

# HyeSung Lee

ROBOTICS · PHYSICAL AI · DEXTEROUS MANIPULATION

19-13, Taepyeong-ro 194beon-gil, Uijeongby-si, Gyeonggi-do, 11687, Rep. of KOREA

☎ (+82) 10-4551-3679 | ✉ hs981002.naver.com | 📷 hyesung98 | 📱 hyesung98

“Don't Dream, Be it”

## Introduction

I'm Hyesung Lee, a researcher deeply interested in Physical AI—particularly **Dexterous Manipulation** using multifingered robotic hands. My work focuses on enabling humanoid robots to manipulate objects by modeling force-level Interactions through Learning-based Methods, going beyond purely kinematic approaches.

### Research Interests:

- Dexterous Manipulation, Representation Learning for Visuo-Tactile& Kinesthetic Fusion, Vision-Haptic-Language-Action(VHLA) Model
- Reinforcement Learning, Imitation Learning
- Learning-based approaches for dexterous robot hand control

## Education

### Kwangwoon University

B.S. IN SCHOOL OF ROBOTICS

- Current GPA : 3.76/4.50, Current Major GPA : 3.89/4.50
- Club : ROBIT(Robotics Competition Group)
- ADVISOR: Jin-Oh Kim

Seoul, S.Korea

Mar. 2017 - Aug. 2023

### Korea University & KIST

M.S. IN COMPUTER SCIENCE

- Current GPA : 4.31/4.50
- ADVISOR: Sungwook Yang(KIST) & Jinkyu Kim(Korean Univ.)
- Thesis: Learning to Refine Human Motion into Physically Feasible Robotic Actions for Dexterous Manipulation

Seoul, S.Korea

Feb. 2024 - Feb. 2026

### KAIST & KIST

PH.D. IN KIM JAECHUL GRADUATE SCHOOL OF AI

- Current GPA : 0.00/4.50
- ADVISOR: Sungwook Yang(KIST) & Kimin Lee(KAIST)

Seoul, S.Korea

Mar. 2026 *ing*

## Work Experience

### Stryx(Startup Company)

INTERN

- Developed Road Data Acquisition software using 3D Lidar, GNSS, Machine Vision Camera
- Developed Sensor Calibration Visualization Tool software using ROS Rviz

Seoul, S.Korea

Sep. 2021 - Dec. 2021

### Kakao Mobility

CONTRACT WORKER

- Made Promotional Autonomous Driving Mobile Robot for Kakao NEMO 2022 Conference
- Research on Stereo Camera Visual Odometry

Seoul, S.Korea

Dec. 2021 - May. 2022

### KIST(Korea Institute of Science and Technology)

INTERN

- Research on Endomicroscopic Images SLAM and Sensor Fusion.
- Perform Photo-Theragnosis System Integration

Seoul, S.Korea

Mar. 2023 - August. 2024

## International Publication

2026.01	<b>IEEE RA-L/ICRA 2026, Hyesung Lee, Sungwook Yang</b> "Real-Time SLAM-Guided Closed-Loop Photodynamic Therapy with Pixel-Accurate Light-Dose Control"	IEEE RA-L/ICRA
2025.10	<b>IEEE Humanoid 2025(Dexterous Humanoid Manipulation Workshop), Hyesung Lee, Si-Hwan Heo, Sungwook Yang</b> "DexRefine: Refine Human Motion to Physically Feasible Robotic Actions"	IEEE Humanoid
2023.5	<b>IEEE EMBC 2023, Kim Jin, Hyesung Lee, Sungwook Yang</b> "Real-Time Endomicroscopic Image Mosaicking with an EKF-based Sensor Fusion Approach"	IEEE EMBC

## Domestic Conference

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2025.04	<b>KMSE Dynamics, Robot, Control div 2025, Hyesung Lee, Sungwook Yang</b> "Torque and Energy Regularization Penalty Effects in Reinforcement Learning Based Dexterous Hand Object Manipulation" (Domestic Conference)	KSME Dynamics, Robot, Control Div.
2025.02	<b>KROS 2025, Hyesung Lee, Sungwook Yang</b> "Deep Reinforcement Learning-Based Transformation of Human Motion Capture Data into Robot Actions to Reduce the Embodiment Gap between Humans and Robots" (Domestic Conference)	KROS 2025
2024.02	<b>KROS 2024, Hyesung Lee, Sungwook Yang</b> "Real-Time Photo-Theragnosis of Brain Tumor Using Handheld Endomicroscopic Probe" (Domestic Conference)	KROS 2024
2023.11	<b>KSME HQ 2023, Hyesung Lee, Sungwook Yang</b> "Real-Time Photo-Theragnosis of Brain Tumor Using Handheld Endomicroscopic Probe" (Domestic Conference)	KSME HQ
2023.4	<b>KSME Bioengineering div 2023, Hyesung Lee, Kim Jin, Sungwook Yang</b> "Simultaneous Localization and Mapping of Endomicroscopic Images Using Optical Tracking System" (Domestic Conference)	KSME Bio Engineering Div.

## Awards

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### AWARDS

2023.04	<b>Paper Excellence Award</b> , KSME Bio Engineering Div. Poster Presentation	KSME Bio Engineering Div.
2017.11	<b>Grand Prize</b> , Introduction to Engineering Design Exhibition	KwangWoon Univ.
2018.10	<b>5th</b> , IRC 2018 Sumo Robot Competition	Ilsan KINTEX
2018.11	<b>3rd</b> , 2018 R-BIZ Challenge Turtlebot3 Autorace	Daegu EXCO
2019.08	<b>2nd</b> , Busan Robot Contest Turtlebot3 Autorace	Busan Bexco
2019.10	<b>1st</b> , National Defense Robot Contest	Hanwha Defense

## Technical Skills

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<b>Programming</b>	C++ / C, Python, Matlab
<b>Framework</b>	Qt, Tensorflow, OpenCV, PyTorch, Hard Real-Time Framework
<b>DevOps</b>	ROS & ROS2, Git, Linux
<b>Simulation</b>	IsaacLab & IsaacSim
<b>Languages</b>	Korean, English

## Projects

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### 2022 Capstone Design

Capstone(KwangWoon Univ.)

ROS, 2D-LIDAR

Sep. 2022 - Dec. 2022

- Applied Kalman Filter and Particle Filter based Tracking Algorithm
- Applied an Object Clustering Algorithm using the Adaptive Epsilon DBSCAN
- Applied Obstacle Avoidance Algorithm using Repulsive Potential Fields
- Applied Driving Algorithm using PI Controller

### 2019 Hanyang Univ. Intelligent Model Car Competition

Competition(Club ROBIT)

INFINEON TC237, LINE SCAN CAMERA

Jun. 2019 - Aug. 2019

- Driving Algorithm Utilizing Pure Pursuit and PID Control
- Development of Sensor Monitoring and Vehicle Control Program via Bluetooth Connectivity with Infineon TC 237 Board

### **Turtlebot3 Autorace Competition**

ROS, 2D-LIDAR SLAM, VISION

- Lane detection using RANSAC
- Particle filter based Localization
- Utilized A-Star Algorithm and Potential Fields for path planning and Obstacle Avoidance
- YOLO based Sign Detection

*Competition(Club ROBIT)*

*Aug. 2018, Jun. 2019*

### **2019 Defense Robot Competition**

ROS, STM CORTEX-M4, QT

- Controlling BLDC Motor using PID Cascade Control
- Developed Monitoring and Pilot application utilizing QT GUI with UDP communication protocol

*Competition(Club ROBIT)*

*May. 2019 - Dec. 2019*