VIRTUAL REALITY SYSTEMS

Virtual: "being in essence or effect, but not in fact"
Reality: "a real event, entity, or state of affairs"
-Webster's Dictionary

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The essence of reality is, of course, one of the largest questions to entertain man's mind and has been sought in physics and the sister sciences,[1] metaphysics, philosophy and religion. A construct of man's imagination to the semiologist,[2] it is intrinsically cultural and specific to the anthropologist. Fascinating too is how man's mind created image-based media that bring to life both "old" and "new" realities for both "re-creation" and "recreation." [3] Now man's mind has invented computer enhanced artificial or virtual reality (VR) systems. These let users' minds participate in the those abstract spaces where the physical viewer does not exist.

THE ISSUE OF CONTROL IN THE HCI

Virtual realities are a type of human-computer interface (HCI) and as such may be understood from a historical perspective. In the earliest era, the computer was a very simple, straightforward machine. Interaction was human manipulation of an inanimate object, little more than the provision of an explicit instruction set to be carried out without deviation. In short, control resided with the user.

In the second era of human computer interface, some level of intelligence and control was imparted to the system to enable a dialogue with the user. Simple context sensitive help systems are early examples, while more sophisticated expert system designs typify this era. Control was shared more equally.

In this, our third era of the human-computer interface, the constructed system emulates a particular environment, constructed with rules and knowledge about "reality." Control is, in part, outside the realm of the human-computer dialogue. For instance, currently the predominate metaphor is that a desktop with rules that emulate a paper handling system; unlike a real paper handling system, the electronic one will not let the user place his only copy of an electronic document in TRASH without some ability to retrieve it later in spite of his intention in putting it there originally.

Perhaps the ultimate of this level of human-computer interaction might be that depicted by the Holodeck simulations from the television series *Star Trek: The Next Generation*. Here the system views the user as only one data source. The user retains command override, but is not the dominate force in the control of the developed interaction.

From this brief, broad historical perspective, one can classify VR as a form of human-computer interface characterized by an environmental simulation that is controlled only in part by the user, a natural evolution of interface design with increasing control placed with the computer.[4]

VR SYSTEMS-A CONTINUUM

In addition, VR systems may be characterized by the nature of the realities depicted on a continuum.

> Remotely controlling machines such as wind tunnels and robots provide computer mediated reality.
>
> Moving along the continuum, there are efforts that have a data source based in reality. Meaning can be extracted from ever larger databases (such as from wind tunnel simulations and remote sensing of planet earth) by visualization.
>
> Moving further, some CAM/CAD and other design systems allow for the user to be exposed to a possible but not actual constructed reality (e.g., the UNC architecture simulations).

Finally, at the far extreme of this continuum are microworlds such as learning environments in which the laws of the known universe may be modified, suspended, or contradicted, potentially under the control of the user.

NATURALNESS OF USER INVOLVEMENT

Usefulness in any tool is enhanced by naturalness in its user's involvement. The mind of man can now conceive of Cyberspaces, such as the Holodeck of the *USS Star Ship Enterprize* that are indistinguishable from reality. For now, our devices can only approximate these effects. Clearly, experiments with Eyephones and DataGloves do allow for a far greater degree of natural user involvement than do CRT-based realities such as those based on menu selections or those in which the user imagines cursor or mouse movements to be the equivalent of other bodily movements.

DEMONSTRATION PROJECTS ARE NEEDED

Specific developments are needed for more realistic VR systems: VR for multiple users, enhanced graphic resolution, user interface standards, data communication standards, and increased CPU power. While important challenges, there are from the perspective of an information scientist even more need to develop VR systems. Arching over the future of all HCI are: the huge volume of data and information we are now capable of gathering; the wide variety of types of data and information we seek; and the to discover the relationships in these data and information. Thus, projects that include a VR component are needed to develop enabling technologies in signal acquisition, digitization, mediation and presentation.[5]

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NOTES AND ATTACHMENTS

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2. Hasan, R. "Ways of Saying: Ways of Meaning." In Semiotics of Culture and Language. R. Fawcett & M.A.J. Haliday (eds) London: Frances Pinter Pub. 1984.

3. For instance, the 1895 film "The Arrival of the Train at the Station," one of the first black and white films ever produced, caused audience members to jump out of their theater seats to avoid being hit by the train.

4.Spring, Michael B. "Informing with Virtual Reality," in Sandra K. Hensel and Judith Paris Roth (eds), Virtual Reality: Theory, Practice, and Promise. London: Meckler, 1991.

5. Further Readings:

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