Gyeore Yun

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Education

2018.2 – 2024.8	Ph.D. Candidate Interaction Laboratory (POINT Lab.) Department of Computer Science and Engineering Pohang University of Science and Technology (POSTECH) Advisor: Prof. Seungmoon Choi
2015.9 – 2015.12	Exchange Student. Université de technologie de Troyes.
2012.3 – 2017.8	B.S. (Computer Science and Engineering), Pohang University of Science and Technonlogy.

Research Interest

- Sound Processing and Sound-Based Cross-Modal Conversion
- Learning-Based Automatic Synthesis and Rendering of Haptic Effects
- Multimodal Interaction in VR/AR
- Human-Computer Interaction

International Papers

- Jiwan Lee, **Gyeore Yun**, and Seungmoon Choi, "Audiovisual-Haptic Simultaneity Across the Body in Gameplay Viewing Experiences," In *Proceedings of Eurohaptics*, 2024.
  DOI: https://doi.org/10.1109/TOH.2024.3353761
- Dajin Lee, **Gyeore Yun**, and Seungmoon Choi, "Effects of Contact Force on Vibrotactile Perceived Intensity Across the Upper Body," *IEEE Transactions on Haptics*, 2024.
  DOI: https://doi.org/10.1109/TOH.2024.3353761
- Dong-Geun Kim, Jungeun Lee, **Gyeore Yun,** Hong Z. Tan, and Seungmoon Choi, "Sound-to-Touch Crossmodal Pitch Matching for Short Sounds," *IEEE Transactions on Haptics*, 2024.
  DOI: https://doi.org/10.1109/TOH.2023.3338224
- **Gyeore Yun**, Minjae Mun, Jungeun Lee, Dong-Geun Kim, Hong Z Tan, and Seungmoon Choi, "Generating Real-Time, Selective, and Multimodal Haptic Effects from Sound for Gaming Experience Enhancement," In *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems (CHI)*, 2023.
  DOI: https://doi.org/10.1145/3544548.3580787
  Video: https://www.youtube.com/watch?v=YfEc_I8xt7o&t=1s
- Sangyoon Han, Jiwan Lee, **Gyeore Yun**, Sung. H. Han, and Seungmoon Choi, "Motion Effects: Perceptual Space and Synthesis for Specific Perceptual Properties," *IEEE Transactions on Haptics*, vol. 15, no. 3, pp. 626-637, 2022.
  DOI: https://doi.org/10.1109/TOH.2022.3196950.

- Hyejin Choi, Amit Bhardwaj, **Gyeore Yun**, and Seungmoon Choi, "Perceived Hardness of Virtual Surface: A Function of Stiffness, Damping, and Contact Transient," In *Proceedings of the IEEE World Haptics Conference (WHC)*, 2021.
  DOI: https://doi.org/10.1109/WHC49131.2021.9517263
  Video: https://youtu.be/C-HmiSIQnSk
- **Gyeore Yun**, Hyoseung Lee, Sangyoon Han, and Seungmoon Choi, "Improving Viewing Experiences of First-Person Shooter Gameplays with Automatically-Generated Motion Effects," In *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems (CHI)*, 2021.
  DOI: https://doi.org/10.1145/3411764.3445358
  Video: https://youtu.be/iJY56sd9kwM
- Sangyoon Han, **Gyeore Yun**, and Seungmoon Choi, "Camera Space Synthesis of Motion Effects Emphasizing a Moving Object in 4D Films," In *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR)*, 2021.
  DOI: https://doi.org/10.1109/VR50410.2021.00093
  Video: https://www.youtube.com/watch?v=EhGmMkPnuVc
- Seungjae Oh, **Gyeore Yun**, Chaeyong Park, Jinsoo Kim, and Seungmoon Choi, "VibEye: Vibration-Mediated Object Recognition for Tangible Interactive Applications," In *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems (CHI)*, 2019.
  DOI: https://doi.org/10.1145/3290605.3300906
  Video: https://youtu.be/rH7KywQ0Z-8
- **Gyeore Yun**, Seungjae Oh, Seungmoon Choi, "Seamless Phantom Sensation Moving across a Wide Range of Body," In *Proceedings of the IEEE World Haptics Conference (WHC)*, 2019.
  DOI: https://doi.org/10.1109/WHC.2019.8816104
  Video: https://youtu.be/wnYYZgFLvAI

