




Waseem Hassan

Curriculum Vitae

 University of Copenhagen, Denmark
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 <http://hassanwaseem.github.io>

Education

- 2016/09 – 2022/02 **Ph.D., Computer Engineering**
Kyung Hee University, South Korea
Thesis title: *Towards Haptic Texture Content Library: Texture Synthesis Through Automatic Model Assignment and Texture Authoring in Haptic Attribute Space*
Advisor: Professor Seokhee Jeon
- 2014/09 – 2016/08 **M.S. Computer Engineering**
Kyung Hee University, South Korea
Thesis title: *Towards Universal Haptic Library—Library-Based Haptic Texture Assignment Using Image Texture*
Advisor: Professor Seokhee Jeon
- 2008/09 – 2012/08 **B.S. Electrical (Telecomm) Engineering**
National University of Science and Technology, Pakistan

Academic Experience

- 2023/02 – present **Postdoc, Computer Science**
Human-Centred Computing, University of Copenhagen, Denmark

Funded Research Projects

- **Touchless AI (EU Horizon 2020):** Led the design and development of new touchless haptic technologies and interaction techniques for non-contact haptic feedback.

Other Responsibilities

- **Supervision:** Supervised Bachelor's and Master's thesis projects.
- **Communication:** Served as communication liaison for the University of Copenhagen, coordinating with Principal Investigators during bi-weekly meetings.
- **Skill Development:** Organized weekly research seminars and mentoring workshops to enhance research skills within the section.

Academic Experience (continued)

2022/03 – 2023/02

Postdoc, Computer Engineering

Haptics and VR Lab., Kyung Hee University, South Korea

Funded Research Projects

- **Haptic Simulation Technology for Moving Interface (Hyundai Korea):** Quantified haptic affection of car doors through data-driven analysis of physical parameters of the door.
- **Data Processing and Multi-Modal Interaction through EdgeCPS (ETRI Korea):** Developed modular *on-demand* haptic interfaces to provide multimodal feedback, including vibrations, thermal, normal force, impact, and shear force.
- **Model-Mediated Adaptive Tele-Operation for Realistic Haptic Experience Sharing (NRF Korea):** Created a model-mediated teleoperation system for remote haptic texture modeling and rendering in real-time.

I was strongly involved in developing the concept and in writing the proposal for this grant.

Other Responsibilities

- **Teaching:** Taught two undergraduate courses on Technical Writing and Presentation. Responsible for designing course material, written exams and project presentations, and grading.
- **Supervision:** Supervised Bachelor's, Master's, and Ph.D. students, guiding their research projects and thesis work.

2016/09 – 2022/02

Ph.D. Research Assistant, Computer Engineering

Haptics and VR Lab., Kyung Hee University, South Korea

Funded Research Projects

- **Development of Virtual Objects Interaction Techniques in Life-Safety Situations (Ministry of the Interior and Safety):** Developed simulators for safety training, including an earthquake simulator with VR and haptics, and a fire training simulator featuring VR and a haptic fire extinguisher.

I was strongly involved in developing the concept and in writing the proposal for this grant.

- **Drone-Based Haptic Interface with Unlimited Workspace (NRF Korea):** Used a drone as a haptic interface to provide haptic interaction feedback and stiffness rendering.
- **Perceptual Performance Enhancement of Ultrasonic Haptic Display (ETRI Korea):** Developed the algorithm for perceptually correct haptic rendering in mid-air using ultrasound phased arrays.

Academic Experience (continued)

- **Haptic Modeling and Rendering Technology for Mirror World (Global Frontier, NRF Korea):** Created a “Universal Haptic Texture Library” encompassing two sub-projects:
 - Authoring new realistic haptic textures based on interpolation of data-driven models of real textures.
 - Establishing a haptic texture attribute space to perceptually compare haptic textures and designing a deep learning system using 1D-CNN to predict perceptual haptic attributes of unseen textures from image features.

