

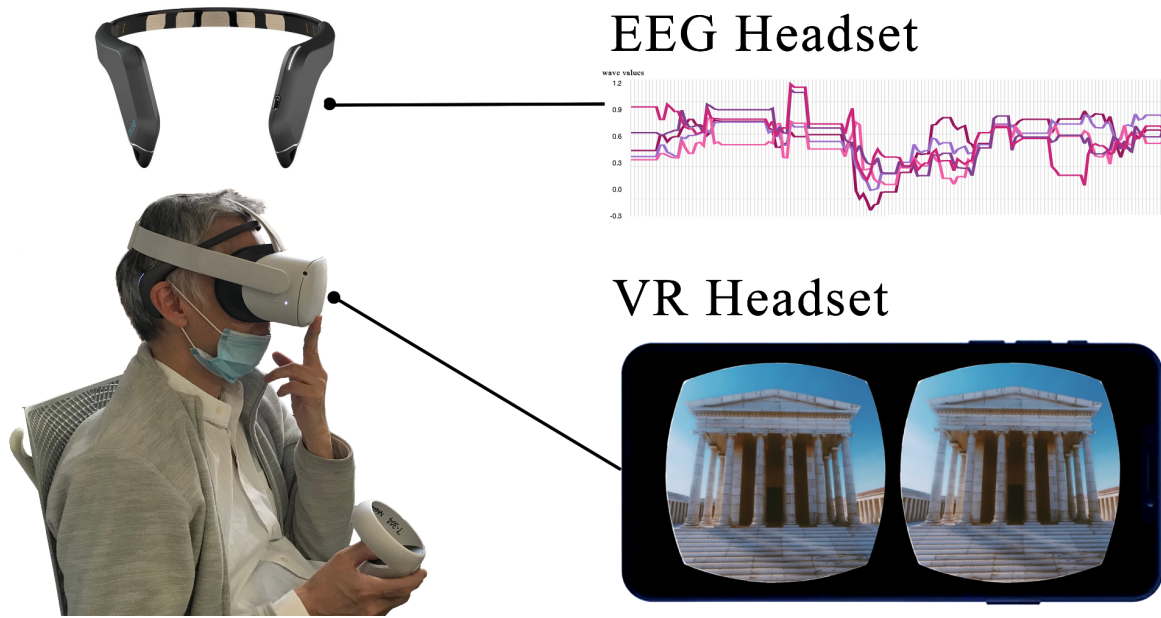
MIT 4.s52 Feeling Architecture: Affective Computing and Digital Heritage

Instructors: Guzden Varinlioglu - guzden@mit.edu, Takehiko Nagakura - takehiko@mit.edu

Class Meetings: Wednesdays at 2-5pm, Room: 9-450

Limited Enrollment: 12 students

Fall 2022 (2+1+6) 9 units



Content: The course is an introduction to the research field of digital cultural heritage through the spatial and emotional experience, facilitated by immersive technologies. By means of affective computing methods, we will think about architectural design with special attention to how we feel inside it. The course gives an overview of theories and principles in experiencing art/culture and design, affective computing such as wearable technologies/bio sensors, as well as immersive technologies such as AR/VR/XR and gamification. Further, it provides for a practical exploration of research methods in three areas related to digital humanities: collection/management, visualization/immersion, analysis/ interpretation.

Format: The course will consist of seminars with weekly practice and reading assignments across five topics: user experience, affective computing, immersive technologies, digital humanities and digital heritage. Two weeks will be devoted to each topic: an introductory lecture on the theory of each topic and a related and practical assignment. This will be followed by guest lectures from international and local prominent scholars with whom students will have the opportunity to engage and ask questions about the topics they are studying. The guest lecturers we have selected represent inclusive and diverse contexts of heritage professionals. Towards the end of the semester, there will also be two experimental workshops that will serve as example research projects.

Aims: To help students understand the link between architectural heritage and affective computing; to introduce key issues in digital heritage; and to provide students with the basic theoretical and practical knowledge of contemporary visual representation methods such as AR/VR, game and wearable devices.

Conduct: The background of these 5 topics and 2 workshops will enable students to develop their own final project, based on either a literature review or the development of an original argument for an in-class



presentation. The assignments presented throughout the semester will constitute the basis for the final project; these should take into account class discussions, as well as students' own reflections. The final project should be around 1500 words and structured with an introduction, development, and conclusion. Final projects are encouraged to be submitted to CAAD conferences such as eCAADe, ACADIA, etc.

