ADAPTING TO THE VIRTUAL ENVIRONMENT

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Abstract

Concepts of virtual reality (VR) are defined and explained, with a brief historical introduction. At one level, the paper seeks to desensitize the reader to the VR world, and at another level, readers are invited to desensitize themselves using various approaches for gradual entry to the VR world.

A Brief History and Description of Virtual Reality

A common response to the virtual environment is one of reluctance and shyness. True, there are some that jump in with both feet, but for most of us, particularly for those beyond our 20's, we enter it as we would a cold swimming pool. Many are not quite sure what it really means, but are hesitant to ask, thinking that everyone knows about it but them, like a joke that only they do not "get." Others, notably those who have seen and enjoyed vivid depictions of it in movies (*The Matrix* trilogy, the lesser known *Thirteenth Floor*, or the recent blockbuster *Avatar,* for example), are bolder and more aggressive in their exploration. The purpose of this presentation is to provide a leveling of the audience, so that we may all approach the topic on a more-or-less even conceptual basis.

First, we should talk about the name itself: *virtual reality* (VR). The term virtual comes from a root word that refers to truth or goodness, hence words like virtuous and virtuosity. Of late, and particularly in the "computer age," it has come to mean something that happens in a computer or in a computer-generated environment. VR, then, is a reality that takes place within, or via the operation of, a computer-generated display. The addition of the word "reality" to the word "virtual" suggests that what is taking place virtually is a type of reality. It is a reality that somehow takes place "within" a computer. It is an experience that becomes more than just watching a screen, it allows us to project ourselves convincingly into the environment. This fact is crucial, and one that is necessary to realize the essence of the VR experience. Another important feature is the fact that we are not just observers in the VR but participants in it. That is, we can make things happen in that world, and things can happen to us or, more accurately, to the virtual us in it. The virtual us is, incidentally, what is referred to as our avatar.

One might wonder if being involved in a movie might be an example of a VR experience. Certainly, we "enter" the reality of the movie, and our ability to enjoy it may depend on how fully and deeply we allow ourselves to enter that reality. It fails the test of interactivity, however. To whatever extent the movie affects our emotions and us; we cannot act back on the

reality we have entered. To some extent, we are prisoners of that reality with no prerogatives of action within it.

Perhaps surprisingly, however, our first experience with a VR likely takes place in a much more common environment. If you have ever been in a mall, for example, and consulted the guide often decoratively mounted near the entrances, you will notice that they all have an arrow, dot, or other designation that carries the label "You are Here." Of course, you are not "there," but standing in front of a board with a highly schematic representation of the mall, usually with a view that would be impossible to achieve in reality, depicting locations of the various stores, shops, and kiosks in the mall. To make sense of this depiction, you have to project yourself into the depiction, at the location of the "You are Here" point, and orient yourself from that point to understand the layout of the mall and where you are with respect to that layout. In a sense, you can interact with the VR depicted on the board, using yourself, your actual body, as its own avatar as you navigate about the mall with the picture of the map board in your memory.

In watching a movie about World War II recently, there was a scene in which a number of civilians and uniformed men were sitting around a large table. On the table was painted a large map of the European theatre of war, with model ships and planes placed on it in various locations. Women in uniforms and headsets, bearing sticks similar to those used by roulette croupiers to rake in chips, used the sticks to move around the ship and plane models on the maps, as situation reports came in through their headphones. What was being represented in the movie was the situation room of the British government in the War Cabinet rooms located underneath the Parliament buildings in London (these have been preserved, incidentally, and can be toured).

Since it was obviously not easy for the British government to create this room, especially during times of severe austerity, one must conclude that a graphic method of depicting conditions in the war was very important and useful to those concerned. They were not just playing with model ships and planes. The room was filled with serious and sober men and women, and they were playing no game. The board was not "real" in any other sense than a virtual one—that is, it depicted a schematic reality into which people inserted themselves in order to understand a situation with greater perspicacity. This world acted on the participants by showing them a graphic portrayal of war situations, to which they responded with commands to various fighting units. As the units responded to these commands, the board changed to reflect it. As the enemy made moves, that was also reflected by the "croupiers'" changing the board accordingly. Although on a quite slow time frame by today's standards, it still meets our criteria for being an interactive, virtual environment. It is certain that events being portrayed on the board produced emotional responses, often, one would imagine, very strong ones. In a real sense, then, it might seem that we have not added anything new to a process long familiar to any human who has ever consulted a map. Today's VR is, however, different in two important ways: the speed of interactional actions and reactions, and the use of pixel arrangements to represent reality.

These two factors, near real time actions/reactions and the infinitely customizable environment allowed by the use of pixels, make a profound difference. While military operatives were forced to use their VR, today's youngsters pay serious money for the opportunity to play *World of Warcraft, Battle of the Immortals*, *Call of Duty,* or other interactive games. This fact, however,

only moves the question back one step. Why do these two factors act to attract participants to the virtual environment? The answer may lie in the fact that both factors allow for the participants greater immersion in the game. Clearly, the more rapidly a display reflects an action of the participant, the more connected they will feel to the action/reaction event, the more real it will feel, and the more convincing will be the illusion of the existence of an alternate reality.

