YOUNGJIN HONG

(763)388-7740 | hong0745@umn.edu | LinkedIn | Website

RESEARCH INTERESTS

Task and Motion Planning, Learning-based Robot Tasks in Unstructured Environments, and Robot Hardware Design

EDUCATION

University of Minnesota (UMN) — **Minneapolis, MN, USA**
Ph.D. Electrical Engineering — *Sep. 2022 - Present*

Sungkyunkwan University (SKKU) — **Suwon, Korea**
M.S. in Mechanical Engineering — *Mar. 2022 – Feb.2024*

- Thesis: "Stable Pushing using Convolutional Neural Networks" (Advisor: Prof. Hyungpil Moon)
- *Teaching Assistant,* "Computer-Aided Drawing" (Spring 2023), "Creative & Interdisciplinary Design" (2022)

B.S. in Mechanical Engineering — *Mar. 2016 – Feb. 2022*

- Two years of absence for military service (2018-2020)

PUBLICATIONS / PRESENTATIONS

***equal contributions**

Publications

Youngjin Hong*, Houjian Yu* et al., "LACY: A Vision-Language Model-based Language-Action Cycle for Self-Improving Robotic Manipulation," *(Under Review – Double Blinded)***.**

Mingen Li, Houjian Yu, Yixuan Huang, **Youngjin Hong**, Hantao Ye, Changhyun Choi. "Hierarchical DLO Routing with Reinforcement Learning and In-Context Vision-language Models," *(Under Review – Double Blinded)***.**

Youngjin Hong et al, "Vision-based Stable 2D Planar Pushing of Dishware with 6-DOF Manipulator," *ECCOMAS Thematic Conference on Multibody Dynamics,* **2023.** [Website] [Paper][Demo]

Haejoon Seong*, Youngjin Hong*, Hong-ryul Jung*, Myeongyun Doh*. Et al, "Passive Transformable Fingertip to Augment Tableware Grasp Capability," *International Conference on Control, Automation and Systems (ICCAS),* **2022.** [Website] [Paper]

Presentations

Youngjin Hong et al**,** "Stable Dishware Pushing via Convolutional Neural Networks," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Late Breaking Results,* **2023.**

PATENTS (PENDING)

Moon, H., Seo, S., Jung, H., Shin, J., Shin, J., & **Hong, Y.** "Multi-Modla Gripper with Foldable Suction Cup," 10-2023-0169750 Korea Patent, 2023.

Moon, H., Jung, H., Doh M., **Hong, Y.,** Seong, S., & Kim, J. "Variable Fingertips and Operating Methods of Robot Grippers," 10-2022-0104287, Korea Patent, 2022.

RESEARCH EXPERIENCE

UMN Choice Robotics Lab — **Minneapolis, USA**
Graduate Researcher — *Sep. 2024 – Present*

SKKU Robotics and Intelligent Systems Lab — **Suwon, Korea**
Associate Researcher, Global Engineering Inst. for Ultimate Society (GENIUS) — *Sep. 2023 – Feb.2024*
Graduate Researcher, Dept. of Mechanical Engineering — *Mar. 2022 – Aug. 2023*
Undergraduate Researcher, Dept. of Mechanical Engineering — *Aug. 2020 – Feb. 2022*

[Government R&D Projects]

"Development of Service Robot Technologies for Cleaning a Table" — *Jul. 2022 – Present*

- Designed a transformable fingertip to augment the grasp capability of a Robotiq 2f gripper.
- Developed a vision- and learning-based 2D dish push planner for a dishware of unknown physical properties.
- Automated synthetic train data using Isaac Gym simulator to train the push planning network.

"Core Mobile Technology Development for 5G Edge-based Transportation & Manipulation" *Mar. 2022 – Jul. 2022*
- Developed analytic force closure determination algorithm for a parallel-jaw gripper. [Website]

"Development of Cloud Robot Intelligence Augmentation, Sharing, and Framework Technology" *Feb. 2022– Dec.2022*
- Devised a learning-based cloud grasp planner using Dockerfile and its ROS-SSH communication system [Website].
- Built a 6D pose estimation and parallel-synthetic network; trained data generation module on Issac Gym [Website].
- Integrated and enhanced the intelligence of multiple robots as a result.

[Undergraduate Research Project]
"Optimum Grasp Point Searching Algorithm of Parallel-Jaw Gripper" *Sept. 2020 – Dec. 2020*
- Developed an analytic optimum grasp planner using Ferrari-Canny grasp quality metrics.
- Applied force closure, convex hull, grasp wrench space, and soft contact concept.

WORK EXPERIENCE

Hanwha Aerospace Co., Ltd. **Seoul, Korea**
***Robot Research Engineer**, Manned-Unmanned Teaming (MUM-T) Research Center* *Jan. 2024 – Jul. 2024*
- UGV (Unmanned Ground Vehicle) simulation
- Developed business proposal for a Ministry of National Defense project for next-generation UGV technologies
- Done piloting UGV prototypes

HD Hyundai Infracore Co., Ltd. **Incheon, Korea**
R&D Intern, Product Reliability Team, Construction Equipment BG *Feb. 2021 & Jul. 2021*
- Automated a durability test of Urea ($CO(NH_2)_2$) heater relay through web scraping using Python [Website].
- Participated in the reliability growth test of prototype excavator using CATIA V6.
- Analyzed the CAN data of the engine aftertreatment system of prototype excavator using vSignalyzer.

Seoul Metro – Moran Station **Seoul, Korea**
Social Service Personnel, Alternative Military Service (ROK Army) *Aug. 2018 – Jul. 2020*
- Managed night subway station patrols, coordinating with local authorities and staff for public safety and emergency responses, including during natural disasters.

SCHOLARSHIPS & AWARDS

Industry-University Scholarships
Hanhwa Aerospace Co., Ltd. Scholarship *Spring, Fall 2023*
HD Hyundai Infracore Co., Ltd. Scholarship *Spring, Fall 2021*

SKKU Academic Scholarships
Graduate Merit-based Scholarship (Half tuition) *Spring 2022 - Spring 2023*
Student Success Scholarship (Full tuition) *Spring, Fall 2021*
Orchestra Club Leader Scholarship *Spring, Fall 2017*
Student Success Scholarship (Undergraduate Research Program) *Fall 2020*
Academic Excellence Scholarship (70% tuition, 95th percentile GPA) *Fall 2016*

Awards
Excellence Prize, S-Hero Engineering Talents *Nov. 2021*
Excellence Prize, S-Hero Engineering Talents *Nov. 2020*
Innovation Prize, 2019 V Creator Hackathon Project *Dec. 2019*
Bridge Prize, SKKU Global Creative Challenger Program *Feb. 2019*

TECHNICAL SKILLS

Languages: Python, C++, MATLAB, Simulink, Simscape, LaTeX, Git, Bash, Docker
Robotic Programming: ROS, MoveIt, PyTorch, Isaac Gym, OpenAI Gym, Linux
Robotic Hardware: OptiTrack, ARDUINO, Manipulator (Neuromeka Indy7 RB2, Doosan M1013)
Design Tools: Autodesk Inventor, SolidWorks, CATIA, ANSYS