# Joonhyung **Lee**

AI RESEARCH ENGINEER

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## **Wor**k Experience

**Rebellions** *Seoul, S.Korea*

AI ENGINEER, FULL-TIME *Sep. 2024 – Present*

- Research on physical robotics using NPU platform.

**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

## **Edu**cation

**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
- Summa Cum Laude, Ranking: 2/88

## **Pub**lications

**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

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|---|---|
| **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.
- Implemented a RAG system using LangChain and LLMs with prompt engineering.
- Secured seed funding 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.
- 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*

- 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)

# Honors & Awards

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|---|---|
| 2022 | **Scholarship for Admission Excellence (Half-Funding),** 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                    *RA-L, IROS*

REVIEWER OF THE CONFERENCE                                                                          *2025*