

Sangwon Seo

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RESEARCH OBJECTIVES

My research centers on Human-Robot Collaboration, Human-Centered AI, and Team-Assistive AI. During my Ph.D., I have developed computational and machine learning-based methods to improve both human-human and human-robot teamwork.

EDUCATION

RICE UNIVERSITY, HOUSTON, TX

Aug 2019 – Present

PH.D. IN COMPUTER SCIENCE

- Thesis (Tentative): AI-Assisted Teamwork

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

RESEARCH EXPERIENCE

HUMAN-CENTERED AI AND ROBOTICS GROUP, RICE UNIVERSITY

Aug 2019 – Present

PH.D. CANDIDATE (ADVISOR: PROF. VAIBHAV UNHELKAR)

- Proposed an automated task-time intervention system to improve teamwork during tasks
- Developed sample- and label-efficient imitation learning algorithms to learn a generative model of team behavior
- Developed a hierarchical imitation learning algorithm to learn the intentional behavior of experts from demonstrations
- Implemented multiple web-based teamwork simulators

BIOMEDICAL SIGNAL AND INFORMATION LAB, SEOUL NATIONAL UNIVERSITY

Feb 2013 – Feb 2015

M.S STUDENT (ADVISOR: PROF. KWANG SUK PARK)

- Developed signal processing algorithms for daily monitoring of physiological signals
- Developed autoregressive-moving-average-based interpolation methods to fill in missing RR-interval values to enhance heart rate variability analysis

BIOPHOTONICS AND NANO ENGINEERING LAB, SEOUL NATIONAL UNIVERSITY

Dec 2011 – Jun 2012

RESEARCH INTERN (ADVISOR: PROF. SUNGHOON KWON)

- Designed and implemented biomedical microelectromechanical systems (Bio-MEMS)

INDUSTRY EXPERIENCE

CORELINE SOFT, SEOUL, SOUTH KOREA

Apr 2016 – June 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

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

PUBLICATIONS

FULL PAPERS

- **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

UNDER REVIEW

- **S. Seo** and V. V. Unhelkar, "IDIL: Imitation Learning of Intent-Driven Expert Behavior", *Under review (Available upon request)*

SHORT PAPERS

- **S. Seo**, "AI-Assisted Human Teamwork", *AAAI-24 Doctoral Consortium*, 2024
- M. Khalid, **S. Seo**, M. A. Zenati, M. Ebnali, L. R. Kennedy-Metz, R. D. Dias, V. V. Unhelkar and E. Salas, "Opportunities and Challenges of Real-Time Measurement of Team Performance on the Cardiac Operating Room", *Human Factors and Ergonomics Society (HFES) 67th International Annual Meeting*, 2023
- 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

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 (PROF. VICENTE ORDÓÑEZ-ROMÁN) *Spring 2023*
COMP 440/557: ARTIFICIAL INTELLIGENCE (PROF. DEVIKA SUBRAMANIAN) *Fall 2021*

ADVISING & MENTORING

ARNAV ADHIKARI, HIGH SCHOOL STUDENT, HOUSTON, TX
BING (TIM) HAN, UNDERGRADUATE STUDENT, RICE UNIVERSITY
ZHANYI SUN, UNDERGRADUATE STUDENT, RICE UNIVERSITY

May 2023 – Present
May 2022 – Present
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

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|-----------------------------------|--|
| PROGRAMMING LANGUAGES | Python C C++ Javascript HTML SQL Matlab LaTeX |
| FRAMEWORKS & LIBRARIES | OpenGL OpenMP Flask Gym PyTorch Tensorflow WandB |
| SOFTWARE DEVELOPMENT | Git Docker CMake 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
ONLINE MENTORING FOR LOCAL HIGH SCHOOL STUDENTS

2023
Mar 2012 – July 2012
Mar 2010 – Feb 2013
Mar 2010 – Feb 2011
Sep 2009 – Feb 2010