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

PUBLICATIONS

FULL PAPERS

- **S. Seo** and V. V. Unhelkar, "IDIL: Imitation Learning of Intent-Driven Expert Behavior", *23nd International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2024 (Acceptance rate 25%) [*To appear; Available upon request*]

- **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

SHORT PAPERS

- **S. Seo**, "AI-Assisted Human Teamwork", *AAAI-24 Doctoral Consortium*, 2024 [*To appear*]

- 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, 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)
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 | 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 *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