

Waseem Hassan

Postdoc

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Employment

- Post-doctoral researcher at Human Centered Computing, University of Copenhagen 2023.02.01 – Current
- Research Professor at Computer Science and Engineering Department, Kyung Hee University, South Korea 2022.11.01 – 2023.02.28
- Post-doctoral researcher at Haptics and Virtual Reality Lab, Kyung Hee University, South Korea 2022.03.01 – 2022.10.31

Education

- Kyung Hee University, Yongin-si, South Korea 2016.09.01 – 2022.02.16
Ph.D. in Computer Engineering
Title: Towards Haptic Texture Content Library: Texture Synthesis Through Automatic Model Assignment and Texture Authoring in Haptic Attribute Space
Advisor: Professor Seokhee Jeon
- Kyung Hee University, Yongin-si, South Korea 2014.09.01 – 2016.08.17
M.S. in Computer Engineering
Title: Towards Universal Haptic Library—Library-Based Haptic Texture Assignment Using Image Texture
Advisor: Professor Seokhee Jeon
- National University of Science and Technology, Pakistan 2008.09.01 – 2012.08.31
B.S. in Electrical (Telecomm) Engineering

Research Interests

Haptic texture perception and psychophysics
Machine learning for haptic content automation
Wearable and modular haptic interfaces (Hardware and Software)
Soft pneumatics for wearable haptics

Honors and Awards

- Best student innovation challenge award, World Haptics Conference (WHC) 2019
- Outstanding paper award, Ubiquitous Robotics and Ambient Intelligence (URAI) 2019
- Outstanding paper award, Korean Computer Congress (KCC) 2016
- Doctoral research scholarship, 2016 – 2022
- Masters research scholarship, 2014 – 2016
- Graduate student scholarship, Kyung Hee University, 2014 – 2022
- President Telecomm Society at MCS, National University of Science and Technology 2011 – 2012
- Sports prefect at MCS, National University of Science and Technology 2011 – 2012
- Undergraduate merit scholarship, National University of Science and Technology, 2008 – 2009

Projects

1. Touchless AI, European Union's Horizon 2020 research and innovation program (2023-2025)
2. Haptic Modeling and Rendering Technology for Mirror World, Global Frontier, NRF Korea (2014 - 2022)
3. Perceptual Performance Enhancement of Ultrasonic Haptic Display, ETRI Korea (2016 - 2017)
4. HD Haptic Technology for Hyper Reality Contents, MSIP, IITP (2017 - 2019)
5. Drone-Based Haptic Interface with Unlimited Workspace, Basic Research, NRF Korea (2017 - 2019)
6. Development of Virtual Objects Interaction Techniques in Life-Safety Situations, Ministry of the Interior and Safety (2019 - current)
7. Haptic simulation technology for moving interface, Hyundai Korea (2022.03 - current)

