Role: Circuit design of LiDAR Sensor (CARNAVICOM)

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Jun. 2019 – Dec.2021

Development of low price 3D LiDAR for measurement of service robots in indoor and outdoor environment

Role: Circuit design of LiDAR Sensor (CARNAVICOM)

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Apr. 2019 – Dec.2021

Open Platform Development for Remote Management on Embedded Software

Role: Embedded software test (CARNAVICOM)

Ministry of Education (MOE) and National Research Foundation of Korea (NRF), S.Korea

Jun. 2018 – Aug. 2021

The Development of low-cost LiDAR Sensor including Laser Diode and Semiconductor for Autonomous Car

Role: Test/verification (GITC) and Circuit design of LiDAR Sensor (CARNAVICOM)

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

May. 2017 – Dec. 2020

Development of paper document management system with smart cabinet based on IoT technology

Role: Circuit & module design for IoT (GITC)

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Mar. 2017 – May. 2018

Development of negative-ion air purification device for vehicles with indoor pollution detection function

Role: Circuit design for sensor (GITC)

Ministry of SMEs and Startups(MSS), S.Korea

Jun. 2016 – May. 2018

System development of automated sensing of hazardous objects for construction safety and precise location tracking of workers

Role: Circuit design for sensor (GITC)

Ministry of Land, Infrastructure and Transport (MOLTI), S.Korea

Apr. 2016 – Dec. 2017

The Development of the 8-channel 15f/s grade scanning LiDAR Sensor for autonomous car

Role: Verification of LiDAR sensor (GITC)

Ministry of Trade, Industry & Energy (MOTIE), S.Korea

Aug. 2015 – Jul. 2017

Development of Intelligence Fusion Visual Sensor Module

Role: Circuit design for image, UV and IR sensor (KNU)

Ministry of Education and Science Technology (MEST), S.Korea

Mar. 2012 – Feb. 2015

MEMS Research Center for National Defense

Role: Circuit design for sensor (KNU)

Agency for Defense Development (ADD), S.Korea

Mar. 2009 – Dec. 2012

Patents

INTERNATIONAL PATENTS

Oct. 2022	**US20220317265A1,** LiDAR system for reducing power consumption and method of driving the same	*United State of America, USA*
Dec. 2020	**PCT/KR2020/018248,** LiDAR system for reducing power consumption and method of driving the same	*S.Korea, KIPO*
Dec. 2020	**PCT/KR2020/018249,** Autonomous unmanned aerial vehicle and control method in the same	*S.Korea, KIPO*

DOMESTIC PATENTS

Nov. 2021	**10-2021-0163010,** Vision-based real-time vehicle detection and tracking algorithm for forward collision warning	*S.Korea*
Nov. 2021	**10-2021-0163009,** Semantic depth data transmission reduction techniques using frame-to-frame masking method for light-weighted LiDAR signal processing platform	*S.Korea*
Jan. 2021	**10-2210-6010000,** LiDAR system for reducing power consumption and method of driving the same, registered	*S.Korea*
Dec. 2020	**10-2191-1090000,** Autonomous unmanned aerial vehicle and control method in the same, registered	*S.Korea*
Dec. 2019	**10-2019-0175337,** Operation server for searching code block using hot spot extraction and operation platform system including the same	*S.Korea*
Nov. 2017	**10-2017-0152535,** Platform system for employment of IoT device, registered	*S.Korea*
May. 2016	**10-2016-0058685,** Weld bead detecting method based on image	*S.Korea*