The first digital images were quite primitive, and, like today's digital images, used small squares of varying shades of gray appearing on a cathode ray tube screen to comprise a mosaic. Since the first image had relatively little computing power, the squares, or pixels, were necessarily large, giving the image a checkerboard look. As computers became more powerful, and monitor screen resolutions became more refined, a larger number of pixels could be used, providing higher resolution. The introduction of color and movement require orders of magnitude more computing power, but as it became available, it was immediately used, driven primarily by the video game markets. Today, feature-length movies at commercial theatres are presented in full color and even in three dimensions. This has allowed for computer-generated virtual realities of increasing realism.

One of the first interactive games to reach the market, *Pong*, was produced by Atari in May of 1972 in the form not all that different from video game sets of today (PongGame.org, 2011). There were hand-held player consoles and an interface that allowed actions on the consoles to be displayed on an ordinary television set. The similarity pretty well ends there, however. The *Pong* consoles had two controls, one that simply allowed the player to cause the game's portrayal of a "paddle" to move up or down on the screen, and the other to determine the speed of the game. The technology of the time did not allow the player to actually position the paddle from the console, but simply to "tell" the paddle to begin moving up or down, which it did at a speed pre-set by the user. While this gave the player some ability to control the paddle, it was, at best, a rudimentary one.

Adapting to Virtual Reality

Now that it is apparent that most of us have participated in some virtual world or another, let us explore how one might attain a greater comfort with it. For this, we turn to some of the tools psychologists have developed to reduce fears of a particular stimulus and to gain greater comfort with unfamiliar situations. Interestingly, as we will see later, VR itself can be used in very serious applications of this very sort.

The reader should note two of the words used in the paragraph above: namely "fear" and "unfamiliar." By reducing both of these human experiences, greater comfort is achieved and, with that comfort, one experiences a greater willingness to explore.

Psychologists have long known that the key to fear reduction is to expose a subject to a feared stimulus long enough for them to discover that it no longer (or never did) present any true threat. Since they do not receive the reward of immediate fear reduction that would come from fleeing from the stimulus, they quickly learn that it does not present true danger. With most of us, however, it is more intuitive and compelling to simply avoid the stimulus. While this provides immediate relief, it has two distinct disadvantages: 1) the fear does not go away, can become

stronger and even may generalize to other associated stimuli; and 2) the subject's freedom is curtailed. As an example, let's say someone had a bad time at a hospital. They may, in the future, choose not to go to hospitals, thereby avoiding the fear that had become conditioned. As they continue to avoid hospitals, they eventually come to regard anything that smells or resembles a hospital aversive. Should they be well advised in the future to go to an emergency room, however, they may well demur and then suffer unfortunate consequences.

Procedures for Adapting

How can we use this information to approach the virtual environment more pleasantly, then? First, let us remember that exposure (to the feared stimulus) can be either gradual (psychologists call this "successive"), or sudden ("implosive"). Since our purpose is to reduce one's sensitivity to a feared stimulus, we are left with the choice of whether to expose the subject to the feared stimulus in gradual steps successively, or all at once (implosively) in order to obtain the desensitization that we desire.

Bringing this home to the individual user, then, who might be reluctant to approach VR, a logical procedure would be as follows:

A. One should keep solidly in mind that VR is nothing new, dating back to when primitive man saw movement in the animal drawings he had made on the cave wall, animated by the moving firelight. It has been with us steadily, in many different forms ever since.
B. Spend some time watching someone engaging in some activity using VR. Preferably, you should watch someone who is slightly ahead of you in their journey. (Watching an expert playing *World of Warcraft* with a guild of ten other players scattered over the globe engaging in a coordinated "raid" on another group can be a bit daunting to the beginner.) In watching some desensitization will take place but it will also be an excellent opportunity to ask questions when the answers would be most meaningful and informative. Also, in watching, one almost immediately gets the "sense" of VR.
C. Be sure that you are passably familiar with your computer. While you will ordinarily have plenty of time to decide on your next action, having to think about the acts necessary for the operation of the VR program on top of unfamiliarity with your equipment might produce a discouraging overload. If the learning curve is too steep, we are more likely to abandon a project.
D. Select a VR program to learn on that would favor success. Better to pick a program that is too simple rather than too hard. If a program is too simple, and we become bored with it quickly, it is recorded as a success by the nervous system, and confidence is bolstered. VR programs come in several different types:
    i. Conflict-based programs generally pit one person against another, or against the computer that is programmed to play as an antagonist to the player. Examples of these would be combat programs such as *Halo, World of Warcraft, Carmageddon, etc.*
    ii. Challenge games, in which the player has to exhibit an increasing skill in overcoming hurdles, impediments, and various problems to be overcome. These games are often designed for younger players, such as *Sonic* or *Donkey Kong,* but there are also versions for the more mature player (*Myst, Riven).*

