Yunho Kim

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RESEARCH INTERESTS

Robotics (Manipulation, Locomotion, Navigation), Learning-based control, Reinforcement learning

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST) Sep 2022 - Feb 2024

Master of Science in Robotics & Machine Learning (Advisor: Jemin Hwangbo) GPA: 4.18/4.3

Seoul National University Mar 2018 - Feb 2022

Bachelor of Science in Mechanical Engineering GPA: 3.75/4.3

WORKING EXPERIENCE

Neuromeka | *AI Researcher/Engineer* Feb 2024 - Current

- Conducting research on bi-manual manipulation and high-level motion planning

RAI Lab, KAIST | *Student researcher* Jun 2021 - Sep 2021, Jan 2022 - Aug 2022

- Proposed an autonomous navigation framework with a novel learning-based local planner for safe quadruped robot navigation in geometrically complex environments. The developed method utilized model-based reinforcement learning and generative modeling techniques.
- The results are published as a paper in the RSS 2022 conference [https://arxiv.org/abs/2204.08647].

INROL Lab, Seoul National University | *Student researcher* Mar 2021 - Jun 2021, Sep 2021 - Dec 2021

- Proposed a multiple-gait learning framework for quadruped robots inspired by central pattern generators of humans. The developed framework utilized hierarchical reinforcement learning techniques.
- The results are available as a preprint in Arxiv [https://arxiv.org/abs/2112.04741].

RLLAB Lab, Seoul National University | *Student researcher* Aug 2020 - Mar 2021

- Proposed a neural network architecture to detect objects given speech commands.
- Processed open-source text data to suitable speech representation using Google's Text-to-Speech API and signal processing libraries. Used Google Colab for training.
- Conducted study on vision language navigation.

CORE Lab, Seoul National University | *Student researcher* Apr 2020 - Jul 2020

- Implemented path tracking and planning algorithms for autonomous RC car navigation.
- Worked on setting up the hardware platform, and the platform is currently being used in the lab.

Samsung Electronics Creative-LAB | *Software Development Intern* Jan 2020 - Feb 2020

- Developed Android application prototype for sensing data and informing users via Bluetooth communication.
- Used Android Studio for the app development. Used Arduino for the hardware prototype.

PUBLICATIONS (more details at https://awesomericky.github.io/)

Learning Fast, Tool-aware Collision Avoidance for Collaborative Robots IEEE RA-L 2025

Joonho Lee, **Yunho Kim**, Seokjoon Kim, Quan Nguyen, Youngjin Heo

High-speed Control and Navigation for Quadrupedal Robots on Complex and Discrete Terrain Science Robotics 2025

Hyeongjun Kim, Hyunsik Oh, Jeongsoo Park, **Yunho Kim**, Donghoon Youm, Moonkyu Jung, Minho Lee, Jemin Hwangbo

Learning Semantic Traversability with Egocentric Video and Automated Annotation Strategy IEEE RA-L 2024

Yunho Kim*, Jeong Hyun Lee*, Choongin Lee, Juhyeok Mun, Donghoon Youm, Jeongsoo Park, Jemin Hwangbo

Not Only Rewards But Also Constraints: Applications on Legged Robot Locomotion IEEE T-RO 2024

Yunho Kim, Hyunsik Oh, Jeonghyun Lee, Jinhyeok Choi, Gwanghyeon Ji, Moonkyu Jung, Donghoon Youm, Jemin Hwangbo

Safety Guided Policy Optimization IROS 2022

Dohyeong Kim, **Yunho Kim**, Kyungjae Lee, Songhwai Oh

Learning Forward Dynamics Model and Informed Trajectory Sampler for Safe Quadruped Navigation RSS 2022

Yunho Kim, Chanyoung Kim, Jemin Hwangbo

Learning Multiple Gaits of Quadruped Robot Using Hierarchical Reinforcement Learning arXiv 2022

Yunho Kim, Bukun Son, Dongjun Lee

PERSONAL PROJECTS (more details at https://awesomericky.github.io/)

Perceptive locomotion controllers for quadruped robots

- Trained perceptive locomotion controllers for quadruped robots using reinforcement learning and constrained reinforcement learning.
- Implemented the training framework in C++ and Python. Engineered design choices (e.g., neural network architecture, rewards/constraints, curriculum learning) for high control performance.
- Implemented other State-Of-The-Art methods [https://github.com/awesomericky/quadruped-robot-belief-encoder]
- Obtained highly robust locomotion controllers that can react to both velocity commands and point-goal commands.

Terrain mapping

- Designed and implemented a 2.5D terrain mapping pipeline (software architecture) in both the simulation and the real world. The pipeline includes acquiring camera data, merging state estimators, and generating terrain maps.
- Implemented the pipeline in C++ and ROS. Used advanced techniques in C++ and Linux like multi-threading, RT kernel / RT scheduling, and singleton patterns for high-performance software. Used realsense SDK for camera data acquisition.
- Obtained very high mapping frequency (about 60 Hz) with very small latency.