

Yein Song

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RESEARCH INTERESTS

I explore human life and work in technology-integrated spaces such as vehicles, homes, offices, and factories. My Ph.D. dissertation, in particular, explores human-vehicle interaction, vehicle experiences, and driving discomfort.

EDUCATION

Seoul National University , Seoul, South Korea Ph.D., Department of Industrial Engineering (Advisor: Dr. Myung Hwan Yun)	Sep 2021 - Present
Seoul National University , Seoul, South Korea M.S., Department of Industrial Engineering (Advisor: Dr. Myung Hwan Yun)	Sep 2019 - Aug 2021
Chungnam National University , Daejeon, South Korea B.S., Department of Architecture	Mar 2013 - Aug 2019

PUBLICATIONS & PRESENTATIONS

Thesis

[M.S.] A Qualitative Study on the Auditory Experience of Driving Sound in Electric Vehicles Considering User Characteristics and Context of Driving

Journals

[1] **Song, Y.**, Kim, W., & Yun, M. H. (2024). Auditory experience in vehicles: A systematic review and future research directions. *Heliyon*

Work in Progress

- [5] **Song, Y.**, Yun, M. H., Integrating Facial Expressions and Electrocardiogram Signals for Real-Time Monitoring and Prediction of Passenger Motion Sickness in Electric Vehicles
- [4] **Song, Y.**, Shin, J., Yun, M. H., A Study of Driving Styles and Non-Driving Related Activities Using Multi-modal Data
- [3] **Song, Y.**, Bae, J., Shin, J., Yang, J., Kim, S., Bahn, S., Yun, M. H., Real-Time Motion Sickness Measurement: Feasibility and Application of the Real-Time Motion Sickness Scale (RMS) (Under review)
- [2] **Song, Y.**, Kim, D., Yun, M. H., Investigating Auditory Experiences in Electric Vehicles: A User Impression Study on the Impact of Sound and User Characteristics in Different Driving Contexts (Under review)
- [1] **Song, Y.**, Lee, K., Shin, G., Yun, M. H., Financial Services in the Era of Digital Transformation: An Integrated Approach Reflecting User Characteristics and Context of Use

International Conferences

- [13] Kim, H., **Song, Y.**, Yun, M. H., Kim, K. (2024) Development and Validation of an Ergonomic Posture Assessment System Utilizing Workplace Video Analysis. In 2024 IEEE IEEM
- [12] Shin, J., **Song, Y.**, ... Yun, M. H. (2024). Evaluation of Usability and Arousal Levels in Electric Vehicles Using In-Vehicle Physiological Signals: A Focus on Motion Sickness. In IEA 2024
- [11] **Song, Y.**, (2024). AI-Based Human Modeling for Optimizing Driving Comfort in Autonomous Vehicles. In IEA 2024
- [10] **Song, Y.**, Shin, J., Park, J., ... Yun, M. H. (2024). An Evaluation Tool for Real-Time Motion Sickness in a Driving Environment. In 2024 HFES Annual Meeting
- [9] **Song, Y.**, Yoon, B., Park, ... Yun, M. H. (2023). A Systematic Literature Review for Measure, Estimation, and Mitigation

of Motion Sickness in Vehicle Environment. In 2023 HFES Annual Meeting

- [8] **Song, Y.**, Lee, J., Wang, C., Yun, M. H. (2023). Enhance auditory experience by identifying user needs and classifying user types while driving electric vehicles. In 2023 HFES Annual Meeting
- [7] **Song, Y.**, Choi, M., Ahn, S., Yun, M. H. (2023) A Framework for the Design and Evaluation of Auditory Experience in Vehicle Environment Based on the Literature Review. In 2023 HFES Annual Meeting
- [6] **Song, Y.**, Park, J., Wang, C., Yun, M. H. (2023). Exploring the Latest Trends in Motion Sickness Research: A Network Analysis Approach, In 2023 ACED
- [5] Yoon, B. Y., Ahn, S. H., Oh, J., **Song, Y.**, ... Yun, M. H. (2023). JS-01 Exploring Korean Female Lower Body Classification based on Factor Analysis and Fuzzy C-means Clustering. In 2023 ESK JES Joint Symposia
- [4] Seu, D., **Song, Y.**, Wang, C., ... YUN, M. H. (2023). JS-02 Semantic Network Analysis of ChatGPT Research: An Interdisciplinary Perspective. In 2023 ESK JES Joint Symposium
- [3] **Song, Y.**, Yun, M. H., Nam, C. S., ...(2022). A Study on the Driver-Vehicle Interaction System in Autonomous Vehicles Considering Driver's Attention Status. In 2022 IEEE SMC
- [2] Wang, C., Kim, S. Y., **Song, Y.**, ... Yun, M. H. (2022). Text Mining for Exploring UX Issues of Qualitative Think Aloud Data on EV Sound. In 2022 IEEE IEEM
- [1] **Song, Y.**, Kim, S., Lazaro, M. J., Ha, S., Yun, M. H. (2021) A Study on User Characteristics and User Types in Designing Auditory Experience for Electric Vehicles. In 2021 IEEE IEEM