The grading for the course is as follows: attendance 10%, in-class participation in discussions and weekly readings, 25%; hands-on practices, 25%; experimental workshops, 10%; final project midterm and final presentation, 30%.

We believe that to build an inclusive culture in the age of AI, the study of digital cultural heritage is essential. Please check the design justice principles for more information: <https://designjustice.org/read-the-principles>

Weekly Schedule:

WEEKS	ASSIGNMENTS	TOPICS	TITLES	GRADES
1	Introduction and Experiencing Architecture			
W1, Sep. 7th 2022	Lecture on Course Material	Plutchik, R. (2001). The Nature of Emotions: Human Emotions Have Deep Evolutionary Roots, a Fact That May explain Their Complexity and Provide Tools for Clinical Practice. <i>American Scientist</i> , 89(4), 344-350.		5
	Practical Assignment 1 (PA1)	Implication of affective computing to study experience in architectural space a. Describe the psychology of the spectator/user of space verbally. Find the experience/feeling of the architect or the user as described in the literature.		
Sep. 14th	2-3pm	Guest Lectures	Güven Güzeldere, Harvard University, Department of Philosophy, https://philpeople.org/profiles/guven-guzeldere	5
	3-4pm		Burak Erdeniz, Izmir University of Economics, Department of Psychology, https://people.ieu.edu.tr/en/burakerdeniz/main	
	4-5pm	Reading Assignment 1 & Presentation of PA1	Read assigned chapters and, prepare two questions for the guests: Pasqualini I., Blefari M.L., Tadi T., Serino A. and Blanke O. (2018) The Architectonic Experience of Body and Space in Augmented Interiors. <i>Frontiers in Psychology</i> , 9:375. doi: 10.3389/fpsyg.2018.00375 https://www.frontiersin.org/articles/10.3389/fpsyg.2018.00375/full	
2	Affective Computing			
W3, Sep. 21st 2022	Course Material	Picard, R. W. (2000). "Introduction". <i>Affective Computing</i> . Cambridge, MA: MIT Press. Technology and Emotions Roz Picard TEDxSF, https://www.youtube.com/watch?v=ujxriwApPP4&t=10s		5
	Practical Assignment 2 (PA2)	Implication of affective computing to study experience in architectural space b. Experience the space of your choice through EEG and record the experience through an action camera.		
W4, Sep. 28, 2022	2-3pm	Guest Lectures	Kaya Oguz, Izmir University of Economics, Department of Computer Engineering, http://homes.ieu.edu.tr/koguz	5
	3-4pm		Ann Sussman, Boston Architectural College, https://annsussman.com	



	4-5pm	Reading Assignment 2 & Presentation of PA2	<p>Read assigned chapters and prepare two questions for the guests: Özkan, C., Oğuz, K. (2021). Selecting Emotion Specific Speech Features to Distinguish One Emotion from Others. 2021 International Conference on INnovations in Intelligent SysTems and Applications (INISTA), 1-5, doi: 10.1109/INISTA52262.2021.9548533. https://ieeexplore.ieee.org/document/9548533</p> <p>Sussman, A., & Hollander, J. B. (2021). "A New Foundation? Darwin, Biology, and Cognitive Science". Cognitive Architecture: Designing for How We Respond to the Built Environment. Routledge.</p>	5
3	Immersive Technologies			
W5, Oct. 5th 2022		Course Material	Jaron Lanier: Virtual Reality, Social Media & the Future of Humans and AI Lex Fridman Podcast #218, https://www.youtube.com/watch?v=FxOG6DHmFXM	
		Practical Assignment 3 (PA3)	Recording of the space and integration into Unity a. Record the space of your choice using 360 videos, integrate the video into Unity and experience in VR.	5
Oct. 12th	3-4pm*	Guest Lectures	Figen Gül, Istanbul Technical University, Graduate Program of Architectural Design Computing, https://akademi.itu.edu.tr/en/fgul/	
	4-5pm*		Tomas Dorta, University of Montreal, Hybridlab: Design Research Laboratory https://design.umontreal.ca/professeurs/professeurs-reguliers/un-professeur/in/in14696/sg/Tomás%20Dorta/	
	2-3pm*	Reading Assignment 3 & Presentation of PA3	<p>Read the assigned chapters and, prepare two questions for the guests: Karahan, S., & Gül, L. F. (2021). Mapping Current Trends on Gamification of Cultural Heritage. <i>Game+ Design Education</i>, 281-293. Springer.</p> <p>Dorta, T., Kinayoglu, G., & Hoffmann, M. (2016). Hyve-3D and the 3D Cursor: Architectural co-design with freedom in Virtual Reality. <i>International Journal of Architectural Computing</i>, 14(2), 87-102. https://doi.org/10.1177/1478077116638921</p>	5
4	Digital Humanities			
W7, Oct. 19th 2022		Course Material	Berry, D. (2011). The Computational Turn: Thinking about the Digital Humanities (pp. 1-22). Culture Machine, 12. http://sro.sussex.ac.uk/id/eprint/49813/	
		Practical Assignment 4 (PA4)	Recording of the space and integration into Unity b. Record the space of your choice using 3D photogrammetry, integrate the 3D models into Unity and experience in VR.	5
W8, Oct. 26th 2022	2-3pm	Guest Lectures	Diane Favro, UCLA, Experiential Technologies Center, Center of Digital Humanities, https://ioa.ucla.edu/people/diane-favro	
	3-4pm		Asterios Agkathidis, University of Liverpool, Department of Architecture, https://www.liverpool.ac.uk/architecture/staff/asterios-agkathidis/	
	4-5pm	Reading Assignment 4 & Presentation of PA4	<p>Read assigned chapters and prepare two questions for the guests: Favro, D. (2012). Se non è vero, è ben trovato (If Not True, It Is Well Conceived): Digital Immersive Reconstructions of Historical Environments. <i>Journal of the Society of Architectural Historians</i>, 71(3), 273-277. https://doi.org/10.1525/jsah.2012.71.3.273</p>	5



