Min-Sung **Yoon**

PH.D. CANDIDATE · SCHOOL OF COMPUTING (SOC) AT KAIST
Bldg E3-1, 291 Daehak-ro, Yuseong-gu, Daejeon 34141, South Korea
minsung.yoon@kaist.ac.kr | Homepage | GitHub | LinkedIn | Google Scholar

"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) *Selected as an outstanding graduate researcher recognized for excellence in engineering research.*	*S.Korea*
2023	**Outstanding Planning Paper Award,** IEEE International Conference on Robotics and Automation (ICRA) *Title: "Learning-based Initialization of Trajectory Optimization for Path-following Problems of Redundant Manipulators"*	*UK*
2022	**Outstanding Navigation Paper Finalist Award,** IEEE International Conference on Robotics and Automation (ICRA) *Title: "Confidence-Based Robot Navigation Under Sensor Occlusion with Deep Reinforcement Learning"*	*USA*
2018	**Best Comprehensive Design Award (1st Place, Graduation Project),** ICE, Inha University *Title: "Platooning with Autonomous Driving"*	*S.Korea*
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 *Recognized for academic excellence in 2015 Spring & Fall, 2016 Spring, 2017 Spring & Fall, 2018 Spring*	*S.Korea*

Publications

International Papers

[1] Phase-Aware Policy Learning for Skateboard Riding of Quadruped Robots via Feature-wise Linear Modulation
MINSUNG YOON*, JEIL JEONG*, SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2026

[2] Uncertainty-Aware Non-Prehensile Manipulation with Mobile Manipulators under Object-Induced Occlusion
JIWOO HWANG, TAEGEUN YANG, JEIL JEONG, **MINSUNG YOON**, SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2026

[3] Beyond the Patch: Exploring Vulnerabilities of Visuomotor Policies via Viewpoint-Consistent 3D Adversarial Object
CHANMI LEE, **MINSUNG YOON**, WOO JAE KIM, SEBIN LEE, SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2026

[4] LangPert: Detecting and Handling Task-level Perturbations for Robust Object Rearrangement
XU YIN, **MINSUNG YOON**, YUCHI HUO, KANG ZHANG, SUNG-EUI YOON
arXiv preprint, 2025

[5] Robust Pedipulation on Quadruped Robots via Gravitational-moment Minimization

Heechan Shin, **Minsung Yoon**, Jeil Jeong, Sung-eui Yoon
International Journal of Control, Automation and Systems (IJCAS), 2025
International Conference on Control, Automation and Systems (ICCAS), 2025

[6] 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

[7] 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

[8] 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

[9] 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

[10] 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

[11] 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

[12] 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)

[13] 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

[14] 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

[15] 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

[16] 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

[17] Adversarial Attack on Visuomotor Policy

Chanmi Lee, **Minsung Yoon**, Sung-Eui Yoon
Korea Computer Congress (KCC), 2024

[18] 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

[19] 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

[20] 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
KR 10-2025-0201446, Patent application filed on Jan. 8, 2026

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