Other Responsibilities

- **Supervision:** Supervised Bachelor’s and Master’s students, guiding their research projects and thesis work.

2014/09 – 2016/08





M.S. Research Assistant, Computer Engineering

Haptics and VR Lab., Kyung Hee University, South Korea

Funded Research Projects

- **Haptic Modeling and Rendering Technology for Mirror World (Global Frontier, NRF Korea):** Created a “Universal Haptic Texture Library” which enabled the automatic assignment of perceptually correct haptic textures to unseen objects using image textures only.

Selected Publications

- [1] **W. Hassan**, A. Marzo, and K. 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*, ser. CHI ’24, Honolulu, HI, USA: Association for Computing Machinery, 2024, ISBN: 9798400703300.  DOI: 10.1145/3613904.3642311.
- [2] **W. Hassan**, J. B. Joolee, and S. Jeon, “Establishing haptic texture attribute space and predicting haptic attributes from image features using 1d-cnn,” *Scientific Reports*, vol. 13, no. 1, p. 11 684, 2023, ISSN: 2045-2322.  DOI: 10.1038/s41598-023-38929-6.
- [3] **W. Hassan**, A. Abdulali, and S. Jeon, “Authoring new haptic textures based on interpolation of real textures in affective space,” *IEEE Transactions on Industrial Electronics*, vol. 67, no. 1, pp. 667–676, 2020.  DOI: 10.1109/TIE.2019.2914572.
- [4] **W. Hassan**, A. Abdulali, M. Abdullah, S. C. Ahn, and S. Jeon, “Towards universal haptic library: Library-based haptic texture assignment using image texture and perceptual space,” *IEEE Transactions on Haptics*, vol. 11, no. 2, pp. 291–303, 2018.  DOI: 10.1109/TOH.2017.2782279.

Teaching and Supervision

Teaching

2022 **CSE20800, Technical English 1**
Kyung Hee University, South Korea

CSE30900, Technical English 3
Kyung Hee University, South Korea

Teaching Assistant

2017 – 2019 **Advanced Human-Computer Interaction**, MS-PhD course (2017)
Machine Learning, MS-PhD course (2018)
Advanced Artificial Intelligence, MS-PhD course (2019)

Supervision/Co-supervision

2017 **Bachelor Thesis**, Baek Seung Jin
Kyung Hee University, South Korea
Publication: *Hands-On Demonstration of Heterogeneous Haptic Texturing of Mesh Models Based on Image Textures*, AsiaHaptics 2018.

Master Project, Muhammad Abdullah
Kyung Hee University, South Korea
Publication: *HapticDrone: An Encountered-Type Kinesthetic Haptic Interface with Controllable Force Feedback: Initial Example for 1D Haptic Feedback*, UIST 2017.

2018 **Master Thesis**, Ruslan Rakhmatov
Kyung Hee University, South Korea
Publication: *Virtual Reality Bicycle with Data-Driven Vibrotactile Responses from Road Surface Textures*, IEEE Games, Entertainment, Media Conference (GEM) 2018.

Master Project, Ahsan Raza
Kyung Hee University, South Korea
Publication: *Perceptually Correct Haptic Rendering in Mid-Air Using Ultrasound Phased Array*, IEEE Transactions on Industrial Electronics 2019.

2021 **Bachelor Project**, Seungchae Kim
Modular thermal and vibrotactile module for haptic feedback in VR.

Master Thesis, Mohammad Shadman Hashem
Kyung Hee University, South Korea
Publication: *Soft Pneumatic Fingertip Actuator Incorporating a Dual Air Chamber to Generate Multi-Mode Simultaneous Tactile Feedback*, Applied Sciences 2021.

