

HCI for the VR and AR industry

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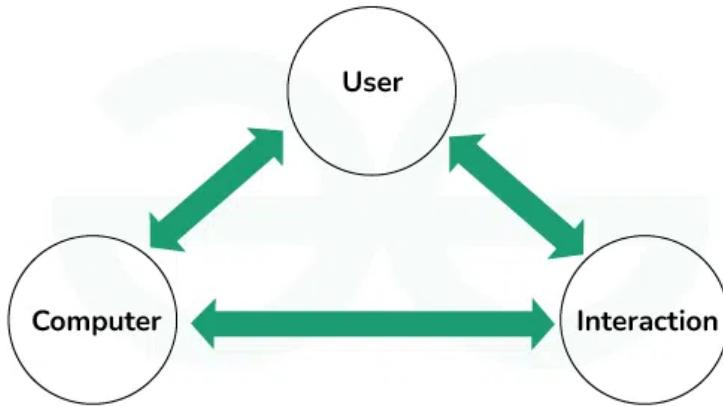
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1. Introduction

Human-Computer Interaction (HCI), focuses on the ways individuals interact with computers and digital technologies. It aims to make technology user-friendly, beneficial, and comfortable. Virtual Reality (VR) and Augmented Reality (AR) are contemporary technologies that're gaining increasing prevalence. Given that users engage with them in 3D settings, their design requires particular focus. This report details how HCI guidelines, principles, theories, and laws can enhance VR and AR experiences in the future.



Interaction between humans and machine



2. HCI Guidelines in VR and AR.

HCI guidelines serve as overarching principles that assist designers in enhancing user experiences. In VR and AR, these principles are crucial since users are immersed in the experience and must feel empowered. A crucial principle is to provide feedback. For instance, when a user makes a selection in VR, the system ought to react with a sound or a brief animation. A further useful principle's consistency. when identical actions function the same across the app, it enhances usability. Furthermore, designs ought to remain straightforward. Excessive visual clutter in a VR or AR environment can lead to distraction or confusion.

3. HCI Principles in VR and AR.

HCI principles assist designers in enhancing the experience and operation of systems.

Key concepts for VR and AR consist of:

Learnability: The system must be straightforward for new users to grasp, utilizing intuitive actions such as hand gestures or head movements.

Efficiency: After users master it, they ought to perform tasks swiftly without encountering obstacles.

Memorability: Users ought to retain the ability to operate the system even after a period of inactivity.

Mistake avoidance and resolution: The design must assist in preventing errors, but if an issue arises, it should be straightforward to correct.

Satisfaction: The entire experience ought to be seamless and pleasant, featuring appealing visuals and attentive controls.

4. HCI Theories Relevant to VR and AR.

HCI theories assist designers in comprehending how individuals engage with systems. There're two valuable theories in VR and AR.

Norman's Action Theory

when an individual wishes to accomplish something, they first make a decision, then take action, and ultimately observe the outcome. In VR, these processes must be straightforward and well-defined. For instance, when a person aims to grab a virtual item, it must react instantly and distinctly.

Distributed Cognition

Individuals depending on tools and their surroundings to aid in thinking and memory. In AR, this may include elements such as arrows, indicators, or tags on the display that assist users and lessen cognitive demand.

Following these theories, VR and AR creators can develop experiences that feel intuitive and assist users in achieving their goals without causing confusion.

5. HCI laws in VR and AR.

Certain HCI principles are particularly beneficial for enhancing the usability of VR and AR.

<u>Fitts's Law</u>	The duration needed to touch or choose an item relies on its size and its distance. In virtual reality, significant buttons or items ought to be sizable and positioned nearby for easy access.
<u>Hick's Law</u>	Having more options requires more time. VR and AR interfaces should display only what is necessary at the time to simplify decision-making.
<u>Miller's Law</u>	states that individuals can retain approximately 7 items in their short-term memory. Directions in VR and AR ought to be divided into smaller stages to prevent information overload

6. Examples

Numerous practical applications demonstrate how effective HCI enhances user experience:

<u>Oculus VR</u>	Employs uniform controls and straightforward feedback, facilitating easy learning and usage.
<u>Pokémon Go</u>	Is an augmented reality game that utilizes basic tapping and provides fast responses via sounds and animations.
<u>IKEA Place app</u>	Allows users to place virtual furniture into their actual rooms by utilizing AR technology. The application is user-friendly and adheres to HCI principles, aiding individuals in making improved choices while shopping.

These applications demonstrate that effectively utilizing HCI can enhance the effectiveness and enjoyment of VR and AR.

7. Conclusion

To sum up, HCI enhances the utility, comfort, and enjoyment of VR and AR technologies. By utilizing HCI guidelines, principles, theories, and laws, designers can prevent frequent issues such as unclear controls or overwhelming information. As VR and AR expand in the future, applying HCI concepts will be crucial for creating systems that are engaging yet simple and enjoyable for users.