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)
- Developed an automated task-time intervention system to improve teamwork during tasks
- Developed sample- and label-efficient methods to learn a generative model of team behavior
- 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 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 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

Deep Learning for Vision and Language (COMP 646) *Spring 2023*
Artificial Intelligence (COMP 440/557) *Fall 2021*

Advising & Mentoring

Arnav Adhikari, Highschool Student, Houston, TX *May 2023 – Present*
Bing (Tim) Han, Undergraduate Student, Rice University *May 2022 – Present*
Zhanyi Sun, Undergraduate Student, Rice University *Jan 2022 – Jun 2022*

Reviewer

International Conference on Autonomous Agents and Multiagent Systems (AAMAS) *2023*
International Conference on Advanced Robotics and Its Social Impacts (ARSO) *2023*
Robotics and Automation Letters (RA-L) *2021, 2023*
International Conference on Robotics and Automation (ICRA) *2024*

Skills

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 Systems (OptiTrack) | ROS | Panda (Franka Emika)
Languages English | Korean

Extra

AAMAS Student Volunteer *2023*
Student Venture Network, Seoul National University *Mar 2012 – July 2012*
College of Engineering Tennis Club, Seoul National University *Mar 2010 – Feb 2013*
System Administrator, ECE Department, Seoul National University *Mar 2010 – Feb 2011*
SNU Mentoring, Seoul National University *Sep 2009 – Feb 2010*
online mentoring for local high school students