Teaching and Supervision (continued)

- 2022 **PhD Project**, Mudassir Ibrahim Awan
Kyung Hee University, South Korea
Publication 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.
Publication 2: *Predicting Perceptual Haptic Attributes of Textured Surface from Tactile Data Based on Deep CNN-LSTM Network*, Virtual Reality Software and Technology (VRST) 2023.
- 2024 **Bachelor Thesis**, Naomi Knudsen
University of Copenhagen, Denmark
Haptic painting on a tablet/phone.
- Bachelor Thesis**, Sara Selman
University of Copenhagen, Denmark
Haptic painting on a tablet/phone.
- Master Project**, Liyue Da
University of Copenhagen, Denmark
Moving Phantom Sensation Induced by Whole-body Vibration.

Honors and Awards

- 2019 **Best Student Innovation Challenge Award**
World Haptics Conference (WHC) 2019
Friction wheel: Bringing in-car controls to driver's fingertips by embedding dual ubiquitous haptic friction displays into a steering wheel
- Outstanding Paper Award**
Ubiquitous Robotics and Ambient Intelligence (URAI) 2019
Perceptual thresholds for haptic texture discrimination
- 2018 **Nominated for Best Paper Award**
EuroHaptics, 2018
Haptic Logos: Insight into the feasibility of digital haptic branding
- 2016 **Outstanding Paper Award**
Korean Computer Congress (KCC) 2016
Building haptic texture perceptual space from real-life textured surfaces using multidimensional scaling
- 2016 – 2022 **Doctoral Research Scholarship**
Kyung Hee University, South Korea
- 2014 – 2016 **Masters Research Scholarship**
Kyung Hee University, South Korea
- 2014 – 2022 **Graduate Student Scholarship**
Kyung Hee University, South Korea
- 2011 – 2012 **President, Telecomm Society**
MCS, National University of Science and Technology, Pakistan
- 2008 – 2009 **Undergraduate Merit Scholarship**
National University of Science and Technology, Pakistan

Outreach

Workshops and Conferences

- 2024/05 **SCIENCE Postdoc Day**
University of Copenhagen, Denmark
Organized the Postdoc Day event which included workshops, panels, and networking sessions to equip attendees with the tools and knowledge needed for successful careers.
- 2023/10 **HCC Open House**
University of Copenhagen, Denmark
Organized the HCC Open House event to showcase research activities and foster engagement with the broader academic and local community.
- 2016/07 **HCI Korea '16**
Kyung Hee University, South Korea
Organized and conducted a conference focused on human-computer interaction, engaging participants in hands-on activities and discussions.

Demonstrations and Exhibitions

- 2024/07 **Exhibition:** Using Low-Frequency Sound to Create Non-Contact Sensations on and in the Body
EuroHaptics '24, Lille, France
- 2019/07 **Demonstration:** Heterogeneous Haptic Texture Assignment to Mesh Models Based on Image
SIGGRAPH 2019, Los Angeles, USA
Demonstration: Tactile and Kinesthetic Feedback for Safety Experience/Training Simulators: A Case Study of Fire Extinguisher
SIGGRAPH 2019, Los Angeles, USA
- 2018/03 **Demonstration:** Authoring New Haptic Textures Based on Interpolation of Real Textures in Affective Space: A Demo
Haptics Symposium 2018, California, USA
- 2016/07 **Demonstration:** Towards Universal Haptic Library: Library-Based Haptic Texture Selection Using Image Texture
EuroHaptics 2016

Professional References

Dr. Seokhee Jeon

Designation: Associate Professor

Relation: Ph.D. Supervisor

Affiliation: Department of Computer Science and Engineering, Kyung Hee University, South Korea

Email: jeon@khu.ac.kr

Dr. Kasper Hornbæk

Designation: Professor

Relation: Postdoc Supervisor

Affiliation: Department of Computer Science and Engineering, University of Copenhagen, Denmark

Email: kash@di.ku.dk

Professional References (continued)

Dr. Asier Marzo

Designation: Assistant Professor

Relation: Collaborator

Affiliation: Department of Mathematics and Computer Engineering, Public University of Navarra, Spain