iii. Experiential programs exist that have no inherently competitive element. In these, the player can construct a VR that then acts in accordance with known principles of operation of that type of reality. For example, one such program *SimCity,* allows the player to construct infrastructure such as roads, power lines, and sewage systems. The program then shows the development of homes and traffic that would occur, given what we presently know about urban development. More serious applications include programs in which an architect can allow a client to "walk" through a structure, viewing it as one would who was actually in the building. City planners can likewise "drive," "fly," or "walk" through a proposed downtown revitalization project. Even more exotic applications of this type of VR include computer aided design (CAD) programs that allow engineers to create a part on a computer, rotate it in three dimensions, and even have its operation simulated within the devices it is intended to function. CAD programs can then interface with other software (computer aided machine—or CAM) programs that control robotic machines that then actually produce the part.

iv. Virtual Reality programs (e.g. *Second Life)* have been created for the specific purpose of providing a virtual reality within which user-decided happenings can occur. While all of the above programs use VR to some extent, these latter programs are especially designed for the user to participate in virtual reality experience itself. Important to the use of these applications is the creation of an *avatar*, a representation of the self within the game. While other games may allow this, such avatars are pivotal in VR-specific applications. The uses of these programs are only recently being explored, and the opportunities seem limitless. It is this level of program that is the target of this paper, because entry to this world provides significantly expanded possibilities for its use. The conclusion of this paper will explore just a few of these.

Virtual Reality in Action

In the educational sphere, one may attend classes, individual lectures, seminars, and see demonstrations concurrent with class reaction and discussion. As an example of this, the author recently attended a virtual seminar on an image management program. Students could bring in and show their work on assignments given by the teacher after attending her lecture on the homework assignment. Comments by other students on one's work were often as helpful as those of the instructor.

Skills training is increasingly finding uses for VR. In this image, a trainee is going through parachute training. The goggles provide a visual representation of what he would be familiarity provided by the VR allows him to respond more reliably in the actual situation, while desensitizing his natural fear of falling in the process. He does this in a completely safe environment. Not only does this save a great deal of money in not having to do this in actual conditions, but it provides real time coaching that might not be possible in actual practice.

Many use the VR environment for personal exploration and discovery. Individuals can experience VR in an elaborate setup in which head movement is tracked and represented in the video being presented in video goggles. Hand movements can also be integrated into the reality experience. From the outside, someone in such an apparatus would appear to be a subject in a science-fiction movie, but, as a result of the instrumentation about, the subject would be in an alternative reality.

In observing users of Second Life, one can see what activities players choose to engage in, and, most interestingly, what form of avatar is chosen. Avatars can be of either sex, and a near-limitless array of attire, hairstyle, and jewelry are available. An avatar may even be an animal, whether it is a representation of an actual or imaginary one.

One of the most dramatic and potentially important uses of VR is in the psychotherapeutic area. The reader is invited to review the explanation of desensitization above. VR can be used to provide this as a valuable adjunct for treatment for and "vaccination" against Posttraumatic Stress Disorder (PTSD) (American Psychiatric Association, 2000), an often devastating psychological injury attending victims of crime, natural disaster, or warfare. Our present involvement in violent conflict in the Middle East is producing an overwhelming stream of PTSD victims returning from combat. The most empirically verified therapy for this disorder (referred to hereafter as injury) is termed Prolonged Exposure Therapy. As described above, it involves exposing subjects to stimuli to which the subject has been sensitized, and thus allowing the exposure to extinguish. Since combat is difficult to reproduce in a treatment facility, therapists have been limited to using the subjects' ability to imagine such scenarios. Many either would not or could not bring themselves to do this.

With VR, the therapist can bring these sensitized stimuli forward at a controlled and bearable rate so that the subject will choose to remain in the situation long enough for desensitization to take place in response to the exposure. As Bret A. Moore (2011) writes:

> However, by using virtual reality, psychologists can simulate the stressful situations — with nothing more than a headset and a comfortable chair. Phobias are not the only thing virtual reality is good for. Psychologists are using avatars to help service members suffering from PTSD. In a program developed by the National Center for Telehealth and Technology in Tacoma, Wash., service members can create a visual representation of themselves in the virtual world. They can choose to be tall or short, skinny, muscular or fat, male or female, and any color of the rainbow. They can even choose to be a robot if so desired.

The place of VR in our future is assured. Those with an understanding and facility with this emerging area will enjoy a much more relaxed learning curve than those who might well find themselves required to catch up. The tools for learning it are all around, and the reluctance many will feel can be easily managed using the steps outlined above. The major factor as to whether one will adapt is simply one's determination to do so.

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