Mixed Reality and Future HCI

SPRING 2020

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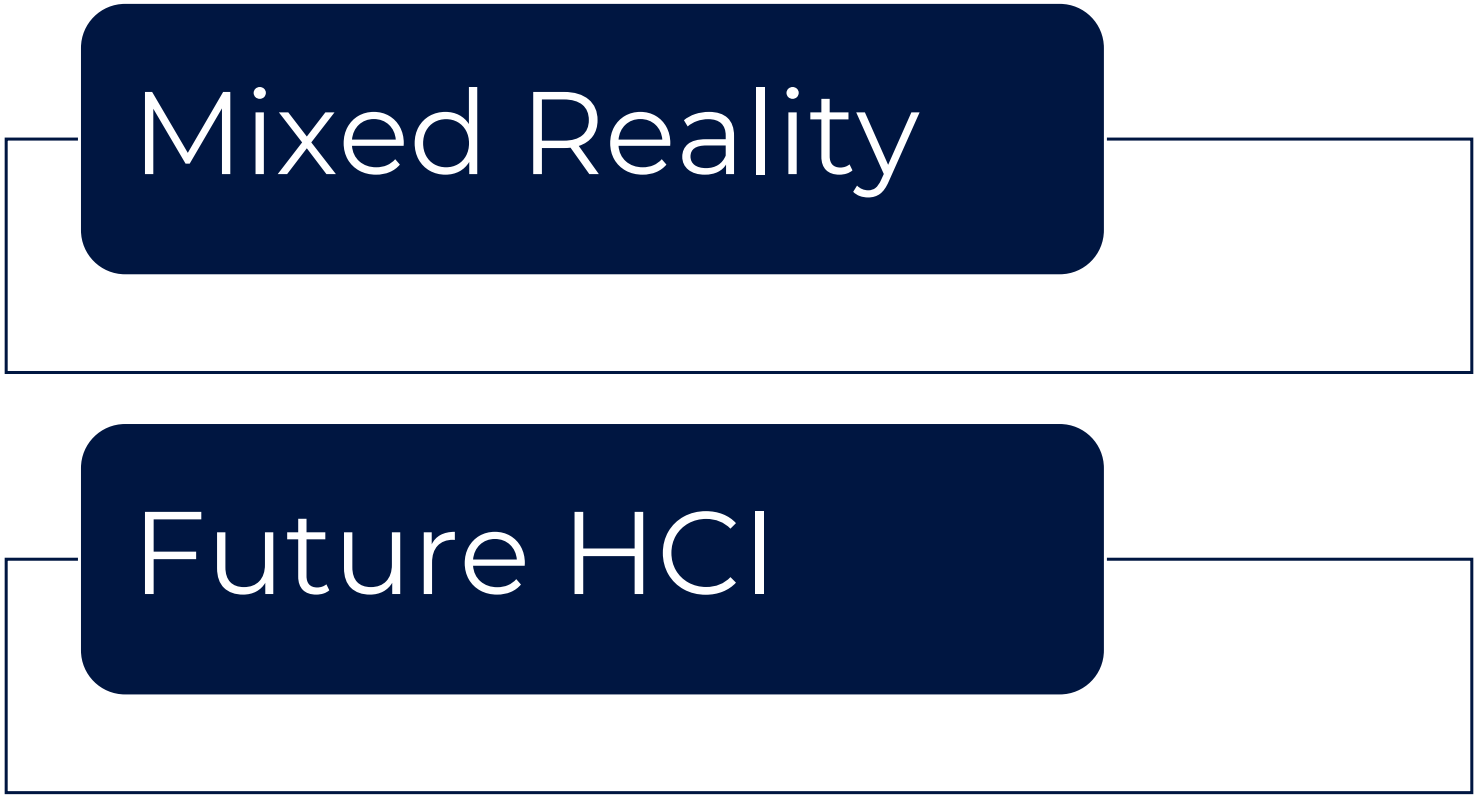
Week	Topic	Reading
1	Introduction to HCI; Design Principles	Chapter 1
2	User-Centred Design Process	Chapter 2 & 3 / Gould et al. (1987)
3	User Interaction and Interfaces	Chapters 4, 5 & 6 / Shin et al. (2017)
4	Interaction Design and Development I	Chapters 7 & 8
5	Interaction Design and Development II	Chapters 9 & 10
6	Interaction Design and Development III	Chapters 11 & 12
7	Information Presentation and Design Patterns	
8	Usability Evaluation Methods I	Chapters 13 / Borsci et al. (2015)
9	Usability Evaluation Methods II	Chapter 14, 15 & 16
10	Accessibility and Special Issues in HCI	Online: WCAG2.0
11	Models, Theories and Risks	MacKenzie (1992)
12	Mixed Reality and Future HCI	
13	Subject Revision	

This Week



Subject Description

- The subject provides students with an understanding of Human Computer Interaction (HCI) principles and practices, and how to apply them in the context of developing usable interactive computer applications and systems. The subject also emphasises the importance of taking into account contextual, organisational, and social factors in the design of computer systems. Students will be taken through the analysis, design, development, and evaluation of user interfaces. They will acquire hands-on design skills through an interaction design project. The subject will cover topics including user-centred design, the development process, prototyping, usability testing, measuring and evaluating the user experience and accessibility.

