Joonhyung **Lee**

AI Research Engineer

Seoul, Republic of Korea

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Work Experience

ATLO — *Seoul, S.Korea*

CTO, Full-time — *Jun. 2024 – May. 2025*

- Built a multimodal AI agent with emotion-aware dialogue generation, deployed on robot, iOS, and web platforms

KAIST — *Daejeon, S.Korea*

Machine Decision Intelligence Lab, Undergraduate Research Intern — *Jan. 2022 – Jun. 2022*

- Implemented fundamental RL algorithms (e.g., Q-learning, Policy Gradient, SAC, and PPO methods) (Code)
- Supervisor: Donghwan Lee

Education

Korea University — *Seoul, S.Korea*

Master of Science in Artificial Intelligence — *Sep. 2022 - Aug. 2024*

- Supervisor: Sungjoon Choi
- Cumulative GPA: 4.14/4.50

Korea University — *Sejong, S.Korea*

Bachelor of Science in Electro-Mechanical Systems and Engineering — *Mar. 2018 - Feb. 2022*

- Cumulative GPA: 4.13/4.50 | Major GPA: 4.31/4.50 | Credit: 146 | Ranking: 2/88

Publications

SPOTS: Stable Placement of Objects with Reasoning in Semi-Autonomous Teleoperation Systems — *ICRA*

Joonhyung Lee, Sangbeom Park, Jeongeun Park, Kyungjae Lee, and Sungjoon Choi — *2024*

- *Project Page* | *Code* | *Paper* | *Video* | *Talk (15 min)*

Visual Preference Inference: An Image Sequence-Based Preference Reasoning in Tabletop Object Manipulation — *IROS*

Joonhyung Lee, Sangbeom Park, Yongin Kwon, Jemin Lee, Sungjoon Choi — *2024*

- *Project Page* | *Code* | *Paper* | *Video* | *Talk (10 min)* | *Poster*
- Presented on Vision-Language Models for Navigation and Manipulation (VLMNM) at ICRA 2024 Workshop

Quality-Diversity based Semi-Autonomous Teleoperation using Reinforcement Learning — *Neural Networks*

Sangbeom Park, Taerim Yoon, **Joonhyung Lee**, Sunghyun Park, and Sungjoon Choi — *2024*

- *Project Page* | *Paper* | *Video* | *Poster*
- Published in JCR Top 10% Journal in Computer Science, Artificial Intelligence & Neurosciences (Imapct Factor: 7.8)
- Presented on Physical Human-Robot Interaction at ICRA 2024 Workshop

CLARA: classifying and disambiguating user commands for reliable interactive robotic agents — *RA-L*

Jeongeun Park, Seungwon Lim, **Joonhyung Lee**, Sangbeom Park, Minsuk Chang, Youngjae Yu, and Sungjoon Choi — *2024*

- *Project Page* | *Paper* | *Video*

Robust Detection for Autonomous Elevator Boarding Using a Mobile Manipulator — *ACPR*

Seungyoun Shin, **Joonhyung Lee**, Junhyug Noh, and Sungjoon Choi — *2023*

- *Project Page* | *Paper* | *Video*

Skills

Programming	Python, C++, C#, MATLAB
Libraries	PyTorch, ROS2
Physics Simulation	MuJoCo, Isaac Sim, Unity, Gazebo
Realworld Robots	UR5e, Franka Panda, GAEMI, Pioneer 3-DX , DJI F450 Drone
DevOps	Docker, AWS, EC2
Languages	Korean (Native), English (Fluent)

Highly motivated with a strong ability to learn quickly and adapt to new challenges.

Projects

Interactive Multimodal Agent for Emotion-Aware Dialogue — *ATLO*

AI Research Engineer & CTO — *Jun. 2024 - May. 2025*

- Launched and operated a web-based dialogue agent service ATTO and iOS app DITTO.
- Led the development of multimodal robot hardware with a low-latency speech pipeline for real-time interaction.
- Implemented a RAG system using LangChain and LLMs with prompt engineering.
- Secured 110M KRW seed funding at a 1.1B KRW valuation from Strong Ventures.
- Achieved 54,000+ conversation sessions in four months.
- Materials: APP service, Web service, H/W architecture, Videos (ATTO, DITTO)

LLM-Based Human-Preference-Aware Robotic Systems — *ETRI*

M.S. Research Project — *Oct. 2023 - Mar. 2024*

- Developed LLM-powered robot behavior prediction system converting natural language commands to robot action sequences.
- Built human-robot dialogue interface with uncertainty handling and user preference feedback collection system.
- Implemented language-to-trajectory conversion module using Python and ROS2, deployed on Jetson AGX Orin platform. (Code)

Elevator Recognition System for Indoor Autonomous Robots — *ROBOTIS*

M.S. Research Project — *Sep. 2022 - Jul. 2023*

- Developed hierarchical detection system using YOLOv7 for elevator state recognition (e.g., floor, door status, direction).
- Implemented data augmentation techniques through diffusion methods, improving mAP@0.5 from 0.730 to 0.784.
- Deployed on Jetson AGX Orin platform with ROS2, successfully integrated into ROBOTIS GAEMI Robot product.
- Demo Videos: Final Demo | ROBOTIS Demo (#1, #2) | Campus Demo

Automation Maintenance using Mobile Manipulator — *SAMSUNG*

M.S. Research Project — *Sep. 2022 - Sep. 2023*

- Developed navigation and manipulation capabilities for mobile manipulators in factory settings
- Implemented simulation environments in MuJoCo for autonomous maintenance tasks. (Code)

Presentations

Perception (Semantic Scene Understanding) — *Abu Dhabi, UAE*

Conference Presentation — *Oct. 2024*

Oral presentation at 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

Perception (Semantic Scene Understanding) — *Yokohama, Japan*

Conference Presentation — *May, 2024*

Oral presentation at 2024 IEEE International Conference on Robotics and Automation (ICRA)

Vision-Language Models for Navigation and Manipulation — *Yokohama, Japan*

Conference Workshop — *May, 2024*

Poster presentation at 2024 IEEE International Conference on Robotics and Automation (ICRA)

Physical Human-Robot Interaction — *Yokohama, Japan*

Conference Workshop — *May, 2024*

Poster presentation at 2024 IEEE International Conference on Robotics and Automation (ICRA)

Patent

2024 **10-2024-0023216**, Visual Preference Inference: An Image Sequence-Based Preference Reasoning in Tabletop Object Manipulation — *Korea*

Honors & Awards

2022 **Scholarship for Admission Excellence (Half-Funding)**, Korea University
2020 **Gold Prize**, Engineering School Student Academic Conference, Korea University
2020 **Silver Prize**, Engineering School Student Academic Conference, Korea University
2019-2022 **Dean's List**, Korea University
2019-2022 **Best Tutor Award**, Statics, Electric Circuit, Control Engineering, Korea University
2018-2022 **Scholarship for Academic Excellence (Full-Funding)**, Korea Student Aid Foundation

Extracurricular Activity

Academic Service — *IROS*

Reviewer of the conference — *2025*