Joonhyung Lee

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Education

Korea University Sep. 2022 - Present
M.S. in Artificial Intelligence **GPA: 4.11/4.5**
Advisor: Sungjoon Choi

Korea University Mar. 2018 - Feb. 2022
B.S. in Electro-Mechanical Systems and Engineering **GPA: 4.11/4.5**
Major GPA: 4.32/4.5

Publications

Jeongeun Park, Seungwon Lim, **Joonhyung Lee**, Sangbeom Park, Minsuk Chang, Youngjae Yu, and Sungjoon Choi, "CLARA: classifying and disambiguating user commands for reliable interactive robotic agents", in IEEE Robotics and Automation Letters (RA-L), Feb. 2024.

Joonhyung Lee, Sangbeom Park, Yongin Kwon, Jemin Lee, Sungjoon Choi, "Visual Preference Inference: An Image Sequence-Based Preference Reasoning in Tabletop Object Manipulation", in Submission, Jan. 2024.

Sangbeom Park, Taerim Yoon, **Joonhyung Lee**, Sunghyun Park, and Sungjoon Choi, "Quality-Diversity based Semi-Autonomous Teleoperation using Reinforcement Learning ", in Submission, Jan. 2024.

Joonhyung Lee, Sangbeom Park, Jeongeun Park, Kyungjae Lee, and Sungjoon Choi, "SPOTS: Stable Placement of Objects with Reasoning in Semi-Autonomous Teleoperation Systems", in Proc. of the IEEE International Conference on Robotics and Applications (ICRA), May 2024.

Seungyoun Shin, **Joonhyung Lee**, Junhyug Noh, and Sungjoon Choi. "Robust Detection for Autonomous Elevator Boarding Using a Mobile Manipulator", in Proc. of Asian Conference on Pattern Recognition (ACPR), July. 2023.

Research Experience

Machine Decision Intelligence & Learning Lab | KAIST (*Prof. Donghwan Lee*) Jan. 2022 - Jun. 2022
Research Intern *Python, Reinforcement Learning, PyTorch, ROS1*

- Study the basic theory of Reinforcement Learning
- Implemented PPO, SAC, DDPG to solve tasks in OpenAI Gym, achieving 10% improvement over baselines.
- Solve robotics tasks: Manipulator Motion Planning and Navigation.

Human-oriented Robot System & Control Lab | Korea Univ. (*Prof. Hyunhwan Jeong*) Sep. 2019 - Feb. 2021
Undergraduate Research Student *C/C++, Control, Robotics, ROS1, GitHub*

- Participated in projects on robotics, computer vision,
  - Robotics: 3 DOF Robot Arm Manipulation Motion planning
  - Computer Vision: Color-based object position tracking via Kalman Filter
- Poster presentation on Visual serving control robot arm-gripper system at 7th Korea University EMSE Student Academic Conference (The most excellent prize)

KUCIRA | Student Club Mar. 2018 - Feb. 2021
Undergraduate Research Club *C/C++, Control Theory, Embedded System*

- Participated in projects on robot programming, H/W design
  - Robot programming: Implemented Robot Programming
  - H/W Design: Design Mobile Robot and Robot Arm-gripper
- Poster presentation on Rescue Smart Car at 7th Korea University EMSE Student Academic Conference (The excellent prize)

Experience

ROBOTIS Sep. 2022 - Aug. 2023

Software Engineer *PyTorch, TensorRT, ROS2*

- Contributing to ROBOTIS AI Team, an Autonomous Elevator Boarding using a Mobile Manipulator AI project focused on robust detection and autocompletion.
- Using a YOLO-based detection model, and mitigating the class imbalance problem with diffusion models.
- Implemented an automated elevator boarding system that runs in real-time in a ROS2 environment.

Teaching Experience

Teaching Assistant, Intelligent Robotics (English Lecture) Mar. 2023 - Jun. 2023

Covers various topics in Robotics including Kinematics, Dynamics, SLAM, Path Planning, and etc.

codes: xai615-simulation | xai615-realworld

Tutoring for Korea University EMSE major subjects. Sep. 2019 - Feb. 2022

- Introduction of Statics (**Best TA**) Fall 2019.
- Statics Fall 2019.
- Electric Circuit I&II Spring, Fall 2021.
- Control Engineering I&II Sprint, Fall 2021.

Skills

Languages:

Python, C/C++, Matlab

Technologies & Tools:

MuJoCo, Git, Linux, ROS(1&2), Docker, AVR

Robots & Controller Hardware:

UR5e, Franka Panda, Aimbot (ROBOTIS), Jetson Nano, ATmega128, Raspberry PI, Arduino

Leadership

Students' Association. Mar. 2021 - Feb. 2022

Council President

- Guiding a community of 400+ EMSE students in their professional development, technical skills and interest in tech.
- Orchestrating workshops, coding sessions, and events to encourage socialization and continuous growth.