Soonhyuk Kang

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Education

KwangWoon University Expected Graduation Date: Feb 2026

GPA: 4.13/4.5

Major GPA: 4.17/4.5

Bachelor of major Robotics

Work Experience

Hazardous and Extreme Environment Robotics Lab @HERO Jun 2025 – Aug 2025

Intern

- Imported a SLAM baseline into the lab's underwater simulation environment

Robotics & A.I. Lab @RAIL July 2024 – Jun 2025

Student Intern

- Research on SLAM
- Participated in the VLM-based project

Magnetic Robotics Lab @MRL Jan 2024 – July 2025

Student Intern

- Research on Magnetic Robot

Projects

Line Tracking (NVIDIA PilotNet) + Traffic Sign Detection (YOLO) – Raspberry Pi Autonomous Driving Oct 2025 – Nov 2025

- **[Team Leader]** Built a real-time autonomous driving system on Raspberry Pi 5 using multi-threaded lane tracking and YOLO-based traffic-sign detection.
- Applied dual PilotNet lane models (Left/Right) and switched models dynamically based on sign recognition results for reliable maneuvering.
- Enhanced on-device performance through ROI-based preprocessing and hardware-aware model optimization.

Underwater SLAM Baseline Import Jun 2025 – Aug 2025

- Imported a SLAM baseline into the lab's underwater simulation environment.
- Extracted datasets from simulation for evaluation.
- Set up the imported baseline as a reference for comparison with the lab's SLAM system.

Autonomous Mobile Robot for Target Search Based on LLM Jan 2025 – Aug 2025
[Team Leader]

- Developed an indoor autonomous robot that integrates LLM and SLAM to search for missing targets based on natural language descriptions.
- Applied a modified Bayesian approach to infer location probabilities from human traits interpreted by the LLM.
- Generated search priorities and executed autonomous navigation using Cartographer-based SLAM and ROS2 communication.

Home Sign Language Assistant Robot Using Turtlebot Apr 2025 – Jun 2025

- Developed a home assistant robot that recognizes sign language commands and performs actions
- Built indoor 2D SLAM maps using Cartographer and tuned parameters for stable navigation.
- Linked sign command interpretation with navigation and object grasping using ROS2.

Cross-View Place Recognition Using Vision-Language Models Jul 2024 – Oct 2024

- Performed cross-view image matching for visual place recognition (VPR) using CLIP and ViT-based VLM.
- Generated image-text embeddings via semantic captioning and Transformer-based feature extraction.
- Enhanced top-1 recall accuracy by aligning features across viewpoints through language-guided cues.

Object Detection Using RealSense and Data Communication with Kiosk System Aug 2024 – Dec 2024

- Designed a real-time kiosk system integrating RealSense cameras and socket communication.
- Trained object detection models using YOLO and applied them for fruit classification.
- Implemented data validation and optimized system accuracy using Python.

Robot Arm Control System: Implementation of Kinematics, Simulation, and Control Oct 2024 – Dec 2024

- Developed a simulation UI for robot arm kinematics using ODE.
- Implemented motor control algorithms and real-time communication with ODE.
- Verified simulation accuracy through real-time joint angle control.

A mobile robot equipped with multiple sensors Mar 2024 – Jun 2024
[Team Leader]

- Conducted the project using the C language.
- Developed a mobile robot with Atmega 128 as the main controller and equipped it with six sensors for operation
- Each sensor operated using the PWM method.

Line Tracer Sep 2023 – Dec 2023

- Conducted the project using Matlab.
- Used an LED to detect black lines and navigation.
- Processed the detected data through normalization to minimize oscillation.

Publication

Soonhyuk Kang, Minjae Wi, Chulho Jin, Seonguk Kim, and Junghyun Oh, "LLM 기반 특정 대상 탐색을 위한 자율주행 모바일 로봇," in *Proceedings of the Institute of Control, Robotics and Systems (ICROS) Annual Conference*, June 2025, pp. 1028–1029.

I Made Putra Arya Winata, Jinhoon Wang, Soonhyuk Kang, and Junghyun Oh, "장소 인식을 위한 시각 언어 모델 추출 기반 교차 시점 접근법," in *Proceedings of the Korea Robotics Society Annual Conference (KROC)*, February 2025, pp. 422–423.

Awards

Poster – First Prize, Match-Up Advanced Program Competition, Kwangwoon University Dec 2025

Report – Second Prize, Match-Up Advanced Program Competition, Kwangwoon University Dec 2025

Participation prize, ICT Hanium DreamUp Nov 2025

Dean's List (Academic Excellence), Kwangwoon University Apr 2025

Research Interest

Autonomous driving

Reinforcement Learning

SLAM

Skills

Programming: C++ / C, Python
Language: Korean, English