Hee-Seung Moon

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RESEARCH INTERESTS

My overarching research vision in Human-Computer Interaction (HCI) is to deepen our understanding and inference of individual users through **computational modeling of human behavior** and compose user-centric systems optimized for their needs. This focus emphasizes developing solutions that consider not only individual behavior patterns but also each person's underlying physical and cognitive features, and internal motivations. I leverage AI techniques, encompassing data-driven methods, RL-based human policy optimization, and amortized inference, to enhance our computational human modeling.

Keywords: Data-driven/RL-based user behavior simulation, simulation-based inference, biomechanical simulation

CURRENT POSITION

Aalto University, Finland — September 2022 – Present
Postdoctoral Researcher — Computational Behavior Lab (Advisor: Antti Oulasvirta)

EDUCATION

Yonsei University, South Korea — August 2022
Ph.D., School of Integrated Technology, College of Engineering — Advisor: Jiwon Seo & Byungjoo Lee
· Thesis Title: Adaptation of Deep User Behavior Model for Personalized Interaction

Yonsei University, South Korea — February 2015
B.S., School of Integrated Technology, College of Engineering

EXPERIENCE

ETH Zürich, Switzerland — June – July 2024 (Expected)
Visiting Scholar — Sensing, Interaction and Perception Lab (Advisor: Christian Holz)
· Inferring a user's grasping intentions in VR based on pre-grasp motions using simulations of human biomechanics.

Aalto University, Finland — March – May 2022
Visiting Scholar — User Interfaces Research Group (Advisor: Antti Oulasvirta)
· Investigated amortized inference techniques for user simulation models in HCI.

Naver AI Lab, South Korea — April – October 2021
Research Intern — Mentor: Minsuk Chang
· Investigated multi-task RL techniques for simulating users under different cognitive-physical features.

Yonsei University, South Korea — March 2015 – August 2022
Research Assistant — Intelligent Unmanned Systems Lab (Advisor: Jiwon Seo)
· Investigated meta-learning techniques for adapting user behavior models to individuals.
· Developed human-model-based robotic guidance systems assisting human task performance.
· Investigated the use of haptic information during task interruption & recovery.

SELECTED PUBLICATIONS

Real-time 3D Target Inference via Biomechanical Simulation
H.-S. Moon, Y.-C. Liao, C. Li, B. Lee, and A. Oulasvirta
Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI 2024)
Honorable Mention Award (Top 5%)

Amortized Inference with User Simulations
H.-S. Moon, A. Oulasvirta, and B. Lee
Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI 2023)

Speeding up Inference with User Simulators through Policy Modulation
H.-S. Moon, S. Do, W. Kim, J. Seo, M. Chang, and B. Lee
Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI 2022)

Fast User Adaptation for Human Motion Prediction in Physical Human–Robot Interaction
H.-S. Moon and J. Seo
IEEE Robotics and Automation Letters (RA-L), vol. 7, no. 1, 2022

Sample-Efficient Training of Robotic Guide Using Human Path Prediction Network
H.-S. Moon and J. Seo
IEEE Access, vol. 10, 2022

Optimal Action-based or User Prediction-based Haptic Guidance: Can You Do Even Better?
H.-S. Moon and J. Seo
Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI 2021)

Prediction of Human Trajectory Following a Haptic Robotic Guide Using Recurrent Neural Networks
H.-S. Moon and J. Seo
2019 IEEE World Haptics Conference (WHC)

Effect of Redundant Haptic Information on Task Performance during Visuo-Tactile Task Interruption and Recovery
H.-S. Moon, J. Baek, and J. Seo
Frontiers in Psychology, vol. 7, art. 1924, 2016

AWARDS, GRANTS AND HONORS

Honorable Mention Award 2024
CHI 2024 (1 first-authored paper)

International Postdoc Fellowship September 2023 - August 2024
National Research Foundation of Korea
· Proposal Title: Inferring User Input Intention in VR based on Biomechanical Simulation

Special Recognitions for Outstanding Reviews
CHI 2022 (1 paper), CHI 2023 (2 papers, 1 LBW), CHI 2024 (1 paper)

Excellent Academic Paper Award 2022
Yonsei University, South Korea

Graduate Fellowship 2015 – 2019
ICT Consilience Creative Program, Ministry of Science and ICT, South Korea

Undergraduate Fellowship 2012 – 2015
ICT Consilience Creative Program, Ministry of Science and ICT, South Korea

Minister Award 2014
Ministry of Science and ICT, South Korea