Curriculum Vitae

Seungmin Lee (이승민)

Contact: +82 10-5540-1890
Mail: albert31115@gmail.com
Link: https://highsky7.github.io/

Profile

- Expertise in autonomous systems, robotics, and computer vision
- Proficient in developing and deploying real-time perception (object detection/segmentation) and control algorithms on embedded systems (Jetson Orin Nano)
- Hands-on experience building end-to-end VLA model pipelines, spanning data collection, training, evaluation, and distributed inference via remote GPU servers using ZeroMQ library
- Experience with transformer architectures including Whisper-based speech recognition
- Experience in full-stack application development

Education

Konkuk University | Seoul, South Korea
B.S. in Mechanical Engineering (Expected Aug 2026)

- **Overall GPA:** 3.59 / 4.50
- **Major GPA:** 3.69 / 4.50
- **Rank:** Top 9.1%

Selected High-Grade Coursework:

Subject	Grade	Subject	Grade
Self-Designed Semester Project	A+	Application of Mechanical-AI	A
Introduction to Future Automotive Engineering	A+	Problem Solving through Programming	A+
Capstone Design (E)	A	Computational Thinking	A+
System Modeling & Design	A	Understanding Artificial Intelligence	A

Research Experience

Korea University MINT LAB | Seoul, South Korea
Undergraduate Research Intern (11/2025 - Present)

- Designed and implemented training scripts and data preprocessing pipelines tailored to the lab's Vision-Language-Action (VLA) model architecture.
- Developed a real-time visualization framework for the LeRobot library's LIBERO evaluation pipeline to enable live monitoring of policy execution.
- Created gravity compensation controller node with data recording option using Pinocchio library on OpenArm v0.3 hardware.
- Built a data collection pipeline for VLA model training, recording teleoperated demonstrations into the LeRobot dataset format with synchronized image observations, joint states, and action labels.
- Implemented a distributed VLA inference pipeline using ZeroMQ, enabling server-side model inference on a remote GPU cluster and real-time action streaming to the robot-connected client laptop for closed-loop policy execution.
- Currently researching VLA architectures targeting efficient learning, improved generalization, and long-horizon task performance.

Awards & Honors

- **Minister of Trade, Industry and Energy Award** | 2025 E2 Festa (Engineering Education Festival) Creative Capstone Design Competition (11/2025)
- **Hanwha National Defense Award (2nd Place, Sponsored by Hanwha AeroSpace)** | The 2025 Army Chief of Staff Cup (09/2025)
- **1st Place** | 2025 Hanyang University Consortium Creative Capstone Design Competition (11/2025)
- **2nd Place** | The 4th International University Student EV Autonomous Driving Competition (07/2025)
- **4th Place** | aMAP Innovator Championship (09/2025)
- **2025 1st Semester Dean's List** (07/2025)
- **2025 2nd Semester Dean's List** (02/2026)
- **Bronze Award** | The 4th Dalseo National University Student Invention Idea Contest (08/2024)
- **Design Award** | The 3rd Future Automobile Software Contest (08/2024)

Language Skills

- **OPIC:** IH (Intermediate High)
- **TOEIC:** 885

Research Objective

- To conduct graduate-level research toward improving the generalization and long-horizon task performance of Vision-Language-Action (VLA) models for general-purpose robotics.

Research Interest

My primary research interest lies in developing Vision-Language-Action (VLA) models for more versatile and generalizable robotic control. Inspired by foundational works such as OpenVLA, π_0, and $\pi_{0.5}$, I focus on designing novel architectures that enable efficient training and facilitate cross-embodiment transfer. Specifically, I am exploring chain-of-thought structures that connect naturally to the action space to improve long-horizon task performance, and leveraging reinforcement learning to enhance generalization in unseen environments.

- Vision-Language-Action (VLA) Models
- Robotic Manipulation and Generalization

Projects & Technical Experience

(Prioritized by relevance and key achievements)

The 2025 Army Chief of Staff Cup National Defense Robot Competition

Software Team Lead (07/2025 - 09/2025)

- **Achievement:** Secured the Hanwha National Defense Award (2nd Place).
- ***Repository:*** DolbotX
- Designed a mission-critical perception system for autonomous pick-and-place operations.
- Engineered a high-accuracy pipeline integrating a custom YOLOv8 model with multi-class drivable area segmentation, and converted PyTorch weights to ONNX format for optimized inference.
- Spearheaded the integration of the vision module with robotic manipulator controls via ROS2 services for precise autonomous execution.

2025 Hanyang University Consortium & 2025 E2 Festa (Engineering Education Festival) Creative Capstone Design Competition

Speech Recognition Developer (11/2025)

- **Achievement:** Secured 1st Place in the 2025 Hanyang University Consortium and Minister of Trade, Industry and Energy Award in the 2025 E2 Festa (Engineering Education Festival).
- Developed a speech recognition and text extraction algorithm utilizing OpenAI's Whisper model.
- Implemented noise attenuation filters to enhance recognition accuracy in noisy environments.

The 4th Int'l University Student EV Autonomous Driving Competition

Team Lead, Perception (01/2025 - 07/2025)

- **Achievement:** Led team to 2nd Place among 26 international universities.
- ***Repositories:*** Team / Personal - YOLOTL
- Directed the development of a real-time lane segmentation algorithm, decision module, and system integration on a laptop for a 1/5-scale EV.
- Developed a large-scale custom Bird's-Eye-View (BEV) lane dataset and trained a novel segmentation model (YOLOTL).
- Integrated the vision system with ROS1 for path generation and implemented a pure pursuit lateral controller.
- Designed a decision module to dynamically adjust the EV's steering angle based on real-time track conditions.
- Managed a hybrid environment using bash scripts and Python virtual environments to handle dependency conflicts between VoxelNeXt and YOLOTL packages.

aMAP Innovator Championship 2025 [1/5]

Team Lead, Vision Systems (09/2025)

- **Achievement:** Led team to 4th Place out of 38 highly competitive teams.
- Designed and implemented a robust computer vision system to accurately detect a 1/5 scale vehicle and classify traffic lights with 4 signals.

Self-Designed Semester Project: DolbotX Robot Platform

Project Lead (09/2025 - 12/2025)

- Developed the "DolbotX" general-purpose robot platform by integrating advanced perception and control modules into a versatile, autonomous system.

Graduation Project: CARLA Autonomous Driving Base Controller

System Lead (03/2025 - 07/2025)

- ***Repository:*** CARLA Base_Controller
- Integrated the CARLA simulator with ROS1 via a ROS bridge.
- Designed and validated a base controller (PID for longitudinal, Pure Pursuit for lateral) as a fallback mechanism for high-level controller failure.

Technical Skills

Category	Skills
Programming Languages	Python, C++, CLI
Frameworks & Libraries	LeRobot, PyTorch, ROS, ROS2 (Robot Operating System), OpenCV, NumPy, Ultralytics, MuJoCo
Core Competencies	Object Detection/Lane Segmentation (YOLOv8, YOLOPv2), Algorithm Development, Robotics Integration, Machine Learning
Developer Tools	Git, GitHub, Hugging Face, Linux, Roboflow