			Wang, Y., Agkathidis, A., & Crompton, A. (2020). Parametrising historical Chinese courtyard-dwellings: An algorithmic design framework for the digital representation of Siheyuan iterations based on traditional design principles. <i>Frontiers of Architectural Research</i> , 9(4), 751-773. https://www.sciencedirect.com/science/article/pii/S2095263520300522	
5	Digital Heritage			
W9, Nov. 2nd 2022		Course Material	Kalay, Y., Kvan, T., & Affleck, J. (2008). <i>New heritage</i> . New Media and Cultural Heritage. London and New York: Routledge (1-10). https://www.taylorfrancis.com/books/edit/10.4324/9780203937884/new-heritage-yehuda-kalay-thomas-kvan-janice-affleck Charter on the Preservation of the Digital Heritage, 2009, https://unesdoc.unesco.org/ark:/48223/pf0000179529_page=2	
		Practical Assignment 5 (PA5)	Experiment the space in VR and record EEG.	5
W10, Nov. 9th 2022	2-3pm	Guest Lectures	Mahyar Hadighi, TTU, Historic Preservation and Design, https://www.depts.ttu.edu/architecture/about/people/faculty/hadighi/index.php	
	3-4pm		Serdar Aydın, Mardin Artuklu University, Department of Architecture, https://www.researchgate.net/profile/Serdar-Aydin-8	
	4-5pm	Reading Assignment 5 & Presentation of PA5	Read assigned chapters and prepare two questions for the guests: Hadighi, M. (2021). Configurable Resiliency: Generating Sustainable Designs in Historic Neighborhoods. ARCC-EAAE 2022 International Conference; Resilient City: Physical, Social, and Economic Perspectives. Edited by Chris Jarrett, and Adil Sharag-Eldin (ISBN 978-1-935129-31-8. 327-334. Aydin, S., & Schnabel, M. A. (2016). The Museum of Gamers: Unmediated Cultural Heritage Through Gaming. <i>Cultural Heritage in a Changing World</i> , 125-141. Springer. https://link.springer.com/chapter/10.1007/978-3-319-29544-2_8	5
Nov. 16th	W11	Midterm	Presentations and discussion of term paper/project	10
Nov. 23th	W12	Workshop 1	“Local Intelligence and AI”, Lale Basarir, Department of Architecture, Izmir University of Economics https://www.linkedin.com/in/lalebasarir/	5
Nov. 30th	W13	Workshop 2	“Stigmergy” Ozgun Balaban, Guzden Varinlioglu Columbia University GSAPP https://www.arch.columbia.edu/faculty/4041-ozgun-balaban	5
Dec 7th.	W14	Final Presentations	Overall Evaluation / Term Paper & Project Submission	20

