

# SeungHyeok Back

PH.D CANDIDATE · ROBOTICIST

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## Education

### GIST(Gwangju Institute of Science and Technology)

B.S. IN MECHANICAL ENGINEERING

Connective Minor in History-Sociology, Korean Government Support Program

Gwang-ju, Republic of Korea

Mar. 2014 - Feb. 2018

### GIST(Gwangju Institute of Science and Technology)

PH.D COURSE IN SCHOOL OF INTEGRATED TECHNOLOGY (ROBOTICS PROGRAM)

Korean Government Support Program

Gwang-ju, Republic of Korea

Mar. 2018 - PRESENT

## Awards & Honors

2022	<b>Bronze Prize, 28th Samsung Humantech Paper</b> (Top 5% (117/2105))	\$5,000
2021	<b>Outstanding Paper Award</b> , 2021 ICROS-KROC Honam Joint Conference	
2021	<b>Outstanding Paper Award</b> , The 16th Korea Robotics Society Annual Conference	
2021	<b>Outstanding Paper Award</b> , The 36th ICROS Annual Conference, Undergrad. Sec. (co-author)	
2020	<b>4th Place, DREAM AI Healthcare Hackathon</b> , GIST-NVIDIA	\$2,500
2020	<b>National R&amp;D Real Challenge Program</b> , Korea Institute of Human Resources Development (KIRD)	\$3,000
2017	<b>President's Award</b> , GIST Innovative Convergence Technology Contest (Track 1)	
2017	<b>Dean's Award</b> , GIST Innovative Convergence Technology Contest (Track 2)	

## Skills

<b>Programming</b>	Python (Pytorch, ROS), C/C++, LaTeX
<b>Robot</b>	Robot System Integration with ROS (Vision-based Grasping, Manipulation), Sim2Real Transfer (CoppeliaSim, Blender)
<b>Languages</b>	Korean, English

## Experience (Research & Development)

### Shared autonomy based on deep reinforcement learning for responding intelligently to unstructured environments such as robotic assembly tasks

SOFT DEVELOPMENT LEADER

Ministry of Trade, Industry and Energy

Mar. 2020 - PRESENT

### Development of artificial intelligence-based ejector-pin location prediction

CORE MEMBER

Samsung Electronics Co., Ltd.

Apr. 2019 - Mar. 2020

### Development of AI technology for robotic assembly planning by understanding assembly instruction via Sim2Real Transfer

PROJECT LEADER

Samsung Electronics Co., Ltd.

Mar. 2022 - Dec. 2022

### Sim-to-real Transfer of deep reinforcement learning for visuomotor robot control

PROJECT LEADER

GIST Institute for Artificial Intelligence

Jan. 2019 - Dec. 2019

### Artificial intelligence-based object detection of 2D drawing in mold

CORE MEMBER

Samsung Electronics Co., Ltd.

Mar. 2019 - Dec. 2019

## Deep learning based sound event detection in the game environments for the haptic feedback generation

MEMBER

*Dongwoon Anatech Co., Ltd.*

*Mar. 2019 - Aug. 2019*

## Development of an AI algorithm for sleep analysis and diagnosis of sleep apnea syndromes.

CORE MEMBER

*GIST*

*Mar. 2018 - Dec. 2019*

## Development of assistive technology in elderly care

MEMBER

*GIST*

*Jan. 2018 - Aug. 2019*

## Publications (SCI & Top Conference)

### Unseen object amodal instance segmentation via hierarchical occlusion modeling

*ICRA*

2022 IEEE INTERNATIONAL CONFERENCE ON ROBOTICS AND AUTOMATION (ICRA), ACCEPTANCE RATE 43.1%,  
1428/3313

*To be published, 2022*

**Seunghyeok Back**, Joosoon Lee, Taewon Kim, Sangjun Noh, Raeyoung Kang, Seongho Bak, Kyoobin Lee

\* Bronze Prize, 28th Samsung Humantech Paper (Top 5% paper)

\* Outstanding Paper Award, 2021 ICROS-KROC Honam Joint Conference

### Intra- and inter-epoch temporal context network (IITNet) using sub-epoch features for automatic sleep scoring on raw single-channel EEG

*SCIE*

BIOMEDICAL SIGNAL PROCESSING AND CONTROL, SCIE, IF=3.880 (2020), CITED MORE THAN 30 TIMES

*Aug. 2020*

Hogoon Seo\*, **Seunghyeok Back**\*, Seongju Lee\*, Deokhwan Park, Tae Kim, Kyoobin Lee

### Robust Skin Disease Classification by Distilling Deep Neural Network Ensemble for the Mobile Diagnosis of Herpes Zoster

*SCIE*

IEEE ACCESS, SCIE, IF=3.367 (2020)

