

Sangwon Seo

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Research Objectives

My research focuses on *Generative Models of Human Behavior*, *Human-Agent Collaboration*, *Theory of Mind*, and *AI-Assisted Decision Making*. During my PhD, I developed *imitation learning* and *reinforcement learning* algorithms for modeling generalized agent policies from diverse human behaviors, as well as an *AI-driven team coaching system* that automatically analyzes and improves human teamwork in real time.

Education

Rice University, Houston, TX

Aug 2019 – Aug 2025

Ph.D. in Computer Science

- Thesis: AI-Assisted Coordination of Human Teams

Seoul National University, Seoul, South Korea

Mar 2013 – Feb 2015

M.S in Bioengineering

- Thesis: Performance Enhancement in Heart Rate Variability Analysis with Constrained Missing RR Interval Estimation

Seoul National University, Seoul, South Korea

Mar 2009 – Feb 2013

B.S. in Electrical and Computer Engineering

- Thesis: Multiplexing of Bead-Based Immunoassays using a BioMEMS

Experience

Human-Centered AI and Robotics Group, Rice University, Houston, TX

Aug 2020 – Present

Ph.D. Student & Research Staff (Advisor: Prof. Vaibhav Unhelkar)

- Proposed a team-coaching AI algorithm to enhance teamwork in real time during task execution
- Conducted human-subject experiments to evaluate the effectiveness of AI-driven team coaching
- Developed a sample- and label-efficient imitation learning algorithm for modeling team behavior
- Developed an efficient hierarchical imitation learning algorithm to model intentional human behavior using a factored approach
- Formulated a hierarchical reward design framework to train RL policies aligned with user preferences
- Built multiple teamwork simulators and research tools, including a web-based platform for interactive human experiments

Honda Research Institute USA, San Jose, CA

May 2024 – Aug 2024

Research Intern

- Developed imitation learning algorithms that consider continuous latent states in human-agent interaction settings

Coreline Soft, Seoul, South Korea

Apr 2016 – Jun 2019

Associate Research Engineer

- Responsible for developing algorithms for AVIEW MODELER, a medical 3D printing solution
- Developed geometric modeling and processing algorithms
- Implemented a volume and surface rendering pipeline

Agency for Defense Development, Daejeon, South Korea

Mar 2015 – Mar 2016

Researcher

- Developed a telemetry system for aircraft

Biomedical Signal and Information Lab, Seoul National University

Feb 2013 – Feb 2015

M.S Student (Advisor: Prof. Kwang Suk Park)

- Developed signal/image processing algorithms for daily monitoring of physiological signals
- Developed autoregressive moving average-based interpolation methods to enhance heart rate variability analysis corrupted with missing measurements

* My employment at the Agency for Defense Development and Coreline Soft is recognized as fulfilling the military service in South Korea.

Publications

- **S. Seo**, Z. Qian and V. V. Unhelkar, "AI-Assisted Coordination of Human Teams in Situated Tasks," *AAAI Spring Symposium on Human-AI Collaboration*, 2025
- **S. Seo** and V. V. Unhelkar, "Hierarchical Imitation Learning of Team Behavior from Heterogeneous Demonstrations," *24th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2025 (Acceptance rate 24.5%)
- **S. Seo**, B. Han, R. E. Harari, R. D. Dias, M. A. Zenati, E. Salas and V. V. Unhelkar, "Socratic: Enhancing Human Teamwork via AI-enabled Coaching," *24th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2025 (Acceptance rate 24.5%)
- **S. Seo** and V. V. Unhelkar, "IDIL: Imitation Learning of Intent-Driven Expert Behavior," *23rd International Conference on Autonomous Agents and Multiagent Systems (AAMAS)* 2024 (Acceptance rate 25%)
- **S. Seo**, "AI-Assisted Human Teamwork," *AAAI-24 Doctoral Consortium*, 2024
- **S. Seo**, B. Han and V. V. Unhelkar, "Automated Task-Time Interventions to Improve Teamwork using Imitation Learning," *22nd International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2023 (Acceptance rate 23.3%)
- **S. Seo** and V. V. Unhelkar, "Semi-Supervised Imitation Learning of Team Policies from Suboptimal Demonstrations," *31st International Joint Conference on Artificial Intelligence (IJCAI)*, 2022 (Acceptance rate 14.9%)
- **S. Seo**, L. R. Kennedy-Metz, M. A. Zenati, J. A. Shah, R. D. Dias and V. V. Unhelkar, "Towards an AI coach to infer team mental model alignment in healthcare," *2021 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA)*, pp. 39-44, 2021
- S. Kwon, D. Lee, J. Kim, Y. Lee, S. Kang, **S. Seo** and K. Park, "Sinabro: A smartphone-integrated opportunistic electrocardiogram monitoring system," *Sensors*, 16(3), p.361, 2016
- S. H. Hwang, **S. Seo**, H. N. Yoon, H. J. Baek, J. Cho, J. W. Choi, Y. J. Lee, D.-U. Jeong and K. Park, "Sleep period time estimation based on electrodermal activity," *IEEE journal of biomedical and health informatics (J-BHI)*, 21(1), pp.115-122, 2015
- S. Kang, S. Kwon, C. Yoo, **S. Seo**, K. Park, J. Song and Y. Lee, "Sinabro: Opportunistic and unobtrusive mobile electrocardiogram monitoring system," *15th Workshop on Mobile Computing Systems and Applications (HotMobile)*, pp. 1-6, 2014
- J. Kim, S. Kwon, **S. Seo** and K. Park, "Highly wearable galvanic skin response sensor using flexible and conductive polymer foam," *36th annual international conference of the IEEE engineering in medicine and biology society (EMBC)*, pp. 6631-6634, 2014

Working / Under-review Papers

- "Hierarchical Reward Design using Large Language Models" with Z. Qian and V. V. Unhelkar, *Under Review*

Honors & Awards

National Scholarship for Science and Engineering, Korea Student Aid Foundation

Mar 2009

Teaching Experience

Teaching Assistant

COMP 646: Deep Learning for Vision and Language
COMP 440/557: Artificial Intelligence

Spring 2023

Fall 2021, Spring 2025

Advising & Mentoring

Arnav Adhikari, Highschool Student, Houston, TX
Bing (Tim) Han, Undergraduate Student, Rice University
Zhanyi Sun, Undergraduate Student, Rice University

May 2023 – Dec 2023

May 2022 – May 2024

Jan 2022 – Jun 2022

Reviewer

International Conference on Autonomous Agents and Multiagent Systems (AAMAS)
International Conference on Advanced Robotics and Its Social Impacts (ARSO)
Robotics and Automation Letters (RA-L)
International Conference on Robotics and Automation (ICRA)

Skills

PROGRAMMING LANGUAGES	Python C C++ Javascript HTML Matlab
FRAMEWORKS & LIBRARIES	OpenGL Flask PyBullet PyTorch Tensorflow
SOFTWARE DEVELOPMENT	Git Docker CMake Shell Script VSCode Jupyter
ROBOT DEVELOPMENT	Motion Capture (OptiTrack) ROS MoveIt OMPL
LANGUAGES	English Korean

Extra

AAMAS Student Volunteer
Student Venture Network, Seoul National University
College of Engineering Tennis Club, Seoul National University
System Administrator, ECE Department, Seoul National University
SNU Mentoring, Seoul National University

2023

Mar 2012 – July 2012

Mar 2010 – Feb 2013

Mar 2010 – Feb 2011

Sep 2009 – Feb 2010