MYEONGKYU LEE

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RESEARCH INTERESTS

Human-Machine Interaction, Driver's Emotion, Vehicle/Driver Safety, Driver's Behavior

EDUCATION

KOOKMIN UNIVERSITY **SEOUL, KOREA**

Master's Candidate: Automotive and IT convergence *Mar. 2021 – Present*

- GPA: 4.0/4.0, Advisor: Prof. Ji Hyun Yang
- Thesis: "Development of Driver's Perspective Framework for Verification of Automated Vehicle Algorithm (tentative)"
- SUNGKOK Scholarship (merit based; full tuition for both years).

Bachelor of Automotive Engineering *Mar. 2015– Feb. 2021*

- GPA: 3.98/4.0, 4.41/4.5
- Graduation Scholarship (Graduated 1st out of 166 students)
- Academic Excellence Scholarship (for all four years).

PUBLICATIONS AND PROCEEDINGS

M. Lee, J. Choi, S. Kim, and J. Yang, "Analysis of drivers' reactions to simulated jaywalking and application of AI classifiers to predict accidents," under review, *IEEE Transactions on Human-Machine Systems*. SCIE.

M. Lee, S. Lee, S. Hwang, S. Lim, and J. Yang, "Effect of emotion on galvanic skin response and vehicle control data during simulated driving," under review, *Transportation Research Part F: Traffic Psychology and Behaviour*. SSCI.

J. Park, **M. Lee**, J. Maeng, C. Ahn, and J. Yang, "A Study for STPA-based Identification of Safety Requirements from the Perspective of Drivers in Take-Over Request Situation," abstract accepted, *3rd IEEE International Conference on Human-Machine Systems*, Florida, US, November 17-19, 2022.

M. Lee, S. Lee, S. Hwang, S. Lim, and J. Yang, "A Study to Acquire the Driving Characteristic Data According to Driver Emotions and to Propose Emotion Groups in the Driving Context," abstract accepted, *3rd IEEE International Conference on Human-Machine Systems*, Florida, US, November 17-19, 2022.

M. Lee, S. Kim, D. Jung, H. Lee, H. Park, H. Han, and J. Yang, "Simulator-Based Study of the Response Time and Defensive Behavior of Drivers in Unexpected Dangers at an Intersection," accepted, *Automotive UI'22*, Seoul, Korea, September 17-20, 2022.

M. Lee, S. Kim, J. Kim, and J. Yang, "Simulator Study on the Response Time and Defensive Behavior of Drivers in a Cut-in Situation," *International Journal of Automotive Technology*, Vol. 23, No. 3, pp. 813–823, June 2022. SCIE.

H. Pyeon, H. Kim, Y. Bae, **M. Lee**, H. Zhu, J. Yang, and S. Lim, "Development of method to acquire Hands on/off answer value," *Proceedings of 2022 Spring Conference of KSAE*, Seoul, June 2-3, 2022.

M. Lee, H. Shim, S. Kim, J. Choi, and J. Yang, "Study of driver's response time in cut-in situation with driving simulator," *Proceedings of 2021 Spring Conference of ESK*, Seoul, June 17-18, 2021.

PATENTS

J. Yang, S. Lim, **M. Lee**, H. Zhu, H. Pyeon, and Y. Bae, "Method for Providing a Plurality of Driving Modes Based on Whether a Driver grips Steering Wheel or Not," Korean Patent (filed), 10-2022-0086240

J. Yang, S. Lim, **M. Lee**, H. Zhu, H. Pyeon, and Y. Bae, "Method for Controlling Steering Wheel Based on Whether a Driver grips Steering Wheel or Not," Korean Patent (filed), 10-2022-0086241

J. Yang, **M. Lee**, J. Park, and J. Maeng, "Device and Method for Detecting Driver's Steering Wheel Grip," Korean Patent (filed), 10-2022-0073471

RESEARCH EXPERIENCE

Artificial Intelligence Adaptation on the Steering Wheel System **Seoul, Korea**

Graduate Research Assistant, Kookmin University *Sept. 2021 – Aug. 2022*

- Built environment for acquiring steering-related vehicle data according to hands on/off state.
- Acquired hands on/off state data with steering-related vehicle data under actual driving conditions on the road.
- Predicted hands on/off state according to steering-related vehicle data using AI.
- Outcome: 2 patents, 1 conference presentation.

Study on the Driver's Mental Model and Behavior in Take-over Situations **Seoul, Korea**

Graduate Research Assistant, Kookmin University *May 2021 – May 2022*

- Examined drivers' mental model (information process) and behavior in take-over situations.
- Implemented dangerous take-over situation using driving simulator and recruited 40 participants.
- Acquired driving control data/survey data according to four NDRT types.
- Analyzed data in terms of the kinds of action people take and the reason for the action.
- Outcome: Thesis, 1 patent, 1 conference paper.

Study on the Vehicle Control Data/Physiological Data According to Emotions **Seoul, Korea**

Graduate Research Assistant, Kookmin University *Mar. 2020 – Nov. 2021*

- Examined driving control data and physiological data according to emotions.
- Derived eight emotions that usually occur in the driving context.
- Induced eight emotions for 14 participants and acquired vehicle control data/physiological data while driving.
- Analyzed data according to emotions, classified eight emotions into three groups.
- Outcome: 1 journal paper, 1 conference paper.

Study on Driver Behavior Characteristics in Four Dangerous Situations **Seoul, Korea**

Undergraduate Research Assistant, Kookmin University *Mar. 2020 – Nov. 2021*

- Examined drivers' behavior characteristics in four dangerous situations.
- Implemented four dangerous situations reported frequently at National Forensic Service and recruited 186 participants.
- Acquired perception/reaction time, driving control data according to demographic characteristics (age/gender).
- Analyzed data using descriptive/inferential statistics and Machine Learning.
- Suggested data trend according to demographic characteristics and method to improve road safety.
- Outcome: 2 journal papers, 1 conference paper, 1 conference presentation

Undetectable Communications for Drone Applications **Irvine, United States**

Undergraduate Research Assistant, University of California, Irvine *Dec. 2019 – Feb. 2020*

- Implemented cryptic code for interaction between drone and controller.
- Coded for safer and faster response by combining mechanical engineering knowledge with computer science knowledge.
- PI: Dr. Marco Leverato, Mentor: Anas Alsoliman (Ph.D. candidate).

AWARDS AND HONORS

- Competition for creating Intellectual Property based on a paper, 3rd award, Kookmin University, 2022.
- Poster competition of Brain Korea 21 program, 2nd out of 38 students, Kookmin University, 2022.
- Graduation: graduated 1st out of 166 students, College of Automotive Engineering, Kookmin University, 2021.
- Rubber-powered automotive manufacturing competition, 1st out of 6 teams, Kookmin University, 2015.

ADDITIONAL INFORMATION

- ***Computer/Programming/Technical Skills****:* MATLAB/SIMULINK, Python, SPSS, R, HTML, CSS, JavaScript, C, C++, LaTeX, SCANeR Studio, Carmaker, MS Office (all advanced)
- ***Tools****:* Driving Simulator, Eye Tracker, Physiological Acquisition (GSR, HR, Brain wave etc.)
- ***Committee Experience****:* AUTO UI 2022 local chair (2022, Seoul, Republic of Korea)
- ***Teaching Assistant****:* Mentoring/Tutoring – mathematics, physics (2018 – 2021, Kookmin University)
- ***Military Service****:* Sergeant (2016 – 2017, Republic of Korea Army)
- ***Languages****:* Korean (native fluency), English (full professional proficiency)