Posters and Demonstrations

- **Gyeore Yun**, Jungeun Lee, Dong-Geun Kim, Minjae Mun, Hong Z. Tan, and Seungmoon Choi, "Real-Time, Selective, and Multimodal Haptic Feedback from Gameplay Sound," Demonstrated in *IEEE World Haptics Conference (WHC)*, 2023.
- **Gyeore Yun**, Seungjae Oh, Seungmoon Choi, "Seamless Phantom Sensation Moving across a Wide Range of Body," Demonstrated in *IEEE World Haptics Conference (WHC)*, 2019.
  DOI: https://doi.org/10.1109/WHC.2019.8816104
  Video: https://youtu.be/wnYYZgFLvAI

Domestic Papers

- Jaehyeok Ahn, **Gyeore Yun**, and Seungmoon Choi, "Event-Independent Haptic Feedback in a VR Rhythm Game Using a Haptic Garment," In *Proceedings of HCI Korea*, pp. 124-129, 2024.
- Dajin Lee, **Gyeore Yun**, and Seungmoon Choi, "Effects of Contact Force on Vibrotactile Perceived Intensity Across Upper Body," In *Proceedings of Korea Haptics Conference*, 11.22-24, 2023.
- Minjae Mun, **Gyeore Yun**, Chaeyong Park, Seungmoon Choi, "Real-time Multimodal Audio-to-Tactile Conversion System for Playing or Watching Mobile Shooting Games," *Journal of KIISE*, vol. 50, no. 3, pp. 228-242, 2023.
  DOI: https://doi.org/10.5626/JOK.2023.50.3.228
- Dong Yeong Jeong, Sung H. Han, Seungmoon Choi, Mingyu Lee, Haewoo Kang, Sangyoon Han, **Gyeore Yun**, Hyo Seung Lee, Jiwan Lee, and Dajin Lee, " Motion and Haptic Effects Classification of a 4D Cinema Seat," In *Proceedings of the Spring Conference of Ergonomics Society of Korea*, 2019.
- **Gyeore Yun**, Seungjae Oh, and Seungmoon Choi, "Phantom Sensations Moving across a Wide Range of Body," In *Proceedings of Korea Haptics Community Workshop*, 2019.

- **Gyeore Yun**, Yongjae Yoo, Seungmoon Choi, "Implementation of Music Composition System Based on Gesture Recognition Using Natural User Interface," In *Proceedings of HCI Korea*, 2018.

Registered Patent

- **Gyeore Yun,** Seungmoon Choi, "METHOD AND DEVICE FOR PROVIDING MOTION EFFECT," International Patent (US), Appl. No. 17/738,594, Appl. Date: 2022-05-6. (To be registered)
- Seungmoon Choi, Sangyoon Han, **Gyeore Yun**, "METHOD AND APPARATUS FOR GENERATING MOTION EFFECTS BASED ON REDUCED OBJECT MOTION," International Patent (US), Reg. No. 11,989,356, Reg. Date: 2024-05-21.
- **Gyeore Yun,** Seungmoon Choi, "METHOD AND DEVICE FOR PROVIDING MOTION EFFECT," Domestic Patent (KR), Appl. Reg. No. 10-2575318, Reg. Date: 2023-09-01.

Projects

2022.9 – Present

Semantic Sound-to-Haptic Automatic Conversion: Metaverse, Full-body Haptic Effects, and Accessibility, Mid-Career Researcher Program, National Research Foundation (NRF)

The main goal of this project is to automatically provide a tactile experience in a metaverse scenario while wearing a full-body haptic suit by understanding the meaning of sound and providing appropriate spatio-temporal haptic effects. To achieve this, I am conducting research on full-body haptic perception and haptic-audio concurrency, as well as creating a learning-based model to understand the meaning of sound and render appropriate full-body haptic effects.

2022.7 – 2023.7

Research on Function Advancement to Improve the Marketability of Vibration Seat, NGV (Hyundai Automobile Company)

The main goal of this project is to conduct research on warning vibrations and vibrations for racing games to improve the marketability of vibration seats for cars. I am participating in the design of vibration based on vehicle warning sounds and the evaluation of warning vibration sets.

