

Seunghwan Um

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 [Seunghwan Um](https://orcid.org/0009-0004-8466-6578) |  [r-ush](https://github.com/rush) |  [0009-0004-8466-6578](https://www.researchgate.net/profile/Seunghwan-Um) |

Gunpo, Gyeonggi-do - 15875, Republic of Korea

RESEARCH STATEMENT

Hi there! I'm a PhD student at Robotics Innovatory, Sungkyunkwan University, South Korea, under the supervision of Prof. Hyouk Ryeol Choi. My research focuses on designing a versatile robotic gripper for logistics. Recently, my research interest has focused on developing robotic systems capable of interacting with unstructured environments during grasping or manipulation. Specifically, I am exploring "*physically intelligent gripper designs*" and developing "*learning-friendly grippers*" that facilitate policy learning in imitation and reinforcement learning.

EDUCATION

- **Sungkyunkwan University (SKKU)** Mar. 2022 - Present
Ph.D in Mechanical Engineering Suwon, Republic of Korea
- **Hanyang University (ERICA)** Mar. 2018 - Feb. 2022
B.S in Mechanical Engineering Ansan, Republic of Korea

PUBLICATIONS

J=JOURNAL, C=CONFERENCE, S=IN SUBMISSION, P=PATENT, T=THESIS

- [J.4] **Plug-and-Play Shape Matching Module for Zero-Shot Mesh-Free Grasp Refinement on Unknown Objects**
Juyong Hong, Yeong Gwang Son, Seunghwan Um, Hyouk Ryeol Choi*.
IEEE Robotics and Automation Letters (RA-L), Accepted at Sep. 2025.
- [J.3] **Corner-Grasp: Multi-Action Grasp Detection and Active Gripper Adaptation for Grasping in Cluttered Environments**
Yeong Gwang Son, Seunghwan Um, Juyong Hong, Tat Hieu Bui, Hyouk Ryeol Choi*.
ArXiv, 2025.
- [J.2] **Development of Adaptive Gripper Enhancing Power Grasp Range and Linearity**
Issac Rhee, Chun Soo Kim, Heeyeon Jeong, Seunghwan Um, and Hyouk Ryeol Choi* et al.
IEEE Access, 2024.
- [J.1] **ReC-Gripper: A Reconfigurable Combined Suction and Fingered Gripper for Various Logistics Picking and Stowing Tasks**
Seunghwan Um, Heeyeon Jeong, Chun Soo Kim, Issac Rhee, and Hyouk Ryeol Choi*
IEEE Robotics and Automation Letters (RA-L), Presented in ICRA 2024.
- [C.1] **Overcoming Heavy Clutter: Utilizing the Hybrid Grasping Network and Gripper**
Seunghwan Um, Yeong Gwang Son, Tat Hieu Bui, Ho Sang Jung, and Hyouk Ryeol Choi*
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024
Workshop: Benchmarking via Competitions in Robotic Grasping and Manipulation 🏆 [Best Extended Abstract]
- [S.2] **Toward Reliable Bin-Picking: Collision-Aware Robotic Design and Control Strategy for Heavily Cluttered Environment**
Seunghwan Um, Yeong Gwang Son, Jaeyoon Shim, Hyouk Ryeol Choi*
The manuscript was invited to be published in *IEEE Robotics and Automation Practice (RA-P)*.
- [S.1] **PALM-Gripper: T.B.D.**
Seunghwan Um, Yeong Gwang Son, Juyong Hong, Chun Soo Kim, et al. and Hyouk Ryeol Choi*.
2nd Revision on *IEEE/ASME Transactions on Mechatronics (TMECH)*.

PATENTS

- [P.3] **Hybrid Gripper Capable of Bin Picking and Shelf Picking.**
Seunghwan Um, Heeyeon Jeong, Chun Soo Kim, Issac Rhee, and Yoon Haeng Lee.
Korean Intellectual Property Office, Patent No. 10-2023-0076248. Publication Date: 2024.12.23.
- [P.2] **Adaptive Gripper Capable of Parallel Motion.**
Issac Rhee, Chun Soo Kim, Seunghwan Um, Heeyeon Jeong, and Yoon Haeng Lee.
Korean Intellectual Property Office, Patent No. 10-2023-0077512. Registration Date: 2023.12.06.
- [P.1] **Suction Gripper Capable of Translational and Rotational Movements.**
Chun Soo Kim, Issac Rhee, Seunghwan Um, Heeyeon Jeong, and Yoon Haeng Lee.
Korean Intellectual Property Office, Patent No. 10-2023-0093340. Registration Date: 2023.10.18.

EXPERIENCE

- AIDIN ROBOTICS - Cobot Solution Team**
Researcher
◦ Designed grippers for shelf-picking solutions, contributing to efficient logistics automation.
May 2022 - Present
Anyang-si, Gyeonggi-do, Republic of Korea
- Korea Institute of Industrial Technology (KITECH)**
Research Student
◦ Designed and developed control systems for a 2-DoF manipulator, enhancing its performance and accuracy.
October 2021 - December 2021
Ansan-si, Gyeonggi-do, Republic of Korea
- Wall Climbing Car (WCC) [Undergraduate Project]**
Team Leader
◦ Designed a wall-climbing car’s propeller frame and control system.
December 2020 - October 2021
Ansan-si, Gyeonggi-do, Republic of Korea

PROJECTS

- Development of a K-Logistics Humanoid Robot Integrated with a High-Sensitivity Robotic Hand Based on a Multimodal AI Foundation Model**
Participating organizations: AIDIN ROBOTICS, SKKU, KETI, CJ Logistics
◦ **Research Objective:** Automation of contact-rich manipulation tasks using a humanoid robot equipped with a high-sensitivity robotic hand.
◦ Development of a teleoperation system for constructing multimodal datasets incorporating force information
◦ Design of force-control strategies and learning-based policies capable of handling contact-rich interactions
Sep 2025 - Present
Republic of Korea
- Development of Smart Vision System and All-in-One Universal Gripper for Multi-Variou Random Piece Picking**
Participating organizations: SKKU, AIDIN ROBOTICS, KITECH, CJ Logistics
◦ **Research Objective:** Developing robotic picking system including a gripper and vision system for piece picking in a logistics environment.
◦ Designing an integrated gripper capable of various grasping strategy for a shelf environment among logistics environments
◦ Researching grasping strategy that can pick objects while avoiding external constraints in a shelf environment
May 2022 - 2024
Republic of Korea

HONORS AND AWARDS

- 🏆 Samsung Humantech Paper Award**
Samsung Electronics Co., Ltd.
Feb. 2025
[Samsung Humantech 🌐]
- 🏆 9th Robotic Grasping of Manipulation Competition - Picking in Clutter**
IEEE, IEEE RAS
May. 2024
[RGMC 2024 🌐]
- 🏆 KSME Student Creative Design Competition**
The Korean Society of Mechanical Engineers (KSME)
Oct. 2021
[YouTube 🌐]
- 🏆 Creative and Intelligent Robot Contest**
Daejeon Metropolitan City, Chungnam National University
Sep. 2021
[YouTube 🌐]

GRANT

- BK21 Research Encouragement Scholarship** 
Fall. 2024
- Brain Hanyang, Academic Excellence Scholarship**
Spring. 2018