Yujin Kim

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RESEARCH INTEREST

Reinforcement Learning	Optimization and Control	Probabilistic Inference
Decision-Making	Explainable ML	Embodied Intelligence

EDUCATION

Cornell University — New York, United States
PhD in Computer Science; — *Aug. 2024 –*

Korea University — Seoul, Republic of Korea
MS in Electrical Engineering; GPA: 4.39/4.5 — *Mar. 2021 – Aug. 2023*

- Thesis: "Off-Policy Reinforcement Learning Training Method for Multi-Goal Environments and Driving Framework with Synchronized Model Predictive Control"

University of Seoul — Seoul, Republic of Korea
BS in Electrical and Computer Engineering; GPA: 4.0/4.5 — *Mar. 2017 – Feb. 2021*

PUBLICATIONS

- [C1] **Yujin Kim**, Nathaniel Chin, Arnav Vasudev and Sanjiban Choudhury. "Distilling Realizable Students from Unrealizable Teachers." arXiv preprint arXiv:2505.09546 (2025).
- [C2] **Yujin Kim**, Dong-Sung Pae, Sun-Ho Jang, Seong-Woo Kang, and Myo-Taeg Lim. "Reinforcement Learning for Autonomous Vehicles Using MPC in Highway Situations." International Conference on Electronics, Information, and Communication (ICEIC), pp. 1-4. IEEE, 2022. [paper]
- [C3] **Yujin Kim**, Keunwoo Jang. "Whole-body motion planning of dual-arm mobile manipulator for compensating for door reaction force." 2024 IEEE International Conference on Robotics and Automation in PACIFICO Yokohama, Japan, May. 2024.
- [J1] **Yujin Kim**, Dong-Sung Pae, Sun-Ho Jang, Woo-Jin Ahn, and Myo-Taeg Lim. "A reinforcement learning approach to dynamic trajectory optimization with consideration of imbalanced sub-goals in self-driving vehicles." Applied Sciences 14.12 (2024): 5213.
- [J2] Dongwhan Kim, Euncheol Im, **Yujin Kim**, and Yisoo Lee. "Improving Sampling-based MPC for High-frequency Task Space Control of Robot Manipulator" Under Review.
- [J3] **Yujin Kim**,Sol Choi, Bum-Jae You, Keunwoo Jang and Yisoo Lee "Subspace-wise Hybrid RL for Articulated Object Manipulation." arXiv preprint arXiv:2412.08522 (2024).
- [J4] Sun-Ho Jang, Woo-Jin Ahn, **Yujin Kim**, Hyung-Gil Hong, Dong-Sung Pae, and Myo-Taeg Lim. "Stable and Efficient Reinforcement Learning Methods for Avoidance Driving of Unmanned Vehicles." Electronics 12, no. 18 (2023): 3773. [paper]

RESEARCH EXPERIENCE/SELECTED PROJECTS

Korea Institution of Science and Technology — Seoul, Republic of Korea
Research Scientist — *Jan. 2023 – Present*

- **Manipulator Motion Planning and Control**: Developed autonomous robot manipulator operation using RL-based methods, implemented on real robot (Franka Research 3) post-simulation. [J3]

Control and Mechatronics Lab, Korea University — Seoul, Republic of Korea
Research Assistant — *Mar. 2021 – Dec. 2022*

- **RL Methodology**: Proposed off-policy RL training method addressing sub-goal distribution imbalance. [J1]

- **Path Planning for Autonomous Vehicle**: Developed hybrid RL-MPC path planning and control agent overcoming feasibility and real-time issues. [C2]
- **Pallet Loading Algorithm with Robot Manipulator**: Increased space efficiency by 11.8% using RL-based pallet loading algorithm on real robot (Doosan Robotics M1013).

Hyundai Motor Group Seoul, Republic of Korea
Research Scholarship Fellow *Sep. 2019 – Dec. 2022*

- **Fail-Safe System for Autonomous Vehicles**: Developed active fail-safe system for sensor failure scenarios.
- **Analysis and Statistical Modeling for Lane Change Decision-Making**: Conducted data analysis and probability modeling using the US Highway 101 Dataset. Achieved more than 95% estimation accuracy for lane change time.

Hyundai Motor Group Seoul, Republic of Korea
R&D Software Engineer Intern *Jul. 2019*

- **Traffic Lane Correction**: Developed lane correction algorithm to address inaccuracies from video data.

Microrobot Research Society ZETIN, University Of Seoul Seoul, Republic of Korea
Project Member *Mar. 2017 – Feb. 2019*

- **Embedded Software Competition**: Developed perception and decision-making algorithms for urban areas using an embedded RC car platform.
- **Intelligent Model Car Competition**: Produced model car and developed driving algorithms for racing tracks.
- **Microrobot Competition**: Engineered line-following robot hardware and driving algorithm.

HONORS AND AWARDS

Scholarship for Excellent Achievement, University of Seoul *Spring, 2018*

Research Scholarship Fellow, Hyundai Motor Group *Sep. 2019 – Dec. 2022*

Teaching Assistant Scholarship, Korea University *Spring, Fall 2021 – 2022*

3rd Place, 10th F1TENTH Autonomous Racing Grand Prix, ICRA 2022 *May 2022*

3rd Place, 2018 Intelligent Model Car Competition, Hanyang University *Jul. 2018*

Special Award for Women Engineer, 14th Microrobot Competition, Dankook University *Jul. 2017*

TEACHING AND TUTORING

Mentor, Cornell Bowers Undergraduate Research Experience (BURE) *Jun. 2023 – Aug. 2023*

Research Staff, Cornell Engineering: CURIE Academy Summer Program *Jan. 2023 – Feb. 2023*

Senior Research Mentor, Control and Mechatronics Lab, Korea University *Mar. 2022 – Dec. 2022*

Teaching Assistant, Spring 2022 Mechatronics Course, Korea University *Mar. 2022 – Jun. 2022*

Senior Tutor, ZETIN, University of Seoul *Mar. 2018 – Dec. 2018*

Korean Tutor, KUGS Language Exchange Program, Korea University *Oct. 2022 – May 2023*

Seoul Donghaeng-Teaching Volunteering, University of Seoul *Mar. 2018 – Jun. 2021*