Jisu Han

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Research Interest

My primary research focus centers on the development of an artificial intelligence robotic agent endowed with human-like reasoning capabilities. The crux of my focus lies in the unique human ability to easily adapt to novel environments/scenarios. In particular, this requires to design a system that (1) actively *abstract* information from prior experiences or foundation models, and then (2) flexibly *adjust* the abstracted knowledge so that it can quickly adapt to unfamiliar environments under world models.
Within the realm of structured representation learning and adaptive world-models, currently, I am focusing on the (1) active abstraction phrase, investigating learning strategies for visual representations, aiming to enhance agent's capacity to understand the goal itself more clearly (See this project).

Education

Korea Advanced Institute of Science and Technology (KAIST) Seoul, S. Korea
Master Candidate of Artificial Intelligence, Advisor: Beomjoon Kim *Sep. 2022 - Aug. 2024 Expected*

Ewha Womans University Seoul, S. Korea
B.S. in Computer Science and Engineering (Overall 4.0/4.3, Major 4.2/4.3) *Mar. 2018 - Mar. 2022*

Research Experience

Intelligent Mobile Manpulation Lab Research Intern Seoul, S.Korea
Korea Advanced Institute of Science and Technology (KAIST) *July. 2021 – Aug. 2022*

- Research on Interactive perception.

Dynamic Robotic Systems (DYROS) Lab Research Intern Remote
Seoul National University *Dec. 2020 – Aug. 2021*

- Developed a deep learning based grasp solution, published a domestic paper

Information Coding and Processing Lab Research Intern Seoul, S. Korea
Ewha Womans University *May 2019 – July 2019*

- Developed deep Learning(CNN), OpenCV based motion head and eye tracking system to prevent drowsy driving.

Internationsal Publications

Preference learning for guiding the tree search in continuous POMDPs
*Jiyong Ahn, Sanghyeon Son, Dongryung Lee, **Jisu Han**, Dongwon Son, and Beomjoon Kim*

- Conference on Robot Learning (CoRL) 2023

Class projects during Master's program

Goal-oriented visual abstraction for robotics manipulation
Ongoing main project *July. 2023 – Mar. 2024 Expected*

- For the robot to achieve the given goal, this project focuses on injecting architectural bias that conducts a visual abstraction by manipulating the segments that are given in open-world manner.
- Expected to submit European Conference on Computer Vision (ECCV) 2024 as a first author.

Hybrid-Space Diffusion for Task and Motion Planning with Offline RL
AI707: Advanced Topics in Deep Learning (Prof. Kimin Lee) Class project *Sep. 2023 – Dec. 2023*

- To resolve the downward refinement issues from bi-level planning in Task and Motion planning (TAMP), we adopt hybrid-space diffusion model in order to simultaneously optimize both high-level and low-level action parameters.
- You can see the project page here, got A0 in this class.

Clarifying the task: Identifying task from human videos as a representation
AI611: Machine Learning for Robotics (Prof. Joseph Lim) Class project *Mar. 2023 – June. 2023*

- Devise a representation that effectively disentangle environment information and task information via constrastive learning

- You can see the project page here, got A0 in this class.

Auditory Resilience: Diffusion Techniques for Noise-Intensive Sound Datasets

AI502: Deep Learning (Prof. Jaesik Cho) Class project *Mar. 2023 – June. 2023*

- Conducting data augmentation via diffusion model in order to handle noisy data
- You can see the project page here, got B+ in this class.

Compositional Meta-RL

AI614: Advanced deep learning (Prof. Sungju Hwang) Class project *Sep. 2022 – Dec. 2022*

- Inject compositional reasoning so that robots can quickly learn novel tasks by leveraging reusable elements from previous experiments.
- You can see the project page here, got A0 in this class.

Domestic Publications

A Method of Selecting Optimal Inverse Kinematics Solution of Redundant Manipulator for Grasping Door Handle Based-On Object Recognition

Donggu Lee, ***Jisu Han****, Kunwoo Jang, and Jaehung Park*

- Institute of Control, Robotics and Systems (ICROS), 2021

Deep Learning Based Autonomous-Driving Cart Using ROS for Computation Offloading

Jisu Han*, Jiyoon Park, Chaewon Kim, and Sangsoo Park*

- Korea Information Processing Society (KIPS), 2021

Scholarships and Awards

Robot Online Hackerton Encouragement Award | *Korea Univ.* July. 2020

Excellent research team for undergraduate research program | *Ewha Womans Univ.* July. 2019 – Nov. 2019

2018 Intel AI Hackerton Silver Prize | *Intel, Korea Univ.* Nov.2018

2018 AI School Silver Prize | *Korea Univ.* Aug.2018

Technical Skills

Languages: Korean (Native), English (Fluent)
Deep Learning: Pytorch, Tensorflow
Programming: Python, C/C++, Jave
Developer Tools: Git, Docker, Eclipse
Big Data: SQL, R, MongoDB