JIHWAN KIM

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RESEARCH INTERESTS

- Motion planning for robot arm manipulation
- Collision distance estimation and collision avoidance of the robot systems
- Representation learning, active learning, and robot learning

EDUCATION

Seoul National University *Mar 2019 - Feb 2025*
Ph. D. in Mechanical Engineering *GPA: 4.01 / 4.3*
Advisor: Frank C. Park
Thesis: Collision Distance Estimation for High-dof Robot Systems: A Learning-Based Approach
Honors: *Outstanding Doctoral Dissertation Award*

Seoul National University *Mar 2015 - Feb 2019*
B.S. in Mechanical Engineering *GPA: 3.8 / 4.3 (Major 3.87 / 4.3)*
Honors: *Cum Laude*

PUBLICATIONS

[C3] EquiGraspFlow: SE(3)-Equivariant 6-dof Grasp Pose Generative Flows
Byeongdo Lim*, Jongmin Kim*, **Jihwan Kim**, Yonghyeon Lee, Frank C. Park (*: equal contribution)
Conference on Robot Learning (CoRL), 2024

[C2] Graph Geometry-Preserving Autoencoders
Jungbin Lim*, **Jihwan Kim***, Yonghyeon Lee, Cheongjae Jang, Frank C. Park (*: equal contribution)
International Conference on Machine Learning (ICML), 2024

[W1] Leveraging Equivariant Representations of 3D Point Clouds for SO(3)-Equivariant 6-DoF Grasp Pose Generation
Byeongdo Lim*, Jongmin Kim*, **Jihwan Kim**, Yonghyeon Lee, Frank C. Park
ICRA 2024 Workshop on 3D Visual Representations for Robot Manipulation

[J3] Active learning of the collision distance function for high-DOF multi-arm robot systems
Jihwan Kim, Frank C. Park
Robotica, 2024

[C1] PairwiseNet: Pairwise Collision Distance Learning for High-dof Robot Systems
Jihwan Kim, Frank C. Park
Conference on Robot Learning (CoRL), 2023

[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 (*: equal contribution)
IEEE Transactions on Automation Science and Engineering (T-ASE), 2022

[J1] Learning-Based Real-Time Detection of Robot Collisions Without Joint Torque Sensors
Kyu Min Park, **Jihwan Kim**, Jinhyuk Park, Frank C. Park
IEEE Robotics and Automation Letters, 2021

PROJECTS

Non-prehensile Robot Manipulation for Automated Robot Recycling Systems *Apr 2022 - Mar 2024*
Project Member *with IITP*
- Develop high-speed and reliable algorithms for non-prehensile robotic manipulation to automate recycling waste sortation through hitting, pushing, and throwing actions.

Development of Machine Learning Models and Systems for Sales Forecasting *Nov 2020 - Oct 2022*
Project Member *with Fresheasy*
- Develop a machine learning model and training system for sales forecasting to optimize food production management.

Artificial Intelligence-based Automated Painting Robot System *Oct 2020 - Sep 2021*
Project Member *with Doolim-Yaskawa*
- Develop an AI-driven automation system for optimizing robotic painting trajectories in automotive manufacturing facilities.

Development of Learning-Based IT Operations System Monitoring Algorithm *Mar 2020 - May 2020*
Project Member *with EXEM*
- Develop a machine learning algorithm for detecting anomalies in large-scale IT systems through analysis of sequential log message patterns and relationships.

Kinematic and Dynamic Model Identification of Tendon-driven Robot Arm Systems *Nov 2019 - Sep 2020*
Project Member *with NAVER LABS*
- Develop an algorithm for identifying kinematic and dynamic parameters of robot arms with complex tendon-driven mechanisms, focusing on accurate system model identification.

Learning-Based Collision Detection Algorithms for Collaborative Robot Arms *Jun 2019 - Oct 2019*
Project Member *with Doosan Robotics*
- Develop a machine learning algorithm for detecting collisions in collaborative robot arms that can identify external torques without using expensive joint torque sensors [J1].

TEACHING EXPERIENCE

Geometric Methods for High-Dimensional Data Analysis *(M3239.006800)* *Fall 2023*
Teaching Assistant in Seoul National University

Dynamics *(446.204A)* *Fall 2022*
Teaching Assistant in Seoul National University

Introduction to Robotics *(M2794.0027)* *Spring 2019*
Teaching Assistant in Seoul National University