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COMP210 Interfaces & Interaction



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COMP210: Interfaces & Interaction **1: An Introduction to Arduino**

Register Attendance



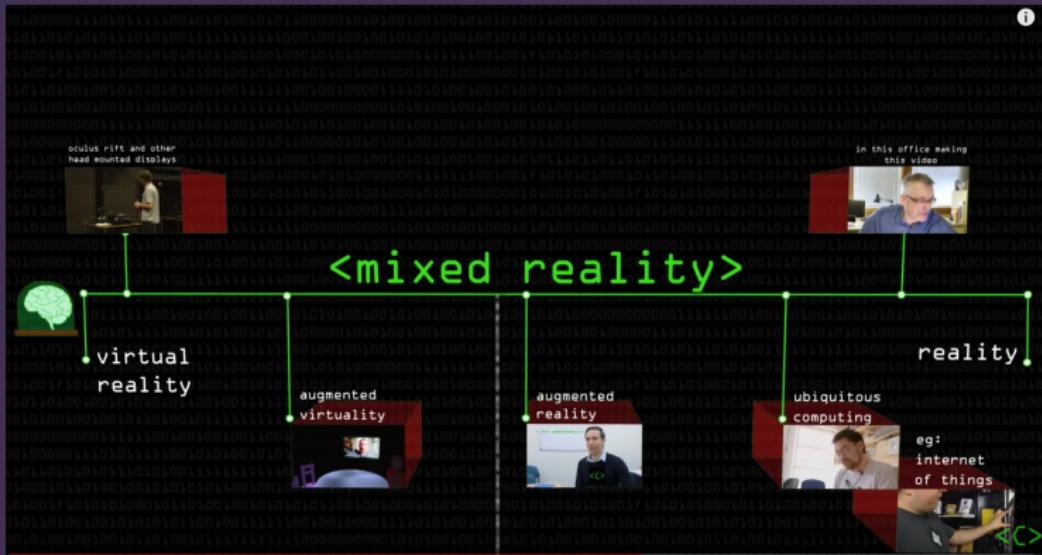
Figure 1: Attendance monitoring is in place. It is your responsibility to ensure that you have signed yourself in.

Learning Outcomes

After this session you will be able to:

- ▶ **Recall**the module aims and objects
- ▶ **Identify** the requirements of the module assignments
- ▶ **Discuss**the scope of the module

Reality Continuum



Computerphile

60s



Ivan Sutherland Sketchpad Demo

1985



NASA View System

Early 90s

World-Fixed Display

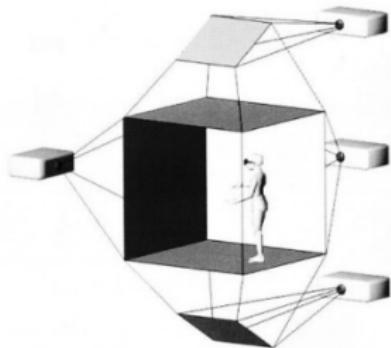


Figure: Cave VR environment: A lifelike visual display is created by projectors positioned outside the CAVE and controlled by physical movements from a user inside the CAVE.



2000s

Today



Active VS. Passive Haptics

"heart rate increases when subjects reach the virtual precipice, suggesting that physiological measures might be an indicator of presence"



<http://www0.cs.ucl.ac.uk/teaching/VE/Slides/2006-2007/week14/ve-presence.pdf>

Proprioception

perception or awareness of the position and movement of the body.

"Haptics is any form of interaction involving touch. It can refer to: Haptic communication, the means by which people and other animals communicate via touching. Haptic perception, the process of recognizing objects through touch."

Motion Platforms



<https://www.youtube.com/watch?v=gWLHlusLWOc>

State of Flux

- ▶ Inside Out tracking
- ▶ Embedded systems
- ▶ Higher fidelity
- ▶ Better pass through
- ▶ Eye tracking (Foveated rendering)
- ▶ Emotion capture – got to get those mirror neurons firing (Facebook VR)
- ▶ Full body tracking
- ▶ natural input mappings
- ▶ Go anywhere, be anything

Tools for Immersion

Immersion is the objective degree to which a VR system and application projects stimuli onto the sensory receptors. We discuss immersion in terms of:

- ▶ Extensiveness - Range of sensory modalities targeted
- ▶ Matching - Stimuli vs reality
- ▶ Surrounding - Extent of environment (panoramic) and tracking
- ▶ Vividness - The quality of simulation
- ▶ Intractability - The quality of the input and outputs
- ▶ Plot - How compelling the narrative is

Feeling Present

"Presence is the psychological state of subjective perception in which even though part or all of an individual's current experience is generated by and/or filtered through human-made technology, part or all of the individual's perception fails to accurately acknowledge the role of the technology in the experience."

