Min-Sung **Yoon**

PH.D. CANDIDATE · SCHOOL OF COMPUTING (SoC) AT KAIST

Bldg E3-1, 291 Daehak-ro, Yuseong-gu, Daejeon 34141, South Korea

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"Passionate about bridging AI and robotics to enhance quality of life."
Research Keywords: *motion & path planning, deep reinforcement learning, navigation under uncertainty, energy-efficient multi-modal locomotion, and safe remote manipulation*

Education

KAIST (Korea Advanced Institute of Science and Technology) *Daejeon, South Korea*
PH.D. IN COMPUTER SCIENCE *Mar. 2022 – Present*
- Advisor: Prof. Sung-Eui Yoon
- Total GPA: 4.1 / 4.3

KAIST (Korea Advanced Institute of Science and Technology) *Daejeon, South Korea*
M.S. IN COMPUTER SCIENCE *Mar. 2020 – Feb. 2022*
- Advisor: Prof. Sung-Eui Yoon
- Total GPA: 4.0 / 4.3

Inha University *Incheon, South Korea*
B.S. IN INFORMATION AND COMMUNICATION ENGINEERING (ICE) *Mar. 2015 – Feb. 2019*
- Graduated *Summa Cum Laude*, with a Major GPA: 4.48 / 4.5, Total GPA: 4.34 / 4.5

Awards & Honors

2025	**Next-Generation Engineering Researcher,** Institute for Promotion of Engineering and Science of Korea (IPESK)	*S.Korea*
	Selected as an outstanding graduate researcher recognized for excellence in engineering research.	
2023	**Outstanding Planning Paper Award,** IEEE International Conference on Robotics and Automation (ICRA)	*UK*
	Title: "Learning-based Initialization of Trajectory Optimization for Path-following Problems of Redundant Manipulators"	
2022	**Outstanding Navigation Paper Finalist Award,** IEEE International Conference on Robotics and Automation (ICRA)	*USA*
	Title: "Confidence-Based Robot Navigation Under Sensor Occlusion with Deep Reinforcement Learning"	
2018	**Best Comprehensive Design Award (1st Place, Graduation Project),** ICE, Inha University	*S.Korea*
	Title: "Platooning with Autonomous Driving"	
2017	**National Science & Technology Scholarship,** Ministry of Science and ICT (MSIT)	*S.Korea*
2016	**Dean's List,** College of IT Engineering, Inha University (Fall Semester)	*S.Korea*
2016	**Dean's List,** College of IT Engineering, Inha University (Spring Semester)	*S.Korea*
201[5–8]	**Honor Student,** Department of Information and Communication Engineering (ICE), Inha University	*S.Korea*
	Recognized for academic excellence in 2015 Spring & Fall, 2016 Spring, 2017 Spring & Fall, 2018 Spring	

Publications

International Papers

[1] ALaM: Adaptive Locomotion and Manipulation for Quadruped Robot
HEECHAN SHIN, **MINSUNG YOON**, JEIL JEONG, SUNG-EUI YOON
International Journal of Control, Automation and Systems (IJCAS), 2025

[2] Efficient Navigation Among Movable Obstacles using a Mobile Manipulator via Hierarchical Policy Learning
TAEGEUN YANG, JIWOO HWANG, JEIL JEONG, **MINSUNG YOON**, SUNG-EUI YOON
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025

[3] Metaheuristic Asphalt Crack Sealing Path Planning based on Discrete Grey Wolf Optimizer
JEREMY C.H. ONG, **MINSUNG YOON**, HEECHAN SHIN, SUNG-EUI YOON, MOHD-ZULHILMI ISMADI, XIN WANG
International Journal of Hydromechatronics (IJHM), 2025

[4] Enhancing Navigation Efficiency of Quadruped Robots via Leveraging Personal Transportation Platforms
MINSUNG YOON AND SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2025

[5] Learning-based Adaptive Control of Quadruped Robots for Active Stabilization on Moving Platforms