Email: asier.marzo@unavarra.es









Academic Review Service

2024	ACM Conference on Human Factors in Computing Systems (CHI) User Interface Software and Technology (UIST)
2022	IEEE Transactions on Vehicular Technology
2022 – current	The International Conference on Robotics and Automation
2021	ACM Augmented Humans Conference
2019 – current	IEEE Robotics and Automation Letters
2018 (special issue)	IEEE Transactions on Industrial Electronics
2018 – current	EuroHaptics Conference IEEE Virtual Reality Conference
2016 – current	IEEE Haptics Symposium IEEE World Haptics Conference IEEE Transactions on Haptics AsiaHaptics Conference




Full Publications List











Journal Articles

- [1] J. B. Joolee, M. S. Hashem, **W. Hassan**, and S. Jeon, “Deep encoder–decoder network based data-driven method for impact feedback rendering on head during earthquake,” *Virtual Reality*, vol. 28, no. 1, p. 23, 2024, ISSN: 1434-9957.  DOI: 10.1007/s10055-023-00906-9.
- [2] A. Raza, **W. Hassan**, and S. Jeon, “Pneumatically controlled wearable tactile actuator for multi-modal haptic feedback,” *IEEE Access*, vol. 12, pp. 59 485–59 499, 2024.  DOI: 10.1109/ACCESS.2024.3376753.
- [3] C. Lee, S. Jeon, **W. Hassan**, and H. Kang, “Vr unseen gaze: Inducing feeling of being stared at in virtual reality,” *Virtual Reality*, vol. 27, no. 2, pp. 1529–1548, 2023, ISSN: 1434-9957.  DOI: 10.1007/s10055-023-00751-w.
- [4] **W. Hassan**, J. B. Joolee, and S. Jeon, “Establishing haptic texture attribute space and predicting haptic attributes from image features using 1d-cnn,” *Scientific Reports*, vol. 13, no. 1, p. 11 684, 2023, ISSN: 2045-2322.  DOI: 10.1038/s41598-023-38929-6.
- [5] M. S. Hashem, J. B. Joolee, **W. Hassan**, and S. Jeon, “Soft pneumatic fingertip actuator incorporating a dual air chamber to generate multi-mode simultaneous tactile feedback,” *Applied Sciences*, vol. 12, no. 1, 2022, ISSN: 2076-3417.  DOI: 10.3390/app12010175.
- [6] A. Talhan, S. Kumar, H. Kim, **W. Hassan**, and S. Jeon, “Multi-mode soft haptic thimble for haptic augmented reality based application of texture overlaying,” *Displays*, vol. 74, p. 102 272, 2022, ISSN: 0141-9382.  DOI: <https://doi.org/10.1016/j.displa.2022.102272>.

