Yunsoo Seo

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RESEARCH INTEREST

My research interests lie at the intersection of **robotics and control, with a particular focus on humanoid locomotion, sampling-based Model Predictive Control (MPC), and multi-contact dynamics**. I am motivated by the challenge of enabling humanoid robots to operate effectively in real-world, dynamic environments by achieving **robust, whole-body motion and balance**. I believe that for robots to collaborate safely and effectively with humans, especially in household or disaster-response settings, expanding their mobility and physical interaction capabilities will be essential.

- Humanoid Robot Locomotion Control
- Walking Motion Generation for Humanoid Robots
- Optimal Control and Collision Avoidance for Manipulator
- Reinforcement Learning

EDUCATION

Mar. 2024 ~ Present	**Korea University** School of Electrical Engineering *Advisor: Myo Taeg Lim* *Master Student* GPA: 4.5 / 4.5	Seoul, Korea
Mar. 2020 ~ Feb. 2024	**Dongguk University** Department of Mechanical, Robotics and Energy Engineering *B.S. in Mechanical, Robotics and Energy Engineering* GPA: 3.69 / 4.5	Seoul, Korea

RESEARCH EXPERIENCE

<Korea Institute of Science and Technology(KIST)>

student researcher

- **Humanoid whole body controller:** Developing a whole-body controller for humanoid robots based on Model Predictive Path Integral (Mar. 2024 ~ Present)
- **Humanoid CoM trajectory generator(MPPI):** Conducted research on Center of Mass(CoM) trajectory generation for humanoid robots using Model Predictive Path Integral (Mar. 2023 ~ Jun. 2023)

- **Humanoid CoM trajectory generator(MPC):** Conducted research on Center of Mass(CoM) trajectory generation for humanoid robots using Model Predictive Control (Jul. 2022 ~ Aug. 2022)

<Machanical Automatic Control(MAC) research society, University of Dongguk>

project member

- **Capstone Design Track-Project:** 6-DOF Manipulator Design and Motion Control, Mobile Manipulator's Trajectory Generation for Path Planning (Jun. 2023 ~ Dec. 2023)
- **Soft Robotics term project:** In charge of Origami Gripper Fabrication as Team Leader (Sep. 2022 ~ Dec. 2022)
- **Engineering Education FESTA 2022:** 6-DOF Manipulator Motion Control, Mobile Manipulator's Trajectory Generation for Path Planning (Sep. 2022 ~ Nov. 2022)

PUBLICATIONS

1. Yunsoo Seo, Myo Taeg Lim, Yisoo Lee"Whole Body MPPI for Real-time Control of a 3-DoFs Leg system", *2025 INSTITUTE OF CONTROL, ROBOTICS AND SYSTEMS (ICROS)*, (2025)
2. Yunsoo Seo, Dongwhan Kim, Jaewan Bak, Yonghwan Oh, Yisoo Lee, "Extremely Fast Computation of CoM Trajectory Generation for Walking Leveraging MPPI Algorithm", *2023 IEEE-RAS 22ND INTERNATIONAL CONFERENCE ON HUMANOID ROBOTS (HUMANOIDS)*, (2023)

AWARDS AND HONORS

- Industry-Academia Internship Scholarship, University of Dongguk, Scholarship Office for Educational Activity Assistance, Korea (Mar. 2023)
- Engineering Education FESTA 2022, Korea Institute for Advancement of Technology , Korea (Oct. 2022)
- University Innovation Program Scholarship, University of Dongguk, National Off-Campus Scholarship, Korea (Sep. 2022)
- Exchange Program Tuition Scholarship, University of Dongguk, Global Scholarship Office, Korea (Mar. 2022)
- Academic Excellence Award, 2020 Fall, University of Dongguk, Korea (Jan. 2021)

LEADERSHIP AND TEACHING EXPERIENCE

Seminar Presenter, KROS Locomotion Manipulation Research Group Workshop (Apr 2024)

- Presented a seminar titled “Real-Time MPC via Improvement of MPPI Sampling Techniques”

Research Intern, Korea Institute of Science and Technology (KIST) (Jul – Aug 2022, Mar – Jul 2023)

- Worked as a student researcher focusing on the development of the Center of Mass (CoM) trajectory generator for humanoid robots

Member, Machanical Automatic Control(MAC) Club (Mar 2022- Jan 2024)

- Participated in projects and activities related to mechanical automation and control systems(manipulator control, soft robot- origami gripper)

Treasurer, Korean Student Association (2022 Spring semester)

- University of Wisconsin–River Falls
- Contributed to planning and executing cultural and community-building events

Team Leader, DoDream Collaborative Learning Study Group (Sep 2021 – Dec 2022)

- University of Dongguk

- Organized study sessions focused on robotics, kinematics, path planning algorithms

Teacher, Eduplex Academy (Aug 2020 – Jan 2022)

- Instructed Mathematics, English, and Science to grades 7–11

SKILLS AND TECHNIQUES

Programming Languages: Python, C++, MATLAB, CUDA

Developer Tools: Eigen, RBDL, ROS, Git, MuJoCo, qpOASES

Unity Languages: Korean (Native), English (Fluent)