MINSUNG YOON, HEECHAN SHIN, JEIL JEONG, SUNG-EUI YOON

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024

Agile Robotics Workshop @ ICRA, 2024

[6] Navigation Among Movable Obstacles with Mobile Manipulator using Learned Robot-Obstacle Interaction Model

TAEGEUN YANG, MINSUNG YOON, JEIL JEONG, SUNG-EUI YOON

Mobile Manipulation and Embodied Intelligence (MOMA.v2) Workshop @ ICRA, 2024

[7] Analysis of Terrain-Aware Optimal Path Planning Methods for Stable Off-Road Navigation

MINSUNG YOON, TAEGEUN YANG, CHANMI LEE, HYUNSIK SON, SUNG-EUI YOON

Off-Road Autonomy Workshop @ IEEE Intelligent Vehicles Symposium (IV), 2024

[8] Learning-based Initialization of Trajectory Optimization for Path-following Problems of Redundant Manipulators

MINSUNG YOON, MINCHEUL KANG, DAEHYUNG PARK, SUNG-EUI YOON

IEEE International Conference on Robotics and Automation (ICRA), 2023 – Outstanding Planning Paper Award, Top 1.1% (15 of 1,345 papers)

[9] Towards Safe Remote Manipulation: User Command Adjustment based on Risk Prediction for Dynamic Obstacles

MINCHEUL KANG, MINSUNG YOON, SUNG-EUI YOON

IEEE International Conference on Robotics and Automation (ICRA), 2023

[10] Confidence-Based Robot Navigation Under Sensor Occlusion with Deep Reinforcement Learning

HYEONGYEOL RYU, MINSUNG YOON, DAEHYUNG PARK, SUNG-EUI YOON

IEEE International Conference on Robotics and Automation (ICRA), 2022 – Outstanding Navigation Paper Finalist Award, Top 2.7% (39 of 1,428)

Selected as one of the KAIST 2023 Research Highlights

[11] Fast and Robust Trajectory Generation for Cartesian Path-following Problems of Redundant Manipulators

MINSUNG YOON, MINCHEUL KANG, DAEHYUNG PARK, SUNG-EUI YOON

Machine Learning for Human-Robot Interaction (HRI) Workshop @ IEEE RO-MAN, 2022

[12] Deep Neural Network-based Fast Motion Planning Framework for Quadrupedal Robot

JINHYEOK JANG, HEECHAN SHIN, MINSUNG YOON, SEUNGWOO HONG, HAE-WON PARK, SUNG-EUI YOON

Machine Learning for Motion Planning (MLMP) Workshop @ ICRA, 2021

Domestic (Korean) Papers

[13] Adversarial Attack on Visuomotor Policy

CHANMI LEE, MINSUNG YOON, SUNG-EUI YOON

Korea Computer Congress (KCC), 2024

[14] Manipulator-Assisted Navigation Among Movable Obstacles using Learned Robot-Obstacle Kinodynamics Model

TAEGEUN YANG, MINSUNG YOON, SUNG-EUI YOON

Korea Robotics Society Annual Conference (KRoC), 2024

[15] Robust Robot Navigation against External Disturbance using Deep Reinforcement Learning

HYEONGYEOL RYU, MINSUNG YOON, DAEHYUNG PARK, SUNG-EUI YOON

Korea Robotics Society Annual Conference (KRoC), 2021

[16] Bias Tree Expansion using Reinforcement Learning for Efficient Motion Planning

MINSUNG YOON, DAEHYUNG PARK, SUNG-EUI YOON

Korea Robotics Society Annual Conference (KRoC), 2021

Patents

[1] User Command Adjustment Based on Risk Prediction of Dynamic Obstacles for Safe Remote Manipulation

KR 10-2023-0169134, PATENT APPLICATION FILED ON NOV. 29, 2023

[2] Learning-based Initialization of Trajectory Optimization for Redundant Manipulators' Path-Following Problem

KR 10-2023-0192803, PATENT APPLICATION FILED ON DEC. 27, 2023

[3] Learning-based Adaptive Control of Quadruped Robots for Active Stabilization on Moving Platforms

