SEUNGYEON KIM

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https://seungyeon-k.github.io

RESEARCH INTERESTS

- Prehensile and non-prehensile robotic object manipulation
- 3D object recognition from 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

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

Institute of Advanced Machines and Design (IAMD) *Sep 2021 - Present*
Student 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

[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 *Sep 2021 - Oct 2022*
Project Leader *with Samsung Research*
- 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 *Apr 2021 - Oct 2021*
Project Leader *with Seoul Robotics*
- Develop a deep neural network architecture that recognizes 3D lane information from LiDAR data.

Artificial Intelligence-based Automated Painting Robot System *Oct 2020 - Sep 2021*
Project Member *with Doolim-Yaskawa*
- 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 *Apr 2019 - Dec 2020*
Project Leader *with SNU-AIIS*
- 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 *Apr 2018 - Dec 2018*
Project Leader *with Samsung Electronics*
- Develop a safe and efficient reinforcement learning algorithm for high-gain position controller-based industrial robots.

TEACHING EXPERIENCE

Geometric Methods for High-Dimensional Data Analysis *(M3239.006800)* *Fall 2022*
Teaching Assistant in Seoul National University

Dynamics *(446.204A)* *Fall 2018*
Teaching Assistant in Seoul National University

Introduction to Robotics *(M2794.0027)* *Spring 2017*
Teaching Assistant in Seoul National University

Basic Calculus 1 *(033.016)* *Spring 2015*
Undergraduate Student Instructor in Seoul National University

Basic Calculus 2 *(033.017)* *Fall 2014*
Undergraduate Student Instructor in Seoul National University

SKILLS

Programming Languages	Python, MATLAB (advanced), C, C++ (intermediate)
Software & Tools	Open3D, PyTorch, LaTeX (advanced), ROS, Blender (intermediate)