Publications: Journal Articles

1. Ahsan Raza, **Waseem Hassan**, Seokhee Jeon, "Pneumatically Controlled Wearable Tactile Actuator for Multi-Modal Haptic Feedback", IEEE Access (2024)
2. Joolekha Bibi Joolee, Mohammad Shadman Hashem, **Waseem Hassan**, Seokhee Jeon, "Deep Encoder-Decoder Network Based Data-driven Method for Impact Feedback Rendering on Head During Earthquake", Virtual Reality 28, 23 (2024)
3. **Waseem Hassan**, Joolekha Bibi Joolee, and Seokhee Jeon, "Establishing Haptic Texture Attribute Space and Predicting Haptic Attributes From Image Features Using 1D-CNN", Scientific Reports 13, no. 1: 11684 (2023).
4. CheolWoo Lee, Seokhee Jeon, **Waseem Hassan**, HyeongYeop Kang, "VR unseen gaze: Inducing feeling of being stared at in virtual reality", Virtual Reality, (2023): 1-20
5. Talhan, Aishwari, Sanjeet Kumar, Hwangil Kim, **Waseem Hassan**, and Seokhee Jeon. "Multi-Mode Soft Haptic Thimble for Haptic Augmented Reality Based Application of Texture Overlaying." Displays 74 (2022): 102272.
6. **Waseem Hassan**, Ahsan Raza, Muhammad Abdullah, Hashem, Mohammad Shadman, Seokhee Jeon., "HapWheel: Bringing in-Car Controls to Driver's Fingertips by Embedding Ubiquitous Haptic Displays into a Steering Wheel." IEEE Transactions on Intelligent Transportation Systems, 2022.
7. Hashem, Mohammad Shadman, Joolekha Bibi Joolee, **Waseem Hassan**, and Seokhee Jeon. "Soft Pneumatic Fingertip Actuator Incorporating a Dual Air Chamber to Generate Multi-Mode Simultaneous Tactile Feedback." Applied Sciences 12, no. 1 (2022): 175.
8. **Waseem Hassan**, Hwangil Kim, Aishwari Talhan, and Seokhee Jeon. "A Pneumatically-Actuated Mouse for Delivering Multimodal Haptic Feedback." Applied Sciences 10, no. 16(2020): 5611
9. **Waseem Hassan**, Arsen Abdulali, and Seokhee Jeon. "Authoring new haptic textures based on interpolation of real textures in affective space." IEEE Transactions on Industrial Electronics 67, no. 1 (2019): 667-676.
10. Raza, Ahsan, **Waseem Hassan**, Tatyana Ogay, Inwook Hwang, and Seokhee Jeon. "Perceptually correct haptic rendering in mid-air using ultrasound phased array." IEEE Transactions on Industrial Electronics 67, no. 1 (2019): 736-745.
11. **Waseem Hassan**, Arsen Abdulali, Muhammad Abdullah, Sang Chul Ahn, and Seokhee Jeon. "Towards universal haptic library: Library-based haptic texture assignment using image texture and perceptual space." IEEE Transactions on Haptics 11, no. 2 (2017): 291-303.
12. Ali, Taqdir, Maqbool Hussain, Wajahat Ali Khan, Muhammad Afzal, Jamil Hussain, Rahman Ali, **Waseem Hassan**, Arif Jamshed, Byeong Ho Kang, and Sungyoung Lee. "Multi-model-based interactive authoring environment for creating shareable medical knowledge." Computer methods and programs in biomedicine 150 (2017): 41-72.
13. Abdulali, Arsen, **Waseem Hassan**, and Seokhee Jeon. "Stimuli-magnitude-adaptive sample selection for data-driven haptic modeling." Entropy 18, no. 6 (2016): 222.
14. Idris, Muhammad, Shujaat Hussain, Muhammad Hameed Siddiqi, **Waseem Hassan**, Hafiz Syed Muhammad Bilal, and Sungyoung Lee. "MRPack: Multi-algorithm execution using compute-intensive approach in map reduce." Plos One 10, no. 8 (2015): e0136259.

Publications: Conference Papers (Peer Reviewed)

1. **Waseem Hassan** , Asier Marzo, Kasper Hornbæk, "Using Low-frequency Sound to Create Non-contact Sensations On and In the Body", In Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '24). Association for Computing Machinery, New York, NY, USA, Article 887, 1–22, 2024.

