



# SOONHYUK KANG

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## Education

**KwangWoon University**

Expected Graduation Date: Feb 2026

**GPA: 4.16/4.5**

**Major GPA: 4.21/4.5**

*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**  
[Team Leader]

Jan 2025 – Aug 2025

- 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 [Team Leader]

Mar 2024 – Jun 2024

- 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

강순혁, 김선국, 위민재, 진철호, 오정현, "베이지안 추론과 비전 인지를 결합한 LLM 기반 자율 탐색 모바일 로봇," 한국로봇종합학술대회(KROC), 2026년 2월

I Made Putra Arya Winata, 왕진훈, 강순혁, 오정현, "장소 인식을 위한 시각 언어 모델 추출 기반 교차 시점 접근법," 한국로봇종합학술대회(KROC), 2025년 2월

## 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