Subject Learning Outcomes (SLOs)

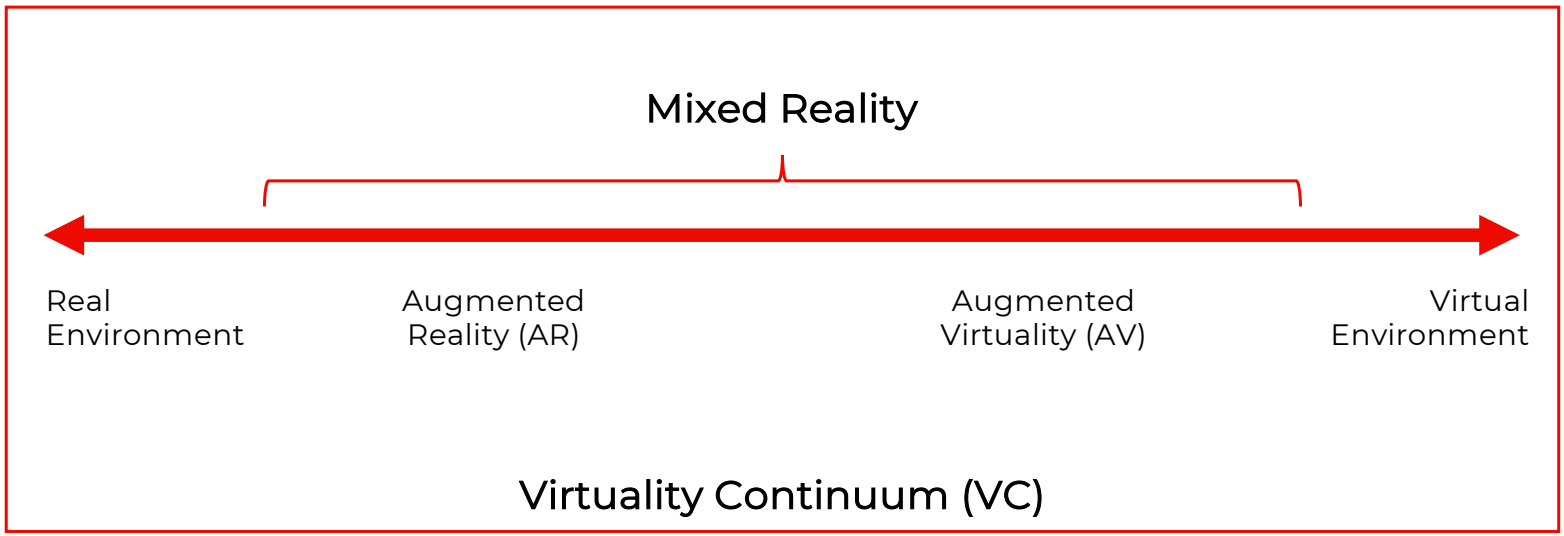
- On successful completion of this subject, students will be able to:
  1. Identify and describe HCI principles and design issues.
  2. Discuss and justify HCI solutions based on design principles.
  3. Demonstrate an understanding of the HCI design process.
  4. Acquire skills to design and implement user-centred design.
  5. Select and use suitable methods of measuring and evaluating the user experience.