2. Mudassir Ibrahim Awan*, **Waseem Hassan***, Seokhee Jeon. "Predicting Perceptual Haptic Attributes of Textured Surface from Tactile Data Based on Deep CNN-LSTM Network", Proceedings of the 29th ACM Symposium on Virtual Reality Software and Technology 2023.
3. Mudassir Ibrahim Awan*, Tatyana Ogay*, **Waseem Hassan***, Dongbeom Ko, Sungjoo Kang, Seokhee Jeon. "Model-Mediated Teleoperation for Remote Haptic Texture Sharing: Initial Study of Online Texture Modeling and Rendering." IEEE International Conference on Robotics and Automation (ICRA) 2023
4. Hashem, Mohammad Shadman, Joolekha Bibi Joolee, **Waseem Hassan**, and Seokhee Jeon." A Silicone Based Finger-Tip Pneumatic Actuator to Render Multi-Mode Haptic Feedback." 18th International Conference on Ubiquitous Robots (UR), 2021
5. Seo, Sang-Woo, SeungJoon Kwon, **Waseem Hassan**, Aishwari Talhan, and Seokhee Jeon. "Interactive virtual-reality fire extinguisher with haptic feedback." In 25th ACM Symposium on Virtual Reality Software and Technology, pp. 1-2. 2019.
6. **Waseem Hassan**, Arsen Abdulali, and Seokhee Jeon. "Haptic Texture Authoring: A Demonstration." In International AsiaHaptics conference, pp. 18-20. Springer, Singapore, 2018.
7. Abdulali, Arsen, **Waseem Hassan**, Baek Seung Jin, and Seokhee Jeon. "Hands-On Demonstration of Heterogeneous Haptic Texturing of Mesh Models Based on Image Textures." In International AsiaHaptics conference, pp. 61-65. Springer, Singapore, 2018.
8. Raza, Ahsan, Muhammad Abdullah, **Waseem Hassan**, Arsen Abdulali, Aishwari Talhan, and Seokhee Jeon. "Painting Skill Transfer Through Haptic Channel." In International AsiaHaptics conference, pp. 66-68. Springer, Singapore, 2018.
9. Rakhmatov, Ruslan, Arsen Abdulali, **Waseem Hassan**, Minji Kim, and Seokhee Jeon. "Virtual reality bicycle with data-driven vibrotactile responses from road surface textures." In 2018 IEEE Games, Entertainment, Media Conference (GEM), pp. 1-9. IEEE, 2018.
10. Abdullah, Muhammad, **Waseem Hassan**, Ahsan Raza, and Seokhee Jeon. "Haptic Logos: Insight into the feasibility of digital haptic branding." In International conference on human haptic sensing and touch enabled computer applications, pp. 696-708. Springer, Cham, 2018.
11. Abdullah, Muhammad, Minji Kim, **Waseem Hassan**, Yoshihiro Kuroda, and Seokhee Jeon. "HapticDrone: An encountered-type kinesthetic haptic interface with controllable force feedback: Example of stiffness and weight rendering." In 2018 IEEE Haptics Symposium (HAPTICS), pp. 334-339. IEEE, 2018.
12. Abdullah, Muhammad, Minji Kim, **Waseem Hassan**, Yoshihiro Kuroda, and Seokhee Jeon. "HapticDrone: An encountered-type kinesthetic haptic interface with controllable force feedback: Initial example for 1d haptic feedback." In Adjunct Publication of the 30th Annual ACM Symposium on User Interface Software and Technology, pp. 115-117. 2017.
13. **Waseem Hassan**, Arsen Abdulali, and Seokhee Jeon. "Perceptual thresholds for haptic texture discrimination." In 2017 14th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI), pp. 293-298. IEEE, 2017. **[Outstanding paper award]**
14. Abdulali, Arsen, **Waseem Hassan**, and Seokhee Jeon. "Sample selection of multi-trial data for data-driven haptic texture modeling." In 2017 IEEE World Haptics Conference (WHC), pp. 66-71. IEEE, 2017.
15. **Waseem Hassan**, and Seokhee Jeon. "Evaluating differences between bare-handed and tool-based interaction in perceptual space." In 2016 IEEE Haptics Symposium (HAPTICS), pp. 185-191. IEEE, 2016.
16. **Waseem Hassan**, and Seokhee Jeon. "Building haptic texture perceptual space from real-life textured surfaces using multidimensional scaling." Korean Computer Congress (2016): 1390-1392. **[Outstanding paper award]**

Publications: Non-refereed Conference Papers/Poster/Demo/Abstract

1. **Waseem Hassan**, Raza, A., Abdullah, M., Jeon, S., "Friction Wheel: Bringing in-Car Controls to Driver's Fingertips by Embedding Dual Ubiquitous Haptic Friction Displays into a Steering Wheel." Student innovation challenge, World Haptics conference 2019. **[Best Student Innovation Challenge Award]**
2. **Waseem Hassan**, and Seokhee Jeon, "Heterogeneous Haptic Texture Assignment to Mesh Models Based on Image." Demonstration, SIGGRAPH 2019
3. **Waseem Hassan**, Aishwari Talhan, Tatyana Ogay, Hwangil Kim, and Seokhee Jeon, "Tactile and Kinesthetic Feedback for Safety Experience/Training Simulators: A Case Study of Fire Extinguisher.", Demonstration, SIGGRAPH 2019

4. **Waseem Hassan**, Arsen Abdulali, and Seokhee Jeon, "Authoring New Haptic Textures Based on Interpolation of Real Textures in Affective Space: A Demo", Demonstration, Haptics Symposium 2018
5. **Waseem Hassan**, and Seokhee Jeon, "Towards Universal Haptic Library Library-Based Haptic Texture Selection Using Image Texture", WIP, Eurohaptics. 2016
6. **Waseem Hassan**, Arsen Abdulali, and Seokhee Jeon, 'Towards Universal Haptic Library: Library-Based Haptic Texture Selection Using Image Texture", Demonstration, Eurohaptics. 2016