KR 10-2025-0040575, PATENT APPLICATION FILED ON MAR. 28, 2025

[4] Efficient Navigation Among Movable Obstacles using a Mobile Manipulator via Hierarchical Policy Learning

UNDER PROGRESS

Talks & Presentations

Tutorial Talks

Presented tutorial talks at Korea Robotics Society Annual Conference (KRoC) *Feb. 2025*
– Title: Reinforcement Learning Techniques and Applications from Robotic Arms to Quadruped Robots

Presented tutorial talks at Korea Computer Congress (KCC) *Jun. 2024*
– Title: Introduction to Reinforcement Learning and Its Applications in Robotic Manipulation

Invited Talks

Presented a guest lecture in [CS586: Robot Motion Planning and Applications] *Apr. 2025*
– Title: Introduction of Reinforcement Learning with Related Applications

Presented a guest lecture in [CS686: Robot Motion Planning and Applications] *Oct. 2023*
– Title: Reinforcement Learning Techniques from DQN to TRPO and PPO

Presented an invited talk at the Flagship Conference / Journal Session of KRoC 2023 *Feb. 2023*
– Title: Confidence-Based Robot Navigation Under Sensor Occlusion with Deep Reinforcement Learning

Research Projects

Sonar-based Autonomous Navigation for Transparent Object Handling *Mar. 2025 – Present*
Supported by DSO National Laboratories, Singapore
Responsible for developing locomotion and simple collision avoidance techniques for quadruped robots using reinforcement learning.

Off-Road Autonomous Navigation *Jun. 2023 – Present*
Supported by Hanwha Aerospace
Responsible for optimal path planning in unstructured outdoor environments and low-level control of track-type robots.

Optimal Motion and Path Planning for Industrial Robot Arms *Mar. 2020 – Feb. 2021*
Supported by Hyundai Heavy Industries
Responsible for developing optimal path planning algorithms for industrial robotic arms in object-transporting tasks.

Development of a Quadruped Robot System *Oct. 2019 – Sep. 2024*
Supported by Agency for Defense Development (ADD)
Responsible for developing quadruped robot locomotion technologies (optimization-based and reinforcement learning–based).

Teaching Experience

Teaching Assistance (TA)

Robot Motion Planning and Applications (CS586), KAIST School of Computing *Spring 2025*
– Lecturer: Prof. Sung-Eui Yoon

Robot Motion Planning and Applications (CS686), KAIST School of Computing *Fall 2023*
– Lecturer: Prof. Sung-Eui Yoon

Introduction to Artificial Intelligence (CS470), KAIST School of Computing *Spring 2023*
– Lecturer: Prof. Daehyung Park

Introduction to Artificial Intelligence (CS470), KAIST School of Computing *Fall 2022*
– Lecturer: Prof. Daehyung Park

Media Coverage

Featured in KAIST Alumni News *May 2024*
Recognized for research presented at ICRA 2023, recipient of the Outstanding Planning Paper Award

Featured in KAIST 2023 Research Highlights *Jul. 2023*
Recognized for research presented at ICRA 2022, finalist for the Outstanding Navigation Paper Award

Featured in KAIST Research News *Jun. 2023*
Recognized for research presented at ICRA 2023, recipient of the Outstanding Planning Paper Award

Featured in KAIST CS Department News *Jun. 2023*
Recognized for research presented at ICRA 2023, recipient of the Outstanding Planning Paper Award

Featured in KAIST CS Department Research Highlights *Jun. 2022*
Recognized for research presented at ICRA 2022, finalist for the Outstanding Navigation Paper Award

Skills

Programming	C, C++, Python, MATLAB
Libraries & Frameworks	PyTorch, TensorFlow, Keras, OMPL, MoveIt
Simulation Platforms	Gazebo, Mujoco, Raisim, IsaacGym/Sim/Lab, Habitat
Experienced Robot Platforms	Fetch, Go1, Jackal, Bunker Pro
Middleware	ROS 1, ROS 2
Languages	Korean (Native), English