Hajun Kim, Ph.D. Candidate

Contact Information

291, Daehak-ro, Yuseong-gu, Daejeon, Korea 34141
82-10-9912-1738, hajun0219@kaist.ac.kr

Research Interests

Legged Robots, State Estimation, Lie Group, SLAM, Control, Machine Learning

Professional Experience

Research Assistant Mar 2020 to present

Mechanical Engineering,
Korea Advanced Institute of Science and Technology
Supervisor: Hae-won Park, Ph.D

Education

Korea Advanced Institute of Science and Technology, Daejeon, Korea

Ph.D. Candidate, Mechanical Engineering, Mar 2022 to present

- Research Area: *State Estimation, Control*
- Advisor: Hae-Won Park, Ph.D

Korea Advanced Institute of Science and Technology, Daejeon, Korea

M.S., Mechanical Engineering, Mar 2020 to Feb 2022

- Thesis: *Control of the wheel-legged robot with mecanum wheels using the nonlinear model predictive control*
- Advisor: Hae-Won Park, Ph.D

Yonsei University, Seoul, Korea

B.S., Mechanical Engineering, Mar 2014 to Feb 2020

- Ranked 1st upon graduation

Journal Publications

1. **Hajun Kim**, Dongyun Kang, Min-Gyu Kim, Gijeong Kim, and Hae-Won Park, "Online Friction Coefficient Identification For Legged Robotcs on Slippery Terrain Using Smoothed Contact Gradients," ***IEEE Robotics and Automation Letters***, accepted, 2025
2. **Hajun Kim**†, Ylenia Nistico†, Joao Carlos Virgolino Soares, Geoff Fink, Hae-Won Park, and Claudio Semini, "Multi-Sensor Fusion for Quadruped Robot State Estimation using Invariant Filtering and Smoothing," ***IEEE Robotics and Automation Letters***, accepted, 2025 († : Equal Contribution)
3. Min-Gyu Kim, Dongyun Kang, **Hajun Kim**, and Hae-Won Park, "A Modular Residual Learning Framework to Enhance Model-Based Approach for Robust Locomotion," ***IEEE Robotics and Automation Letters***, accepted, 2025

Conference Publications

1. Kang, Dongyun, Gijeong Kim, JongHun Choe, **Hajun Kim**, and Hae-Won Park. "Learning Impact-Rich Rotational Maneuvers via Centroidal Velocity Rewards and Sim-to-Real Techniques: A One-Leg Hopper Flip Case Study." Conference on Robot Learning (2025).
2. Choe, JongHun, Gijeong Kim, **Hajun Kim**, Dongyun Kang, Min-Su Kim, and Hae-Won Park. "Design of a 3-DOF Hopping Robot with an Optimized Gearbox: An Intermediate Platform Toward Bipedal Robots." IEEE-RAS 24th International Conference on Humanoid Robots(2025). **Best Oral Paper Award.**

Awards

1. Best Oral Paper Award, IEEE-RAS 24th International Conference on Humanoid Robots, 2025
2. Top Graduate, B.Sc. in Mechanical Engineering, Yonsei University, 2020

Technical Skills

Language : English, Korean
Programming Language : C, C++, ROS, ROS2, Python, MATLAB, SolidWorks
Physics Simulator : Raisim, MuJoCo, NVIDIA Isaac Gym

Project Experience

Control of Mecanum-Wheel Legged Robots

Software Development, Mar 2020- Feb 2022

- Advisor: Hae-Won Park, Ph.D

Control and State Estimation of Quadrupedal Robots (Go1)

Leading of Software Development and Hardware Maintenance, Mar 2021 - present

- Advisor: Hae-Won Park, Ph.D

Control and State Estimation of Quadrupedal Robots (KAIST HOUND2)

Leading of Software Development and Hardware Maintenance, July 2022 - Dec 2024

- Advisor: Hae-Won Park, Ph.D

State Estimation of Huamnoids (KAIST Humanoid)

Software Development and Sensor Fusion, Jan 2025 - present

- Advisor: Hae-Won Park, Ph.D

Teaching Experience

ME453, Introduction to Robotics Engineering, Fall 2022

Teaching Assistant, Korea Advanced Institute of Science and Technology

- Advisor: Hae-Won Park, Ph.D

ME493, Special Topics in Mechanical Engineering My ME I (Career Planning for Mechanical Engineers), Spring 2023

Mentoring, Korea Advanced Institute of Science and Technology

- Advisor: Young-Jin Kim, Ph.D

ME453, Introduction to Robotics Engineering, Fall 2023

Teaching Assistant, Korea Advanced Institute of Science and Technology

- Advisor: Hae-Won Park, Ph.D

ME493, Special Topics in Mechanical Engineering My ME II (Career Planning for Mechanical Engineers), Fall 2023

Mentoring, Korea Advanced Institute of Science and Technology

- Advisor: Young-Jin Kim, Ph.D

ME493, Special Topics in Mechanical Engineering My ME I (Career Planning for Mechanical Engineers), Spring 2024

Mentoring, Korea Advanced Institute of Science and Technology

- Advisor: Young-Jin Kim, Ph.D

ME453, Introduction to Robotics Engineering, Fall 2024

Teaching Assistant, Korea Advanced Institute of Science and Technology

- Advisor: Ki-Uk Kyung, Ph.D

ME492, Special Topics in Mechanical Engineering (Programming for Mechanical Engineering Problem Solving) , Fall 2024

Teaching Assistant, Korea Advanced Institute of Science and Technology

- Advisor: Hyun Jin Kim, Ph.D

ME492, Special Topics in Mechanical Engineering (Programming for Mechanical Engineering Problem Solving), Spring 2025

Teaching Assistant, Korea Advanced Institute of Science and Technology

- Advisor: Huitaek Yun, Ph.D

ME493, Special Topics in Mechanical Engineering My ME I (Career Planning for Mechanical Engineers), Spring 2025

Mentoring, Korea Advanced Institute of Science and Technology

- Advisor: Young-Jin Kim, Ph.D

ME493, Special Topics in Mechanical Engineering My ME II (Career Planning for Mechanical Engineers), Fall 2025

Mentoring, Korea Advanced Institute of Science and Technology

- Advisor: Young-Jin Kim, Ph.D