Patents

1. **Waseem Hassan**, Raza, A., Abdullah, M., Jeon, S., “Apparatus for controlling electronic function module in the vehicle using steering wheel with dual ubiquitous haptic sensor.” South Korean patent 1022757610000, registered July 5, 2021
2. **Waseem Hassan**, Jeon, S. “Haptic Cigarette: Creating perception of smoking using vibrotactile haptic feedback”. South Korean Patent (**Application Pending**)
3. **Waseem Hassan**, Joolee, J.B., and, Jeon, S. “Establishing Haptic Texture Attribute Space and Predicting Haptic Attributes from Image Features Using 1D-CNN” South Korean Patent (**Application Pending**)

Teaching

- CSE20800 Technical English 1
- CSE30900 Technical English 3

Supervision/Co-supervision

1. Baek Seung Jin (BS - 2017)
Paper: Hands-On Demonstration of Heterogeneous Haptic Texturing of Mesh Models Based on Image Textures, AsiaHaptics 2018.
2. Muhammad Abdullah (MS - 2017)
Paper: HapticDrone: An Encountered-Type Kinesthetic Haptic Interface with Controllable Force Feedback: Initial Example for 1D Haptic Feedback, UIST 2017
3. Ruslan Rakhmatov (MS - 2018)
Paper: Virtual Reality Bicycle with Data-Driven Vibrotactile Responses from Road Surface Textures, IEEE Games, Entertainment, Media Conference (GEM) 2018
4. Ahsan Raza (MS - 2018)
Paper: Perceptually Correct Haptic Rendering in Mid-Air Using Ultrasound Phased Array, IEEE Transactions on Industrial Electronics 2019.
5. Mohammad Shadman Hashem (MS - 2021)
Paper: Soft Pneumatic Fingertip Actuator Incorporating a Dual Air Chamber to Generate Multi-Mode Simultaneous Tactile Feedback, Applied Sciences 2021
6. Seungchae Kim (BS - 2021)
7. Mudassir Ibrahim Awan (PhD - 2022)
Paper 1: Model-Mediated Teleoperation for Remote Haptic Texture Sharing: Initial Study of Online Texture Modeling and Rendering, IEEE International Conference on Robotics and Automation (ICRA) 2023.
Paper 2: Predicting Perceptual Haptic Attributes of Textured Surface from Tactile Data Based on Deep CNN-LSTM Network, Virtual Reality Software and Technology (VRST) 2023.
8. Naomi Knudsen (BSc - 2024)
9. Sara Selman (BSc - 2024)
10. Liyue Da (MSc - 2024)

Professional Reviews

1. IEEE Transactions on Haptics (2016 - current)
2. IEEE Transactions on Industrial Electronics (2018 – special issue on Haptics)
3. IEEE Robotics and Automation Letters (2019 - current)
4. IEEE Haptics Symposium (2016 - current)
5. IEEE World Haptics Conference (2016 - current)
6. EuroHaptics Conference (2018 - current)
7. AsiaHaptics Conference (2016 - current)
8. The International Conference on Robotics and Automation (2022 - current)
9. IEEE Virtual Reality Conference (2018 - current)
10. ACM Augmented Humans Conference (2021)
11. IEEE Transactions on Vehicular Technology (2022)
12. ACM Conference on Human Factors in Computing Systems (CHI) (2024)
13. User Interface Software and Technology (UIST) (2024)

Professional References

1. Dr. Seokhee Jeon
Designation: Associate Professor
Relation: Supervisor
Affiliation: Department of Computer Science and Engineering, Kyung Hee University, Korea
email: jeon@khu.ac.kr
2. Dr. Kasper Hornbæk
Designation: Professor
Relation: Postdoc supervisor
Affiliation: Human Centred Computing, Department of Computer Science and Engineering, University of Copenhagen, Denmark
email: kash@di.ku.dk
3. Dr. Noman Akbar
Designation: Senior DSP Engineer
Relation: Senior Graduate lab mate and undergraduate classmate
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