

# Curriculum Vitae

## Seungmin Lee (이승민)

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## Profile

- Expertise in autonomous systems, robotics, and computer vision
- Proficiency in developing and deploying real-time perception (object detection/segmentation) and control algorithms on embedded systems (Jetson Orin Nano)
- Experience with transformer architectures through Whisper-based voice recognition and VLA model development
- Experience in full-stack application development

## Education

### Konkuk University | Seoul, South Korea

B.S. in Mechanical Engineering (Expected Aug 2026)

- Overall GPA: 3.50 / 4.50 (Through 7th Semester)
- Major GPA: 3.54 / 4.50 (Through 7th Semester)
- Rank: Top 26% (Through 7th Semester)

### 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)

- Developed a real-time visualization framework for the LeRobot library's LIBERO evaluation pipeline to enable live monitoring of policy execution.
- Designed and implemented training scripts and data preprocessing pipelines tailored to the lab's Vision-Language-Action (VLA) model architecture.
- Constructed robot hardware structure XML files in MuJoCo simulation and configured a teleoperation environment for data collection and control validation.
- Created gravity compensation controller node with data recording option using Pinocchio library on OpenArm v0.3 hardware.
- Currently researching on VLA architectures targetting efficient learning, improved generalization, and long-horizon task performance.

## Awards & Honors

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- **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 Dean's List** (07/2025)
- **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

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

## Research Objective

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

## Research Interest

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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,  $\pi_0$ , 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
- Embodied AI & Foundation Models for Robotics
- Robotic Manipulation and Generalization

## Projects & Technical Experience

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(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](#)
- Architected a mission-critical perception system for autonomous pick-and-place operations.
- Engineered a high-accuracy pipeline integrating a custom YOLOv8 model with multi-class driving area segmentation, converting PyTorch weights to ONNX format for optimized inference.
- Spearheaded the successful integration of the vision module with robotic manipulator controls using the ROS2 service 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 library.
- 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 light 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

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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, YOLOv2), Algorithm Development, Robotics Integration, Machine Learning
Developer Tools	Git, GitHub, Hugging Face, Linux, Roboflow