Hojoon Lee

AI Researcher

joonleesky@kaist.ac.kr | blog | github

Research Interests

My research aims to create intelligent systems that can continually learn, adapt, and generalize in dynamic environments.
To do so, I am interested in self-supervised learning, reinforcement learning, and its applications to gaming and robotics.

Education

KAIST — *Seongnam, Korea*
Ph.D. student in Artificial intelligence, advised by Prof.Jaegul Choo — *Mar.2022 - Present*

KAIST — *Seongnam, Korea*
M.S in Artificial intelligence, advised by Prof.Jaegul Choo (GPA: 4.1/4.3) — *Mar.2020 - Feb.2022*

Korea University — *Seoul, Korea*
B.S in Computer Science (GPA: 4.05/4.5) — *Mar.2014 - Feb.2020*

Work

Sony AI — *Tokyo, Japan*
Research Intern — *Feb.2024 - Aug.2024*

- Developing a vision-based autonomous racing agent in a realistic simulator using reinforcement learning.
- Mentor: Takuma Seno and Kaushik Subramanian.

KakakEnterprise — *Seongnam, Korea*
AI Research Intern — *Sep.2021 - Feb.2022*

- Built an open-source reinforcement learning framework, Jorldy (300+ ☆).

Neowiz — *Seongnam, Korea*
AI Research Intern — *Mar.2019 - Jul.2019*

- Develop a reinforcement learning agent that can play a turn-based strategy game, BrowndustZero.

Selected Publications

Slow and Steady Wins the Race: Maintaining Plasticity with Hare and Tortoise Networks — ***ICML'24***

- **Hojoon Lee**, Hyeonseo Cho, Hyunseung Kim, Donghu Kim, Dugki Min, Jaegul Choo, Clare Lyle
- To maintain network plasticity, introduce Hare and Tortoise networks, imitating the hippocampus and neocortex of the brain.

Investigating Pre-Training Objectives for Generalization in Visual Reinforcement Learning — ***ICML'24***

- Donghu Kim*, **Hojoon Lee***, Kyungmin Lee*, Dongyoon Hwang, Jaegul Choo
- Investigate which pre-training objectives are beneficial for out-of-distribution generalization in visual RL.

PLASTIC: Enhancing Input and Label Plasticity for Sample Efficient Reinforcement Learning — ***NeurIPS'23***

- **Hojoon Lee***, Hanseul Cho*, Hyunseung Kim*, Daehoon Gwak, Joonkee Kim, Jaegul Choo, Se-Young Yun, Chulhee Yun
- Construct a sample-efficient RL algorithm by preserving the model's input & label plasticity throughout training.

Honors & Awards

Travel Award ($3,000 as awards), Crevisse Partners, 2023.
SIGIR Best Short Paper Honorable Mention, 2022.
Korea Government Full Scholarship ($10,000 per year), Ministry of Science and ICT of Korea, 2020, 2021.
2nd place ($2,000 as awards), Korea University Graduation Project Competition, 1st & 2nd Semester, 2019.
College Scholarship ($4,000 credit as awards), Seongnam Scholarship Foundation, 2017.
Dean's List, Korea University, 2017.
Eight Army General Paik Sun Yup Leadership Award, LTG Thomas.S.Vandal, U.S Army, 2017.

Technical-Skills

Proficient Git, Python, PyTorch, Tensorflow
Experience C, Jax, Docker, SQL, Hadoop

Languages

English Fluent
Korean Native

Academic Service

Reviewer Neurips'23, ICLR'23, ICML'24

Publications

Do's and Don'ts: Learning Desirable Skills with Instruction Videos ***Preprint***

- Hyunseung Kim, Byungkun Lee, **Hojoon Lee**, Dongyoon Hwang, Donghu Kim, Jaegul Choo
- We present DoDont, a skill discovery algorithm that learns diverse behaviors while following the instruction videos.

Slow and Steady Wins the Race: Maintaining Plasticity with Hare and Tortoise Networks ***ICML'24***

- **Hojoon Lee**, Hyeonseo Cho, Hyunseung Kim, Donghu Kim, Dugki Min, Jaegul Choo, Clare Lyle
- To maintain network plasticity, introduce Hare and Tortoise networks, imitating the hippocampus and neocortex of the brain.

Investigating Pre-Training Objectives for Generalization in Visual Reinforcement Learning ***ICML'24***

- Donghu Kim*, **Hojoon Lee***, Kyungmin Lee*, Dongyoon Hwang, Jaegul Choo
- Investigate which pre-training objectives are beneficial for out-of-distribution generalization in visual RL.

A Simple Convolution Injector for ViT: Towards Effective Adaptation in Visuo-Motor Control ***ICML'24***

- Donyoon Hwang*, Byungkun Lee*, **Hojoon Lee**, Hyunseung Kim, Jaegul Choo
- Introduce an add-on convolution module for ViT which injects locality and translation equivariant biases.

PLASTIC: Enhancing Input and Label Plasticity for Sample Efficient Reinforcement Learning ***NeurIPS'23***

- **Hojoon Lee***, Hanseul Cho*, Hyunseung Kim*, Daehoon Gwak, Joonkee Kim, Jaegul Choo, Se-Young Yun, Chulhee Yun
- Construct a sample-efficient RL algorithm by preserving the model's input & label plasticity throughout training.

Learning to Discover Skills through Guidance ***NeurIPS'23***

- Hyunseung Kim*, Byungkun Lee*, **Hojoon Lee**, Dongyoon Hwang, Kyushik Min, Sejik Park, Jaegul Cho
- Develop a skill-discovery algorithm based on the spirit of the Go-Explore algorithm.

On the Importance of Feature Decorrelation for Unsupervised Representation Learning in RL ***ICML'23***

- **Hojoon Lee**, Gwanho Lee, Dongyoon Hwang, Hyunho Lee, Byungkyeun Lee, and Jaegul Choo
- Develop a self-predictive representation learning method from video for reinforcement learning.

ST-RAP: A Spatio-Temporal Framework for Real Estate Appraisal *(short)* ***CIKM'23***

- **Hojoon Lee***, Hawon Jeong*, Byungkun Lee*, and Jaegul Choo
- Propose a novel real estate appraisal framework that integrates a real estate's spatial and temporal aspects.

Towards Validating Long-Term User Feedbacks in Interactive Recommender System 🏆 *(short)* ***SIGIR'22***

- **Hojoon Lee**, Dongyoon Hwang, Kyusik Min, and Jaegul Choo
- Analyze the existence of long-term effects in reinforcement learning-based interactive recommender systems.

DraftRec: Personalized Draft Recommendation for Winning in MOBA Games ***WWW'22***

- **Hojoon Lee***, Dongyoon Hwang*, Hyunseung Kim, Byungkun Lee, and Jaegul Choo
- Develop a personalized champion recommendation system in *League of Legends* with a hierarchical transformer architecture.

Enemy Spotted: In-game Gun Sound Dataset for Gunshot Classification and Localization ***COG'22***

- Junwoo Park, Youngwoo Cho, Gyuhyeon Sim, **Hojoon Lee**, and Jaegul Choo
- Enhance the accuracy of real-world firearm classification and localization by in-game gun sound dataset.