History

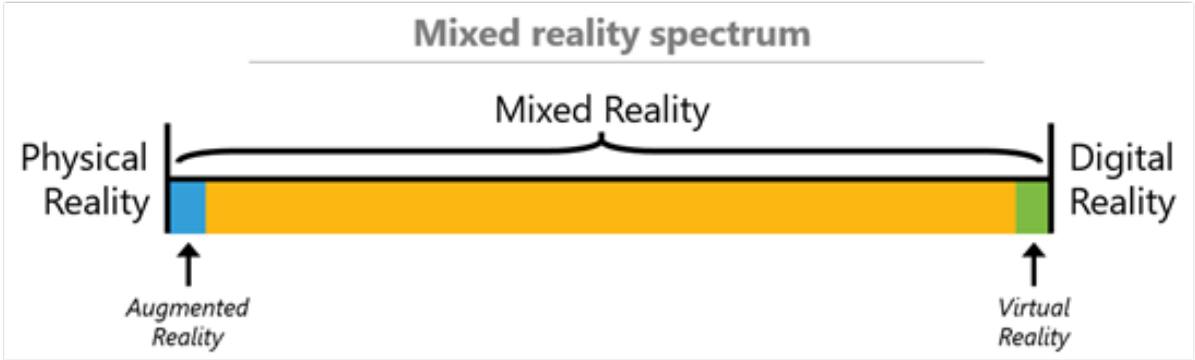
- Panoramic paintings
- 1838 – Stereoscopic photos & viewers
- 1929 – Link Trainer The First Flight Simulator
- 1930s – Science fiction story predicted VR
- 1960 – The first VR Head Mounted Display
- 1961 – Headsight – First motion tracking HMD
- 1965 – The Ultimate display by Ivan Sutherland
- 1968 – Sword of Damocles
- 1969 – Artificial Reality
- 1987 – Virtual reality the name was born
- 1991 – Virtuality Group Arcade Machines
- 1992 – The Lawnmower Man
- 1993 – SEGA announce new VR glasses
- 1995 – Nintendo Virtual Boy

https://www.vrs.org.uk/virtual-reality/history.html

Milgram and Kishino (1994)



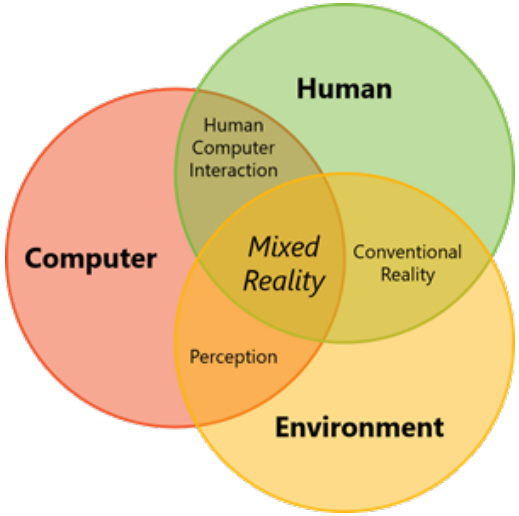
Still referenced today (Microsoft [Bray and Zeller] 2018)



Definitions

- Mixed Reality (MR)
  - The merging of real and virtual worlds
- Augmented Reality (AR)
  - Computer graphic enhancement of video images of real scenes
- Virtual Reality (VR)
  - “Environment is one in which the participant-observer is totally immersed in, and able to interact with, completely synthetic world” (Milgram and Kishino 1994)
  - Exceeds the bounds of space, time, mechanics and material properties

Mixed Reality – Microsoft



- Augmented Reality example:
  - https://www.youtube.com/watch?v=0J-JjHam3zQ

VR

“Designing for VR should not mean transferring 2D practices to 3D, but finding a new paradigm.” (Ravasz 2016)

https://uxdesign.cc/design-practices-in-virtual-reality-f900f5935826#.gzsz7n9rr

Major OS Systems

- https://www.microsoft.com/en-us/hololens
- https://arvr.google.com/
- https://www.apple.com/au/augmented-reality/

VR Interface Guidelines

- Individual companies have their own ideas
- Google:
  - https://www.google.com/design/spec-vr/designing-for-google-cardboard/a-new-dimension.html
- Oculus:
  - https://developer.oculus.com/learn/bp-generalux/
- Unity:
  - https://unity3d.com/learn/tutorials/topics/virtual-reality/user-interfaces-vr
- Leap Motion
  - https://developer.leapmotion.com/explorations/

Guidelines

- https://uxplanet.org/designing-user-experience-for-virtual-reality-vr-applications-fc8e4faadd96
- https://uxdesign.cc/incorporating-ux-in-virtual-reality-64bcb93af944
- https://uxdesign.cc/design-for-ar-vr-8713bb54da72

Consider Spatial Interactions

3D Space

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Where does AR/VR fit in the enterprise?

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Development Kits

- https://developer.apple.com/arkit/
- https://developer.microsoft.com/en-us/windows/mixed-reality
- https://developers.google.com/vr/

Future Interfaces – how will each of these change the human-computer paradigm?

SENSORS
WEARABLE
GESTURE
BRAIN-COMPUTER INTERFACES
FLEXIBLE SCREENS
TANGIBLE

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What is the future of HCI?

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Microsoft’s Vision

- The future will be beyond the screen as we know it today…

- From 2015
  - https://www.youtube.com/watch?v=w-tFdreZB94

Take Home Message…

How will you design for future systems?

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Questions

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