

SEUNGYEON KIM

Seoul, South Korea

ksy@robotics.snu.ac.kr

<https://seungyeon-k.github.io>

RESEARCH INTERESTS

- Vision-based prehensile and non-prehensile robotic object manipulation
- 3D object shape recognition from partially observed vision sensor data
- Group equivariant neural network models

EDUCATION

Seoul National University

Sep 2019 - Feb 2024

Ph. D. in Mechanical Engineering

GPA: 4.15 / 4.3

Advisor: Frank C. Park

Thesis: Learning for Vision-Based Object Manipulation: A Shape Recognition-Based Approach

Honors: *Outstanding Doctoral Dissertation Award*

Seoul National University

Mar 2017 - Feb 2019

M. S. in Mechanical Engineering

GPA: 4.22 / 4.3

Advisor: Frank C. Park / work closely with Sang-Hoon Yeo

Thesis: On the Encoding Capacity of Human Motor Adaptation

Seoul National University

Mar 2013 - Feb 2017

B.S. in Mechanical Engineering, Minor in Economics

GPA: 3.91 / 4.3 (Major 4.02 / 4.3)

Honors: *Summa Cum Laude*

Gyeonggibuk Science High School

Mar 2011 - Feb 2013

One-year early graduation

EXPERIENCE

Robotics Laboratory, Seoul National University

May 2024 - Present

BK21 Postdoctoral Research Fellow

Institute of Advanced Machines and Design (IAMD)

Sep 2021 - Apr 2024

Researcher in Intelligent Machine System Research Department

Institute of Advanced Machines and Design (IAMD)

Apr 2019 - Aug 2019

Assistant Researcher in Intelligent Machine System Research Department

PUBLICATIONS

[C5] T²SQNet: A Recognition Model for Manipulating Partially Observed Transparent Tableware Objects

Young Hun Kim*, **Seungyeon Kim***, Yonghyeon Lee, Frank C. Park

Conference on Robot Learning (CoRL), 2024

[C4] Leveraging 3D Reconstruction for Mechanical Search on Cluttered Shelves

Seungyeon Kim*, Young Hun Kim*, Yonghyeon Lee, Frank C. Park

Conference on Robot Learning (CoRL), 2023

[C3] Equivariant Motion Manifold Primitives

Byeongho Lee*, Yonghyeon Lee*, **Seungyeon Kim**, MinJun Son, Frank C. Park

Conference on Robot Learning (CoRL), 2023

- [C2] SE(2)-Equivariant Pushing Dynamics Models for Tabletop Object Manipulations
Seungyeon Kim, Byeongdo Lim, Yonghyeon Lee, Frank C. Park
 Conference on Robot Learning (CoRL), **Oral presentation (33/504 = 6.5 %)**, 2022
- [J2] DSQNet: A Deformable Model-Based Supervised Learning Algorithm for Grasping Unknown Occluded Objects
Seungyeon Kim*, Taegyun Ahn*, Yonghyeon Lee, Jihwan Kim, Michael Y. Wang, Frank C. Park
 IEEE Transactions on Automation Science and Engineering (T-ASE), 2022
- [C1] A Statistical Manifold Framework for Point Cloud Data
 Yonghyeon Lee*, **Seungyeon Kim***, Jinwon Choi, Frank C. Park
 International Conference on Machine Learning (ICML), 2022
- [J1] On the Encoding Capacity of Human Motor Adaptation
Seungyeon Kim, Jaewoon Kwon, Jin-Min Kim, Frank C. Park, Sang-Hoon Yeo
 Journal of Neurophysiology (JNP), 2021

PROJECTS

- | | |
|---|---------------------------------|
| Object Grasping and Manipulation Skills for Stable Housekeeping Service | <i>Sep 2021 - Oct 2022</i> |
| <i>Project Leader</i> | <i>with Samsung Research</i> |
| <ul style="list-style-type: none"> • Develop prehensile and non-prehensile manipulation skills for handling various tableware objects on the table, as part of household tasks [C2]. | |
| Deep Learning-based Lane Detection Algorithm from LiDAR data | <i>Apr 2021 - Oct 2021</i> |
| <i>Project Leader</i> | <i>with Seoul Robotics</i> |
| <ul style="list-style-type: none"> • Develop a deep neural network architecture that recognizes 3D lane information from LiDAR data. | |
| Artificial Intelligence-based Automated Painting Robot System | <i>Oct 2020 - Sep 2021</i> |
| <i>Project Member</i> | <i>with Doolim-Yaskawa</i> |
| <ul style="list-style-type: none"> • Develop an artificial intelligence-based smart painting robot automation system for automobile factories, primarily responsible for visualizing painting results. | |
| Babymind: Infant-Mimic Neurocognitive Developmental Machine Learning | <i>Apr 2019 - Dec 2020</i> |
| <i>Project Leader</i> | <i>with SNU-AIIS</i> |
| <ul style="list-style-type: none"> • Build infant-mimicking neurocognitive AI technologies for robot manipulation in real-world environments. Conduct research on human motion primitives [J1] and baby-inspired grasping skills [J2]. | |
| Deep Reinforcement Learning Algorithm for Industrial Robot | <i>Apr 2018 - Dec 2018</i> |
| <i>Project Leader</i> | <i>with Samsung Electronics</i> |
| <ul style="list-style-type: none"> • Develop a safe and efficient reinforcement learning algorithm for high-gain position controller-based industrial robots. | |

TEACHING EXPERIENCE

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| Geometric Methods for High-Dimensional Data Analysis (M3239.006800) | <i>Fall 2022</i> |
| Teaching Assistant in Seoul National University | |
| Dynamics (446.204A) | <i>Fall 2018</i> |
| Teaching Assistant in Seoul National University | |
| Introduction to Robotics (M2794.0027) | <i>Spring 2017</i> |
| Teaching Assistant in Seoul National University | |
| Basic Calculus 1 (033.016) | <i>Spring 2015</i> |
| Undergraduate Student Instructor in Seoul National University | |
| Basic Calculus 2 (033.017) | <i>Fall 2014</i> |
| Undergraduate Student Instructor in Seoul National University | |