- [7] **W. Hassan**, A. Raza, M. Abdullah, M. S. Hashem, and S. 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*, vol. 23, no. 10, pp. 18 526–18 534, 2022.  DOI: 10.1109/TITS.2022.3160496.
- [8] **W. Hassan**, A. Abdulali, and S. Jeon, “Authoring new haptic textures based on interpolation of real textures in affective space,” *IEEE Transactions on Industrial Electronics*, vol. 67, no. 1, pp. 667–676, 2020.  DOI: 10.1109/TIE.2019.2914572.
- [9] **W. Hassan**, H. Kim, A. Talhan, and S. Jeon, “A pneumatically-actuated mouse for delivering multimodal haptic feedback,” *Applied Sciences*, vol. 10, no. 16, 2020, ISSN: 2076-3417.  DOI: 10.3390/app10165611.
- [10] A. Raza, **W. Hassan**, T. Ogay, I. Hwang, and S. Jeon, “Perceptually correct haptic rendering in mid-air using ultrasound phased array,” *IEEE Transactions on Industrial Electronics*, vol. 67, no. 1, pp. 736–745, 2019.  DOI: 10.1109/TIE.2019.2910036.
- [11] **W. Hassan**, A. Abdulali, M. Abdullah, S. C. Ahn, and S. Jeon, “Towards universal haptic library: Library-based haptic texture assignment using image texture and perceptual space,” *IEEE Transactions on Haptics*, vol. 11, no. 2, pp. 291–303, 2018.  DOI: 10.1109/TOH.2017.2782279.
- [12] T. Ali, M. Hussain, W. Ali Khan, *et al.*, “Multi-model-based interactive authoring environment for creating shareable medical knowledge,” *Computer Methods and Programs in Biomedicine*, vol. 150, pp. 41–72, 2017, ISSN: 0169-2607.  DOI: <https://doi.org/10.1016/j.cmpb.2017.07.010>.
- [13] A. Abdulali, **W. Hassan**, and S. Jeon, “Stimuli-magnitude-adaptive sample selection for data-driven haptic modeling,” *Entropy*, vol. 18, no. 6, 2016, ISSN: 1099-4300.  DOI: 10.3390/e18060222.
- [14] M. Idris, S. Hussain, M. H. Siddiqi, **W. Hassan**, H. Syed Muhammad Bilal, and S. Lee, “Mrpack: Multi-algorithm execution using compute-intensive approach in mapreduce,” *PLOS ONE*, vol. 10, no. 8, pp. 1–18, Aug. 2015.  DOI: 10.1371/journal.pone.0136259.

Conference Proceedings

- [1] **W. Hassan** and K. Hornbæk, “Audio-tactile integration: Concurrent audio feedback can shift vibrotactile frequency perception,” in *Haptics: Science, Technology, and Applications*, vol. 4, 2024, p. 8.
- [2] **W. Hassan**, A. Marzo, and K. 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*, ser. CHI ’24, Honolulu, HI, USA: Association for Computing Machinery, 2024, ISBN: 9798400703300.  DOI: 10.1145/3613904.3642311.
- [3] M. I. Awan, T. Ogay, **W. Hassan**, D. Ko, S. Kang, and S. Jeon, “Model-mediated teleoperation for remote haptic texture sharing: Initial study of online texture modeling and rendering,” in *2023 IEEE International Conference on Robotics and Automation (ICRA)*, 2023, pp. 12 457–12 463.  DOI: 10.1109/ICRA48891.2023.10160503.
- [4] M. S. Hashem, J. B. Joolee, **W. Hassan**, and S. Jeon, “Multi-mode simultaneous tactile feedback using soft pneumatic fingertip actuator with dual air chamber,” in *Intelligent Autonomous Systems 18*, Cham: Springer Nature Switzerland, 2023, pp. 617–620, ISBN: 978-3-031-44851-5.
- [5] A. Abdulali, **W. Hassan**, B. S. Jin, and S. Jeon, “Hands-on demonstration of heterogeneous haptic texturing of mesh models based on image textures,” in *Haptic Interaction*, H. Kajimoto, D. Lee, S.-Y. Kim, M. Konyo, and K.-U. Kyung, Eds., Singapore: Springer Singapore, 2019, pp. 61–65, ISBN: 978-981-13-3194-7.  DOI: 10.1007/978-981-13-3194-7_13.

