Seo-Young Lee

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RESEARCH INTEREST

My research focuses on human-aligned AI through multimodal representation learning. I develop frameworks that bridge human latent states—such as natural language instructions and tactile signals—with agent behavior. My work spans procedural content generation (PCG), 3D human pose estimation, and zero-shot coordination in both gaming and physical domains.

Keywords: reinforcement learning, multimodal representation learning, PCG, human-AI interaction, human pose estimation

EDUCATION

M.S. in Artificial Intelligence Sep 2023 – Aug 2025
Gwangju Institute of Science and Technology (GIST)
GPA: 4.20/4.50

- **Thesis:** *Human-Like Procedural Level Generation via Reinforcement Learning with Contrastive Language-State Embedding*
- **Advisor:** *Kyung-Joong Kim*

B.S. in Computer Science and Engineering Mar 2017 – Feb 2023
Dongguk University
(GPA: 3.96/4.5)

PUBLICATIONS

** denotes equal contribution*

[1] **Human-Aligned Procedural Level Generation Reinforcement Learning via Text-Level-Sketch Shared Representation**
In-Chang Baek*, **Seo-Young Lee***, Sung-Hyun Kim, Geum-Hwan Hwang, Kyung-Joong Kim.
Under review at IEEE Transactions on Games, 2025.

[2] **IPCGRL: Language-Instructed Reinforcement Learning for Procedural Level Generation**
In-Chang Baek, Sung-Hyun Kim, **Seo-Young Lee**, Dong-Hyeon Kim, Kyung-Joong Kim.
IEEE Conference on Games (CoG), 2025.

[3] **Multi-Objective Instruction-Aware Representation Learning in Procedural Content Generation Reinforcement Learning**
Sung-Hyun Kim, Geum-Hwan Hwang, In-Chang Baek, **Seo-Young Lee**, Kyung-Joong Kim.
Under review at IEEE Conference on Games (CoG), 2026.

[4] **Automatic Curriculum Design for Zero-Shot Human-AI Coordination**
Won-Sang You, Tae-Gwan Ha, **Seo-Young Lee**, Kyung-Joong Kim.
IEEE Access, 2025.

[5] **Smart Insole: Predicting 3D human pose from foot pressure**
Isaac Han, **Seo-Young Lee**, Sang-Yeon Park, Ecehan Akan, Yiyue Luo, Kyung-Joong Kim
2nd NeurIPS Workshop on Touch Processing: From Data to Knowledge.

[6] **Shared Representation for 3D Pose Estimation, Action Classification, and Progress Prediction from Tactile Signals**
Isaac Han, **Seo-Young Lee**, Sang-Yeon Park, Ecehan Akan, Yiyue Luo, Joseph DelPreto, Kyung-Joong Kim
arXiv preprint.

PROJECTS

Funded Research

Instruction Agent Research based on Natural Language-Reward Function Embedding Jul 2024 – Jun 2025
Principal Investigator (PI) *National Research Foundation (NRF), Korea*

- Researched a novel framework for instruction-following agents by embedding natural language into reward functions. Supported by the NRF Master's Research Grant [1,2]

HCI + AI for Human-Centered Physical System Design Oct 2023 – Jan 2025
Graduate Researcher *GIST-MIT Project, GIST*

- Researched deep learning models to infer human latent states and poses from tactile sensor streams for enhanced human-AI co-adaptation. [5,6]

Human Activity Recognition & Object Detection for Art Creation Dec 2022 – Mar 2023
Project Leader *Samsung C-Lab / Dongguk University*

- Developed Human Activity Recognition (HAR) and Picture Frame Detection algorithms for the art creation process.

Academic Projects

Human-Aligned and Language-Instructible Procedural Content Generation (PCGRL) Jan 2025 – Jan 2026
Graduate Researcher

- Researched human-aligned RL frameworks to enable intuitive natural language control and human-like level generation through shared representation learning and multi-objective optimization.[1,2,3]

Adaptive Curriculum Learning for Human-AI Zero-Shot Coordination Jan 2025 – Jan 2026
Graduate Researcher

- Researched zero-shot coordination strategies in Overcooked environments by proposing a curriculum learning framework that prioritizes high-potential levels to enhance agent generalization.[4]

EXPERIENCE

Cognition and Intelligence Lab, GIST Sep 2025 – Jan 2026
Graduate Research Assistant

Artificial Intelligence Lab, Dongguk University Dec 2020 – Mar 2023
Undergraduate Research Assistant

SKILLS

Programming Language: Python, C++
Frameworks: PyTorch, JAX, Flax
Language: Korean, English

Awards & Honors

Master's Research Grant, National Research Foundation (NRF) (₩12,000,000) Jul 2024 – Jun 2025
Academic Excellence Scholarship, Dongguk University Sep 2022