International Society for Presence Research, 2000 ISPR Website

Pervasive

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Virtual Reality Induces Dissociation and Lowers Sense of Presence in Objective Reality

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Abstract

This study utilizes an innovative experimental paradigm to investigate the effects of virtual reality (VR) on dissociative experience and the sense of presence. A nonclinical sample of 30 people were administered measures of dissociation, sense of presence, and immersion before and after an immersion in a virtual environment. Results indicate an increase in dissociative experience (depersonalization and derealization), including a lessened sense of presence in objective reality as the result of exposure to VR. Higher preexisting levels of dissociation and a tendency to become more easily absorbed or immersed were associated with higher increases in dissociative symptoms resulting from VR immersion. Results are discussed in terms of imaginative processes underlying the dissociative experience and potential implications to the treatment of anxiety disorders with VR.

Introduction

DISSOCIATIVE DISORDERS, and particularly depersonalization disorder (DPD), have generated increased in-

terest, which often leads to confusion among researchers and theoreticians.⁷ Holmes et al.⁷ suggest two qualitative distinct forms of dissociation, one characterized by compartmentalization phenomena with dissociative amnesia as a central

Homuncular Flexibility

What is the *homunculus*?

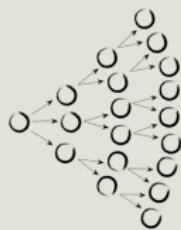


The homunculus (Latin for “little man”) is a kind of sensory map of the human body. It depicts what humans would look like if our parts grew in proportion to how much we sensed with them.

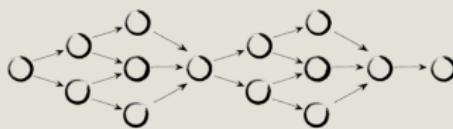
Linear Narrative



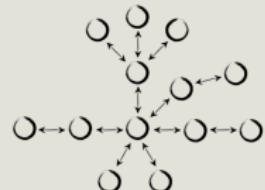
Non-Linear Narrative



BRANCHING



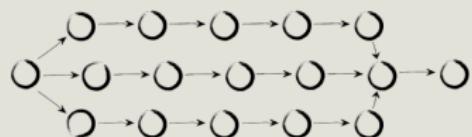
PARALLEL



CONCENTRIC

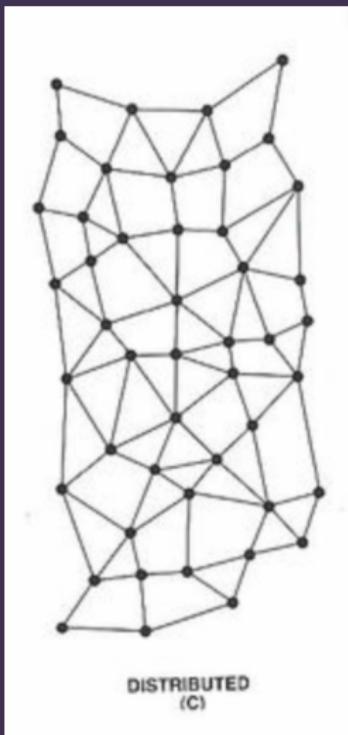


FISH BONE



THREADED

Rhizome



Hamlet on the Holodeck

"Books are good at delivering essentially linear stories, she insists, while computers are good at telling stories of a different kind: procedural, participatory, encyclopedic, and spatial. And they're particularly good at telling stories that reflect the digital age—stories about fractured realities, complex systems, and networked ways of being in the world."