- [6] A. Raza, M. Abdullah, **W. Hassan**, A. Abdulali, A. Talhan, and S. Jeon, "Painting skill transfer through haptic channel," in *Haptic Interaction*, H. Kajimoto, D. Lee, S.-Y. Kim, M. Konyo, and K.-U. Kyung, Eds., Singapore: Springer Singapore, 2019, pp. 66–68, ISBN: 978-981-13-3194-7.  DOI: 10.1007/978-981-13-3194-7_14.
- [7] S.-W. Seo, S. Kwon, **W. Hassan**, A. Talhan, and S. Jeon, "Interactive virtual-reality fire extinguisher with haptic feedback," in *Proceedings of the 25th ACM Symposium on Virtual Reality Software and Technology*, ser. VRST '19, Parramatta, NSW, Australia: Association for Computing Machinery, 2019, ISBN: 9781450370011.  DOI: 10.1145/3359996.3364725.
- [8] **W. Hassan**, A. Abdulali, and S. Jeon, "Haptic texture authoring: A demonstration," in *Haptic Interaction*, H. Kajimoto, D. Lee, S.-Y. Kim, M. Konyo, and K.-U. Kyung, Eds., Singapore: Springer Singapore, 2019, pp. 18–20, ISBN: 978-981-13-3194-7.  DOI: 10.1007/978-981-13-3194-7_5.
- [9] M. Abdullah, M. Kim, **W. Hassan**, Y. Kuroda, and S. Jeon, "Hapticdrone: An encountered-type kinesthetic haptic interface with controllable force feedback: Example of stiffness and weight rendering," in *2018 IEEE Haptics Symposium (HAPTICS)*, 2018, pp. 334–339.  DOI: 10.1109/HAPTICS.2018.8357197.
- [10] M. Abdullah, **W. Hassan**, A. Raza, and S. Jeon, "Haptic logos: Insight into the feasibility of digital haptic branding," in *Haptics: Science, Technology, and Applications*, Cham: Springer International Publishing, 2018, pp. 696–708.  DOI: 10.1007/978-3-319-93399-3_59.
- [11] R. Rakhmatov, A. Abdulali, **W. Hassan**, M. Kim, and S. Jeon, "Virtual reality bicycle with data-driven vibrotactile responses from road surface textures," in *2018 IEEE Games, Entertainment, Media Conference (GEM)*, 2018, pp. 1–9.  DOI: 10.1109/GEM.2018.8516277.
- [12] **W. Hassan**, A. Abdulali, and S. Jeon, "Towards universal haptic library: Library-based haptic texture assignment using image texture and perceptual space," in *Haptic Interaction: Science, Engineering and Design 2*, Springer, 2018, pp. 415–417.
- [13] A. Abdulali, **W. Hassan**, and S. Jeon, "Sample selection of multi-trial data for data-driven haptic texture modeling," in *2017 IEEE World Haptics Conference (WHC)*, 2017, pp. 66–71.  DOI: 10.1109/WHC.2017.7989878.
- [14] M. Abdullah, M. Kim, **W. Hassan**, Y. Kuroda, and S. Jeon, "Hapticdrone: An encountered-type kinesthetic haptic interface with controllable force feedback: Initial example for 1d haptic feedback," in *Adjunct Proceedings of the 30th Annual ACM Symposium on User Interface Software and Technology*, ser. UIST '17 Adjunct, Québec City, QC, Canada: Association for Computing Machinery, 2017, pp. 115–117.  DOI: 10.1145/3131785.3131821.
- [15] **W. Hassan**, A. Abdulali, and S. Jeon, "Perceptual thresholds for haptic texture discrimination," in *2017 14th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)*, 2017, pp. 293–298.  DOI: 10.1109/URAI.2017.7992733.
- [16] **W. Hassan** and S. Jeon, "Evaluating differences between bare-handed and tool-based interaction in perceptual space," in *2016 IEEE Haptics Symposium (HAPTICS)*, 2016, pp. 185–191.  DOI: 10.1109/HAPTICS.2016.7463175.

Patents

- [1] **W. Hassan** and S. Jeon, "Haptic cigarette: Creating perception of smoking using vibrotactile haptic feedback," Application Pending.
- [2] **W. Hassan**, J. B. Joolee, and S. Jeon, "Establishing haptic texture attribute space and predicting haptic attributes from image features using 1d-cnn," Application Pending.

- [3] **W. Hassan**, A. Raza, M. Abdullah, and S. Jeon, “Apparatus for controlling electronic function module in the vehicle using steering wheel with dual ubiquitous haptic sensor,” 1 022 757 610 000, Jul. 2021.