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

Deep Learning-based Lane Tracking and Traffic Sign Recognition System –   Oct 2025 – Nov 2025
Raspberry Pi Autonomous Driving
    [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.

User-Customized Plating using Vision Technology 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

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

I Made Putra Arya Winata, 왕진훈, 강순혁, 오정현, "장소 인식을 위한 시각 언어 모델 추출 기반 교차 시점 접근법," in 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

Excellence Prize, 2024 Intelligent Robot WE-Meet Project Integrated Competition Dec 2024

RESEARCH INTEREST

- **Autonomous driving**

- **Reinforcement Learning**

- **SLAM**

SKILLS

Programming: C++ / C, Python
Language: Korean, English (TOEIC : 750)