Domestic Conferences

- [12] **Song, Y.**, Lee, K., Shin, G., Yun, M. H. (2024). Enhancing User Experience in Integrated Financial Services: Insights from a Text Analysis on Daily Reconstruction Method. In 2024 ESK
- [11] Shin, J., **Song, Y.**, Bae, J., Yang, J., Yun, M. H. (2024). Development of a Model for Predicting Motion Sickness Using Electrocardiogram (ECG). In 2024 KSNVE
- [10] Rhui, E., **Song, Y.**, Bae, J., ... Yun, M. H. (2024). Usability Evaluation and Design Recommendations for User-Centered Smart TV Remote Control. In 2024 HCI Korea
- [9] **Song, Y.**, Oh, M., Yoon, B., ... Yun, M. H. (2023) Development of Navigational Aids Training Content and Human Resource Development Strategy based on Ergonomics Knowledge, In 2023 ESK
- [8] Heo, J., Park, J., **Song, Y.**, ... Yun, M. H. (2023). Emotion Regulation Infotainment System for Driver Safety. In 2023 KIIE spring
- [7] **Song, Y.**, Seu, D., Jung, W., Kim, W., Yun, M. H. (2022. 10). Identifying User Needs for Electric Vehicle Driving Sound Based on Driving Context Using LDA Topic Modeling. In 2022 ESK
- [6] Heo, J., Kim, S., Lee, J., **Song, Y.**, ... Yun, M. H. (2022). A Study on the Relationship Between Driver's Emotion and Attention Level Based on Deep Learning Analysis of Facial Expressions. In 2022 ESK
- [5] Oh, M., **Song, Y.**, Kang, A. A., ... Yun, M. H. (2022). Auditory user interface for autonomous vehicles: Focusing on non-driving task scenarios. In 2022 ESK
- [4] Heo, J., Lazaro, M. J., Lee, J. H., Lee, K. J., **Song, Y.**, ... Yun, M. H. (2021). Identifying UX Issues for Multimodal Interaction of Intelligent Systems Using User-Centered Design Techniques. In 2021 ESK
- [3] **Song, Y.**, Kim, S., Kim, Y. H., Lee, Y., Yun, M. H. (2020). A Study on the Affective Evaluation of Interior Driving Sound with User Factors and Acoustic Parameters. In 2020 ESK
- [2] Kim, H., **Song, Y.**, Lee, K., Kim, S., Yun, M. H. (2020). Task Analysis and Identification of Accessibility Issues in Appliance Use for People with Disabilities Using Therblig. In 2020 ESK
- [1] Kim, S., **Song, Y.**, Lee, K., ... Yun, M. H. (2020). Designing Consumer Personas and Customer Journey Maps for Financial Services Using Quantitative Everyday Reconstruction Method Data. In 2020 HCI Korea

