HyunJe **LEE**

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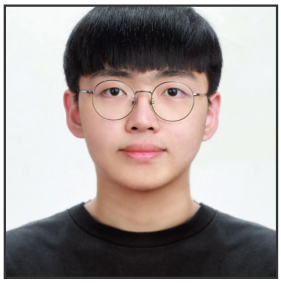

"Aspiring robotics researcher focused on robust visual perception."

Education

University of Seoul *Seoul, S.Korea*

Senior in Computer Science *Mar. 2020 - Present*

- Total GPA of 3.58/4.5, Major GPA of 3.40/4.5

Skills

Front-end JavaScript (Node.js, React), HTML5, CSS

Programming Python (OpenCV, TensorFlow), C++, C

Work Experience

Robust Vision under Adverse Light Conditions using Contrastive Learning

Individual Project *Apr. 2025 - Present*

- Developed a model using Contrastive Learning to enhance visual perception under glare and scattering
- Simulated glare-augmented inputs using both handcrafted filters and GANs, enabling same-class training with contrastive loss.

Autonomous Turret Development Project

Team Project *Apr. 2025 - Present*

- Embedded Systems, Computer Vision, and Control Algorithm Design
- Implemented automated firing control and target detection using OpenCV-based image processing.
- Optimized multi-target engagement with path optimization and shooting prioritization strategies.
- Designed algorithms for predictive shooting based on target distance and velocity estimation.

Hackathon for Learners with Cognitive Challenges

Team Project *Mar. 2025*

- Provide a game system with a user-friendly interface tailored for slow learners
- Designed a modular manufacturing process for intuitive use.

Auto Laptop Cooling System Project

Individual Project *Dec. 2024*

- Using an Atmega128 board
- DHT11 temperature sensor: Used to collect temperature data and control a fan motor using PWM based on the temperature.

Backpropagation Implementation

Individual Project *Nov. 2024 - Dec. 2024*

- Implemented a backpropagation model using code, without relying on any deep learning libraries.
- The model was tested on spiral, MNIST, and Gaussian datasets, achieving high accuracy in all cases.

Graduation Requirements Information Service for UOS Computer Science Students

Team Project *Sep. 2024 - Dec. 2024*

- Conducted as a Software Engineering course project with fellow students from the same department.
- Utilized data scraped from university administration systems.
- Enabled school website credentials (ID and password) via SSO (Single Sign-On).
- Addressed security concerns by implementing the system as a Chrome extension, allowing processing on the FE for enhanced reliability.

RL-based Autonomous Driving with AA

Team Project *Jun. 2024 - Nov. 2024*

- Term Project for 22nd Embedded Software Competition.
- Designed ARXML and AA(Adaptive Applications) based on AUTOSAR standards to implement obstacle avoidance driving using AWS DeepRacer.
- Fused camera and LiDAR data in real time for RL-based decision making and motor control.
- Engineered custom reward functions for efficient obstacle-avoiding RL agents in real-time scenarios.
- Entered the final round.

Multimodal Emotion Analysis using Machine Vision

Team Project — *Aug. 2023 – Oct. 2023*

- The 15th Creative Contest for Supporting Marginalized Communities
- Developed multimodal model integrating visual and auditory data.
- Applied multimodal fusion techniques for infant emotion recognition.
- Utilized OpenCV for facial tracking and Random Forest for audio analysis.

Making Line-Tracer device

TEAM Project — *Nov. 2021 – Dec. 2021*

- Term Project for Embedded System Course (Fall 2020)
- Developed a line-tracing robot using light sensors and camera vision to autonomously follow a track.
- Designed and implemented both hardware and software, integrating sensor calibration and path correction algorithms for stable performance.
- Collaborated with team members on mechanical assembly and embedded programming to ensure real-time adaptability to track conditions.

Embedded device that identifies the types and locations of surrounding hazards.

Team Project — *April. 2021 - Nov. 2021*

- Led the team in the Embedded Software Competition - Free Topic.
- A device that informs hearing-impaired individuals about the type of hazard and its location.
- The obstacle's location was determined using a 4-mic array and ODAS (Open embedded Audition System) to identify the direction.
- By utilizing the time difference of arrival (TDOA) among four microphones, the approximate location was calculated and displayed on a screen.
- Participated in the departmental competition "Saemteulje" in December 2021 and presented the sound source localization algorithm used in the device, and achieved 3rd place.
- Entered the final round.

Wall-Climbing Robot Using Electromagnet

Team Project — *Sep. 2020 - Nov. 2020*

- Term Project for SRC/IRC Intelligent Creative Robot Competition.
- Developed a custom movement algorithm for stable operation.
- Robot was designed to provide supplies efficiently during the COVID-19 pandemic in non-face-to-face environments.
- Obstacles were detected and avoided through ultrasonic sensors, and they could move in all directions with proper movement of electromagnets and motors.
- A movement algorithm for stable movement was developed by ourselves.
- Won the 3rd prize.

Honors & Awards

International

2024	**Finalist**, 22th Embedded Software Contest (Autonomus driving)	*KESSIA, Korea*
2023	**Creative Award**, The 15th Creative Contest for Supporting Marginalized Communities	*STI, Korea*
2021	**3rd Prize**, UOSCS Saemteulje	*University of Seoul*
2021	**Finalist**, 19th Embedded Software Contest (Free Topic)	*KESSIA, Korea*
2020	**Excellence Award**, UOS Learing Community	*University of Seoul*
2020	**President of the KIRIA**, SRC/IRC Intelligent Creative Robot Competition	*MOTIE, Korea*

Extracurricular Activity

ROS Seminar

University of Seoul

PARTICIPANT — *Mar. 2025 - Present*

- Attended a seminar on the Robot Operating System (ROS) covering system architecture, navigation, and control.
- Gained insights into ROS-based robotics development and its applications in autonomous systems.

Core Member, ZETIN Robotics Club

University of Seoul

Club member — *Mar. 2020 - Present*

- Participated in robotics competitions, led and attended seminars, and mentored new members as a core member of the ZETIN robotics club.
- Organized the 25th Line-Tracer Competition and coordinated multiple events at the University of Seoul.

Reinforcement Learning Seminar

University of Seoul

SEMINAR LEADER — *Sep. 2024 - Nov. 2024*

- Led a voluntary reinforcement learning seminar for the members of the robotics club ZETIN.
- Provided hands-on training using AWS DeepRacer for reinforcement learning in autonomous driving.
- Developed optimal driving algorithms by tuning hyperparameters and reward functions for obstacle avoidance.
- Designed an adaptive speed and steering control algorithm based on road curvature.

Department of Computer Science, University of Seoul

University of Seoul

Assistant for the course [Introduction to Creative Engineering Design] — *Sep. 2020 - Dec. 2020*

- Monitored the progress of students' projects and provided constructive feedback to ensure successful completion.
- Prepared and maintained materials and equipment necessary for lectures and practical sessions.