*Jan. 2021*

**Seunghyeok Back**\*, Seongju Lee\*, Sungho Shin, Yeonguk Yu, Taekyeong Yuk, Saepomi Jong, Seungjun Ryu, Kyoobin Lee

### Pilot study of a single-channel EEG seizure detection algorithm using machine learning

*SCIE*

CHILDS NERVOUS SYSTEM

*May. 2021*

Seungjun Ryu, **Seunghyeok Back**, Seongju Lee, Hyeon Seo, Chanki Park, Kyoobin Lee, Dong-Seok Kim

### Segmenting unseen industrial components in a heavy clutter using rgb-d fusion and synthetic data

*ICIP*

2020 IEEE INTERNATIONAL CONFERENCE ON IMAGE PROCESSING (ICIP), ACCEPTANCE RATE 41.7%, 705/1689

*Sep. 2020*

**Seunghyeok Back**, Jongwon Kim, Raeyoung Kang, Seungjun Choi, Kyoobin Lee

## Publications (Others)

### Fusing RGB and depth with Self-attention for Unseen Object Segmentation

*International Conference*

2021 21ST INTERNATIONAL CONFERENCE ON CONTROL, AUTOMATION AND SYSTEMS (ICCAS)

*Dec. 2021*

Joosoon Lee\*, **Seunghyeok Back**\*, Taewon Kim, Sungho Shin, Sangjun Noh, Raeyoung Kang, Jongwon Kim, Kyoobin Lee

### Automatic Detection of Injection and Press Mold Parts on 2D Drawing Using Deep Neural Network

*International Conference*

2021 21ST INTERNATIONAL CONFERENCE ON CONTROL, AUTOMATION AND SYSTEMS (ICCAS)

*Dec. 2021*

Junseok Lee, Jongwon Kim, Jumi Park, **Seunghyeok Back**, Seongho Bak, Kyoobin Lee

### AI for furniture assembly - robotic assembly planning from assembly instruction

*Korean Journal*

ROBOT AND HUMAN (KOREA ROBOTICS SOCIETY)

*Jan. 2021*

**Seunghyeok Back**, Sungho Shin, Raeyoung Kang, Seongju Lee, Joosoon Lee, Taekyeong Yuk, Changhyeon Jeon, Jongwon Kim, Yeonguk Yu, Sungho Bak, Junho Yun, Junseok Lee, Kyoobin Lee

## Automatic Detection and Identification of Fasteners with Simple Visual Calibration using Synthetic Data

2020 25TH IEEE INTERNATIONAL CONFERENCE ON EMERGING TECHNOLOGIES AND FACTORY AUTOMATION (ETFA)

Junseok Lee, Jongwon Kim, Jumi Park, **Seunghyeok Back**, Seongho Bak, Kyoobin Lee

*International Conference*

Oct. 2020

## Research trend of robotic assembly planning from assembly instruction

THE JOURNAL OF THE KOREAN INSTITUTE OF COMMUNICATION SCIENCES

**Seunghyeok Back**, Kyoobin Lee

*Korean Journal*

Dec. 2019

## Patent

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### Components fabrication scheduling apparatus

KR 2021-0072886

Kyoobin Lee, **Seunghyeok Back**, Sungho Shin, Joosoon Lee, Seongju Lee, Raeyoung Kang, Taekyeong Yuk, Seongho Bak

*Application*

2021

### Apparatus and method identifying the size of the target object

KR 2020-0119669

Kyoobin Lee, **Seunghyeok Back**, Sungho Shin, Sangjun Noh, Raeyoung Kang,

*Application*

2020

### Method for optimizing sleep

KR 10-2133314 (TRANSFERRED TO REDWIT)

Hogeon Seo, Kyoobin Lee, **Seunghyeok Back**, Munsang Kim, Tae Kim

*Registration*

2020

## Work Experiences

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### Teaching Assistant

DEEP LEARNING (RT5101-01, SPRING)

*GIST*

Mar. 2020 - June. 2020

### Teaching Assistant

DEEP LEARNING (RT5101-01, SPRING)

*GIST*

Mar. 2019 - June. 2019

### Intern

ARTIFICIAL INTELLIGENCE LABORATORY (PROF. KYOOBIN LEE)

*GIST*

Nov. 2017 - Feb. 2018

### Intern

HEALTHCARE ROBOTICS LABORATORY (PROF. MUNSANG KIM)

*GIST*

July. 2017 - Aug. 2017

### Intern

DISTRIBUTED CONTROL AND AUTONOMOUS SYSTEMS LABORATORY (PROF. HYOSUNG AHN)

*GIST*

July. 2016 - Aug. 2016

### First Editor

GIST NEWS (OFFICIAL PRESS IN GIST)

*GIST*

Feb. 2016 - Aug. 2016

### First Editor

GISCATCH (INDEPENDENT PRESS IN GIST)

*GIST*

Feb. 2015 - Jan. 2016