The New Yorker on Janet H. Murray's Hamlet on the Holodeck

Some tips

- ▶ Use environmental wayfinding aids (explicit and subtle)
- ▶ Draw from architectural design and urban planning
- ▶ Be strategic
- ▶ Include distinct landmarks (tall if possible)
- ▶ Provide breadcrumbs to mark progress
- ▶ Use visual cues to guide navigation
- ▶ Place signs at nodes
- ▶ Use channels to restrict navigation

Be Kind

- ▶ Acceleration - minimize the size and frequency of accelerations
- ▶ Degree of control - don't take control away from the user
- ▶ Duration of simulator use - allow and encourage users to take breaks
- ▶ Altitude - avoid filling the field of view with the ground
- ▶ Binocular disparity - some find viewing stereoscopic images uncomfortable
- ▶ Field-of-View - reducing the amount of visual field covered by the virtual environment may also reduce comfort

(the list goes on)

Health and Safety Docs

Health and Safety

* These health & safety warnings are periodically updated for accuracy and completeness. Check www.oculus.com/warnings for the latest version.

HEALTH & SAFETY WARNINGS: TO REDUCE THE RISK OF PERSONAL INJURY, DISCOMFORT OR PROPERTY DAMAGE, PLEASE ENSURE THAT ALL USERS OF THE HEADSET READ THE WARNINGS BELOW CAREFULLY BEFORE USING THE HEADSET.

⚠ WARNING

Before Using the Headset:

- Read and follow all setup and operating instructions provided with the headset.
- Review the hardware and software recommendations for use of the headset. Risk of discomfort may increase if recommended hardware and software are not used.
- Your headset and software are not designed for use with any unauthorized device, accessory and/or software. Use of an unauthorized device, accessory and/or software may result in injury to you or others, may cause performance issues or damage to your system and related services.
- To reduce the risk of discomfort, adjust the inter-pupillary distance (IPD) for each user before use of the headset.
- A comfortable virtual reality experience requires an unimpeded sense of motion and balance. Do not use the headset when you are: Tired; need sleep; under the influence of alcohol or drugs; hung-over; have digestive problems; under emotional stress or anxiety; or when suffering from cold, flu, headaches, migraines, or earaches, as this can increase your susceptibility to adverse symptoms.
- We recommend seeing a doctor before using the headset if you are pregnant, elderly, have pre-existing binocular vision abnormalities or psychiatric disorders, or suffer from a heart condition or other serious medical condition.

⚠ WARNING Seizures:

Some people (about 1 in 4000) may have severe dizziness, seizures, eye or muscle twitches or blackouts triggered by light flashes or patterns, and this may occur while they are watching TV, playing video games or experiencing virtual reality, even if they have never had a seizure or blackout before or have no history of seizures or epilepsy. Such seizures are more common in children and young people under the age of 20. Anyone who experiences any of these symptoms should discontinue use of the headset and see a doctor. Anyone who previously

has had a seizure, loss of awareness, or other symptom linked to an epileptic condition should see a doctor before using the headset.

⚠ WARNING Children:

This product should not be used by children under the age of 13, as the headset is not sized for children and improper sizing can lead to discomfort or health effects, and younger children are in a critical period in visual development. Adults should make sure children (age 13 and older) use the headset in accordance with these health and safety warnings including making sure the headset is used as described in the Before Using the Headset section and the Safe Environment section. Adults should monitor children (age 13 and older) who are using or have used the headset for any of the symptoms described in these health and safety warnings (including those described under the Discomfort and Repetitive Stress Injury sections), and should limit the time children spend using the headset and ensure they take breaks during use. Prolonged use should be avoided, as this could negatively impact hand-eye coordination, balance, and multi-tasking ability. Adults should monitor children closely during and after use of the headset for any decrease in these abilities.

⚠ WARNING General Precautions:

To reduce the risk of injury or discomfort you should always follow these instructions and observe these precautions while using the headset:

- **Use Only In A Safe Environment:** The headset produces an immersive virtual reality experience that distracts you from and completely blocks your view of your actual surroundings.
 - Always be aware of your surroundings before beginning use and while using the headset. Use caution to avoid injury.
 - Use of the headset may cause loss of balance.
 - Remember that the objects you see in the virtual environment do not exist in the real environment, so don't sit or stand on them or use them for support.
 - Remain seated unless your game or content experience requires standing.