PROJECTS

- Development of AI-based Human Modeling and Digital Twin Systems for User-Centered Driving Experience Optimization in Fully Autonomous Environments, *National Research Foundation of Korea, Ministry of Science and ICT, 2024.03-Present, **Principal Investigator***
- Development of Motion Sickness Evaluation Metrics and Models in Real-Driving Environments, *Hyundai Motors, 2023.01-2023.12, **Project Manager***
- Research on a Framework for Evaluating Personalized Driving Experiences in Autonomous Vehicles Using Explainable AI and Meta-Learning, *National Research Foundation of Korea, Ministry of Science and ICT, 2023.06-2024.02, Researcher*
- Human-in-the-loop AI: Basic research laboratory for smart human-AI collaboration, *National Research Foundation of Korea, Ministry of Science and ICT, 2023.06-2023.10, Researcher*
- Development of AI-Based Decision Support Systems for Patent Monetization, *Ministry of Trade, Industry and Energy, 2023.04-2023.12, Researcher*
- Full Automated Vehicle UX Research and Modeling: Data driven Approach, *LG Electronics, 2023.03-2023.04, Researcher*
- Aids to Navigation (AtoN) Training Program for Senior Vessel Operators, *Ministry of Oceans & Fisheries, 2021.03-2022.10, **Project Manager***
- Analysis of User Behavior in Display Input Experiences, *Samsung Electronics, 2022.03-2022.04, Researcher*
- Optimal HMI Design for Different Autonomous Driving Levels Based on Driving Situations, *Hyundai Motors, 2022.12-2023.03, Researcher*
- Development of Simulation Software for Airborne Control Equipment (UI/UX Analysis and Design), *Agency for Defense Development, Ministry of Defense, 2022.11-2023.04, Researcher*
- Analysis of Public Transport User Behavior Patterns and Conceptual Research for Preventing the Spread of Infectious Diseases, *Hyundai Motors, 2022.07-2022.08, Researcher*
- Development of an AI-Based Online Collaboration System for Professional Translators, *Ministry of Trade, Industry and Energy, 2021.08-2022.07, Researcher*
- Preliminary Research on Intuitive Auditory UX (Development of Sound Design and Evaluation Methodology), *Hyundai Mobis, 2021.07-2021.11, Researcher*
- Development of AI-based Biomarker Identification and Brain Modulation System, *Institute of Information Communications Technology Planning Evaluation, Ministry of Science and ICT, 2021.05-2021.12, Researcher*
- Development of a Task Analysis Model Using an Artificial Intelligence Modeling of Ergonomic Knowledge (Manual Material Handling/Vehicle Driving/Clinical Care Activities), *National Research Foundation of Korea, Ministry of Science and ICT, 2021.03-2024.02, Researcher*
- Development and Application of Usability Evaluation Metrics for Coway Products, *Coway, 2021.04-2021.10, **Project Manager***
- Building a Foundation for Enhancing User Experience Labs for Future Mobility, *Ministry of Trade, Industry and Energy, 2020.05-2020.09, Researcher*
- A Framework of Evaluation and Design Thinking for Auditory Experience in Electric Vehicles, *Hyundai Motors, 2020.05-2021.04, Researcher*
- Development of Eco Coaching Technology, *Hyundai Motors, 2020.03-2020.12, Researcher*
- Development of a Smart Chair with Film-Type Pressure Distribution Sensors and Deep Learning for Seated Posture Monitoring, *Ministry of Trade, Industry and Energy, 2019.08-2019.12, Researcher*
- Implementation of Immersive Tourism Technology Using 4D Technology and Emotional Modeling, *Ministry of Culture, Sports and Tourism, 2019.04-2020.02, Researcher*

RESEARCH GRANTS

- **Ph.D. Candidate Research Fellowship, National Research Foundation of Korea** 2024 - 2026
Development of AI-Based Human Modeling and Digital Twin System for Optimizing Use-Centered Driving Quality in Fully Autonomous Driving Environments (Grant No. RS-2024-00409458, 3,500 USD)

ACADEMIC EXPERIENCE

- **Teaching Assistant**
 - Human Factors 2019 Fall
 - Human Factors Experiment Fall semesters in 2019, 2020, 2021, 2022, and 2024
 - Human Performance 2020 Spring
 - Theories and Lab of VR/AR 2022 Fall - 2024 Fall

SERVICE

- **Student Assistant & Student Volunteer, IEA 2024**
- **Reviewer**
 - Human Factors and Ergonomics Society (HFES) International Annual Meeting 2023, 2024
 - Triennial Congress of the International Ergonomics Association (IEA) 2024
 - Journal of the Audio Engineering Society 2024
- **Mentoring, Two M.S. Students at Seoul National University** 2023

OTHER EXPERIENCES

- **Corporate Seminar**
 - Data-Driven User Experience Design: Theory and Practice of Network Analysis, *LX Hausys* Apr - May 2023
 - Road-map for Future Automotive Human-Machine Interaction Technologies, *Hyundai Motors* Nov 2021
- **Investigation Work, Investigation of Musculoskeletal Risk Factors, Kia Corporation** Jun - Aug 2021
- **Invited Talk, Human, Space, and Interactions, HAUA Lab., Chungnam Nation University** 2024.02.14

SKILLS

- **Language:** Korean (Native), English (Intermediate)
- **Programming Language:** Python, R
- **UI/UX Design:** Adobe (Photoshop, Illustrator, After Effects, Premiere Pro), Figma
- **Architectural/Industrial Design:** Rhinoceros with Grasshopper, Auto CAD, Sketch Up, Lumion
- **Others:** Unity, 3D printer, CNC machine

ARCHITECTURAL EXPERIENCES

- **Internship, SAMOO Architects & Engineers** Jan - Feb 2018
- **Freelance Work, with Three Architectural Firms and One University** 2014 - 2017
(Six projects involving 3D architectural modeling, exterior panel design, CAD drafting, and related tasks)

(Last updated: 2024.12.18)