2021.10 – 2023.11

Semantic Audio-to-Haptic Conversion: Algorithms and Performance, Google

The main goal of the project is to study semantic sound-to-haptic conversion algorithms and develop performance metrics to evaluate the conversion algorithms. To this end, I developed a system generating real-time, selective, and multimodal haptic effects from sound to improve gaming experiences. Additionally, I am conducting research on the optimal algorithm for converting sound into vibrations.

2019.5 – 2021.5

Design of Seat Vibration Patterns in Harmony with Healing Music, NGV (Hyundai Automobile Company)

I investigated the emotional characteristics that can be conveyed by vibrations of various waveforms. Additionally, I studied the emotional changes that occur when providing vibrations synchronized with music compared to music alone.

2019.6 – 2020.6

Automatic Generation of Haptic Feedback for Multimedia Content, Ministry of SMEs and Startups through Acturonix

I developed a system that analyzes sound in real-time to generate appropriate impact and vibration effects using a digital haptic actuator developed by Acturonix to enhance the gaming experience.

2018.2 – Present	**Automatic Authoring of Physical and Perceptual/Affective Motion Effects for Virtual Reality,** Samsung Research Funding & Incubation The main goal was to generate haptic motion effects automatically to provide metaverse users with immersive 4D experiences. I have conducted research on enhancing the gaming viewing experience using sound-based motion effects. Currently, I am developing a method to generate motion effects using object-based audio data.
2017.4 – 2018.3	**Haptic Technology Research for Improving NVH Emotional Quality,** NGV (Hyundai Automobile Company) I conducted research on using the spectral characteristics of music to express pitch as the position of vibration on a car seat. Additionally, I studied tactile illusions that allow smooth changes in the position of vibration to be perceived even with a small number of actuators.

Honors and Awards

Prize (First Place)	Implementation of Music Composition System Based on Gesture Recognition Using Natural User Interface, CSED499: Student Research Project (December, 2016)
Fellowship Award	POSTECH POSTECHIAN Fellowship (June, 2023)
Best Paper Award (Finalist)	Dajin Lee, **Gyeore Yun**, and Seungmoon Choi, "Effects of Contact Force on Vibrotactile Perceived Intensity Across the Upper Body," IEEE Transactions on Haptics, vol. 17, no. 1, pp. 14-19, 2024 Dong-Geun Kim, Jungeun Lee, **Gyeore Yun**, Hong Z. Tan, and Seungmoon Choi, "Sound-to-Touch Crossmodal Pitch Matching for Short Sounds," IEEE Transactions on Haptics, vol. 17, no. 1, pp. 2-7, 2024

Teaching Assistant (TA)

2019 Spring	CSED273: Digital System Design
2019 Fall	CSED211: Introduction to Computer SW Systems

Supervising Undergraduate Research Projects

2021 Fall	Sunghyeon Park, Human-Computer Interface Emotion Recognition focusing on Paralanguage.
2020 Fall	Hong-gi Kim, Hand Tracking Interface for FPS Gaming.
2019 Spring	Jaeheung Choi, Virtual Car Simulation: Tactile Illusion and Egocentric Feedback with Reclining Chair.
2018 Fall	Jungyeong Choi, Visualizing Auditory Information of Hazardous Environments for Hearing Impaired Using Augmented Reality.

Career

2020.02 – 2021.02	Implementation of a Simulation Program for Scalp Micropigmentation., AI&B, Researcher.
2018.02 – 2018.06	Implementation of a Touch-Based Interactive System Using a Beam Projector, I3B, Researcher.
2015.1 – 2015.02	Solution SW Group, SK Hynix,Internship

Technical Skills

Development/ Software	Programming: C/C++, C#, MATLAB, Python, Java Statistical Analysis: R, SAS Libraries: TensorFlow, PyTorch, librosa, NI-DAQmx, CHAI3D, OpenCV, Open3D Game Engines: Unity3D, Unreal Engine, Tools: LATEX, Adobe Photoshop/Premiere, Microsoft Office/Visual Studio/VSCode, Android Studio
Devices	Haptic Interfaces: PHANTOM Series Virtual Reality: Oculus Rift, HTC Vive, Leap Motion, Tactile Suit Others: Vibrotactile Actuators, DAQs, 2/3/6-DoF Motion Platforms, Accelerometers, Photoresistors

References

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