

Junhyeok Lee

B.S. in Automotive Engineering
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RESEARCH INTERESTS

Sim-to-Real Transfer
Neural Rendering
Generative World Models for Autonomous Driving

EDUCATION

Kookmin University , Seoul, Korea	Mar. 2021 - Present
B.S. in Automotive Engineering	Major GPA 4.08/4.5
Minor in Artificial Intelligence	

EXPERIENCE

Research Intern, Vehicle Intelligence Lab, Seoul National Univ.	Jan. 2026 - Feb. 2026
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- Integrated datasets and trained learning-based perception models for autonomous navigation with a tracked off-road mobile robot.
- Optimized model deployment on a **Qualcomm NPU** to support real-time on-board inference.

Undergraduate Research Intern, Kookmin University	Dec. 2025 - Jan. 2026
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- Studied **imitation learning** and **reinforcement learning** approaches for learning-based autonomous parking.
- Implemented and evaluated autonomous parking scenarios in the **CARLA simulator**.

KUUVe (Kookmin Univ. Unmanned Vehicle)	Jun. 2024 - Nov. 2025
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- Developed **localization** and **path-tracking** algorithms using odometry and GPS for autonomous driving platforms.
- Implemented **reinforcement learning** algorithms with **Sim-to-Real** transfer on JetRacer and led two competition teams.

KaAI (Kookmin automotive Artificial Intelligence)	Nov. 2023 - May. 2024
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- Performed dataset post-processing for camera and LiDAR-based autonomous driving research.
- Conducted segmentation tasks and prepared training data for deep learning model development.

PROJECTS

Unity-based Driving Simulator and Sim-to-Real Transfer	Jun. 2025 – Jun. 2026
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- Built a Unity-based driving simulator from scratch with custom vehicle dynamics and a configurable multi-sensor pipeline (camera, LiDAR, radar, IMU, GNSS), including additive Gaussian sensor noise modeling for Sim-to-Real transfer.

SCHOLARSHIPS AND HONORS

2024-2 nd semester	Kookmin University Performance-based Scholarship
2024-2 nd semester	COSS Performance-based Scholarship, Kookmin University
2025-1 st semester	Kookmin University Performance-based Scholarship
2025-1 st semester	COSS Performance-based Scholarship, Kookmin University
2025-2 nd semester	Kookmin University Performance-based Scholarship
2025-2 nd semester	COSS Performance-based Scholarship, Kookmin University
2025-2 nd semester	Dean's List, Kookmin University

AWARDS

2025 International Robot Contest by IROC, KRSA Oct. 2025

3rd Place

Built a Unity-based competition-track simulator and developed a reinforcement learning-based lane-following model with Gaussian Noise-based **Sim-to-Real** transfer.

2025 HL FMA aMAP Innovator Championship [1/5] by HL Mando Sept. 2025

Encouragement Award

Developed a GPS-based autonomous **parking system** that transforms LiDAR-detected obstacles into an absolute coordinate frame for parking-slot selection and path following.

2025 Autonomous Driving Robot Race by Robot Race Org. Committee May. 2025

2nd Place

Developed GPS-based **localization** and **path-tracking** modules using a Pure Pursuit–Stanley hybrid controller with adaptive lookahead.

2024 AutoRace by COSS (Convergence and Open Sharing System) Dec. 2024

3rd Place (COSS Council Chairperson Award)

Led the team and developed a rule-based decision-making algorithm that selects driving strategies using real-time LiDAR and camera perception.

2024 International Robot Contest & R-BIZ Challenge by IROC, KRSA Oct. 2024

2nd Place

Developed odometry-based driving strategy selection and applied a **Kalman Filter** to improve localization reliability under encoder and IMU noise.

PUBLICATIONS

- “Performance Enhancement of Lane Following in Autonomous Driving Using Sequential Multi-Critic PPO with Critic Transfer Strategy”

Junhyeok Lee, *et al.*

KSAE Annual Fall Conference, November 2025 (Accepted).

- “Improved Path-Tracking Performance and Driving Stability of Nonlinear Model Predictive Control Using Variable Steering-Angle Weights Based on Arctangent Function”

SKILLS

Languages	Korean (Native), English (Intermediate)
Programming	Python, C, C++
Deep Learning Frameworks	PyTorch, TensorFlow, TensorRT, Gymnasium
Tools	Git, Docker, CATIA, MORAI, CARLA, Unity
Hardware Systems	JetRacer (Waveshare), ERP-42 Racing (Unmanned Solution)