

The growth of virtual reality

Science, Computer Science



The virtual reality is a combination of virtual and reality. Virtual is what is near and reality is something that we experience in daily lives. Therefore the term virtual reality essentially means very near to reality. This refers to a particular type of recreation of reality. We view the world from our senses and perceptions. In our childhood we had learned that there are five senses that are touch taste smell see and hear. These are obviously our most apparent sense organs. However in reality in humans there are many more types of senses such as a sense of balance. These sensory inputs and few additional processing of sensory information by our brain ensures that there is a rich and robust flow of information from the external environment to our mind. Everything that is perceived about the reality is brought through our senses. In a sense the whole experience of reality is actually the combination of all sensory information and our brains ability to make sense from that information. We can therefore say if our brain is presented with an artificially made-up information the perception of reality in our brain would also accordingly change in response to it. We would be presented with an altered version of reality that is actually present but it would look as real. This is something which is referred to as a virtual-reality.

Virtual reality in technical terms is very straight-forward. It is the term used to describe a 3d environment created by computer which has ability to interact explore and be experienced by a person. The person becomes part of this virtual world and is immersed within this environment. They are also able to change or modulate the objects and perform multiple actions. The concept of virtual-reality is based upon the theories around the long-held human desire to break the barriers and escape the boundaries of this real

world by embracing cyberspace. 6 types of vrs have been regularly used as a mean of advertising buzzword for fascinating interactive video games or for that matter even 3 dimensional movies and tv programs. However none of this really count as vrs as they don't immerse us fully or even partially in virtual cyber world. Virtual reality query in a mobile phones app store will find hundreds of searches even though a small mobiles screen can never get anywhere near generating the similar make-believe experience of vr.

Anyway computer simulations and interactive games will meet certain criteria of vr and therefore there is clearly multiple approaches to build virtual cyber world. Here are few of the major variations: fully-immersive: in order to create complete vr experience three things are required; firstly a feasible credible and reliable virtual world which can potentially be a computer model or replicable simulation. Secondly a good robust computer that can detect what's going on and accordingly adjust the experience similar to real-time so that the alterations and changes can be seen and heard as quickly as its moves- just like in a real word. Third the computer hardware need to have what's called a head-mounted hmd with 2-screens stereo-sound and more than one gloves sensory it can also be moved across in a limited space with surround-sound loud-speakers on-to which dynamic images are projected. Non-immersive: a realistic flight simulator on a personal computer will meet the required parameters of non-immersive virtual-reality. This is especially true if it uses a broad wide screen with powerful headphones surround-sound along-with joystick and other means of controls. However it is not that everyone wants to be fully immersed in alternative reality. E. g an architect would possible like to build a detailed 3

dimensional model of a structure in order to demonstrate it to his clients that can be viewed and played around on a desktop. It may be classified as a kind of virtual reality even though it doesn't overwhelm you completely.

Computer experts in the field of archaeology often generate compelling 3-d reconstructions of ancient civilizations that can be explored. Though they don't recreate the senses like sounds or smell of pre-history but certainly are able to give a much more detailed experience than what can be available from a few drawings or animated movies. Collaborative: let's think about various virtual world games like second-life and mine craft. Do they count as virtual reality it can be observed that they do meet the initial 4 criteria but they don't really meet the 5th one. They don't fully immerse us. However they do offer the latest cutting-edge vr which typically doesn't necessarily imply collaboration that is a medium of sharing the experiences with other people in a virtual environment which is almost real time or something very close to it. Going forward in the future it is anticipated that collaboration and sharing are going to become increasingly important features of vr.

During the 1980s the cyber virtual reality used to be one of the hottest fastest-growing technologies but the sudden rise of the world-wide-web largely killed off people's interest in it thereafter. Even though computer scientists had developed a method of building virtual worlds on the web ordinary people were much more interested in the web that gave them newer ways to access real reality—new ways to search, publish and share thoughts and ideas on social media. With ever growing interest and developments in the technology the upcoming future of v-r seems bright. It is expected that they will be web-

based and collaborative. Augmented reality photo: augmented reality: a heads-up display like this one used by us air force superimposes useful computer-based information on top of the things you see with your own eyes. Picture by major chad e. Gibson courtesy of our air force. These days mobile devices like tablets and smart-phones have put in our hands what earlier used to be supercomputer earlier. While wandering round world- maybe visiting a heritage site like a pyramid or a fascinating foreign city what is required is not typically virtual reality but an enriching experience of the exciting reality that we can observe in front of us. This has generated the idea of augmented reality ar where for example you point your Smartphone at a landmark and interesting information about it pops up on the mobile. Augmented reality can be defined as connecting the real world that is around us to the virtual world of information that has been created on the web.

None of these worlds is virtual but the very thought and idea of navigating the two words simultaneously does have common factor with virtual reality. For example a mobile device can decipher its precise location. The things that can be seen on the screen of the tablet change our location changes. Technically these problems are similar to that of virtual-reality systems —so there is close connection between ar andvr. The equipment for virtual reality closes our vision and makes us believe that we are in virtual world. Vr is differentiated from experience of ordinary computer is the nature of the input and kind of output. In a normal desktop there are things like a keyboard or a mouse whereas in vr there is exotically speech recognition for input sensors that detect how your body is moving etc.. And where a desktop puts up output on a screen or a printer vr uses multiple two screens one for

each eye stereo surround-sound speakers etc. Lets take a quick look at some of the more common vr input and output devices.

Head-mounted displays hmds photo: the view from inside. A typical hmd has two tiny screens that show different pictures to each of your eyes so your brain produces a combined 3d stereoscopic image. Picture by courtesy of us air force. There are two major variances between vr and an ordinary computer screen: in vr there is a 3-d image that changes smoothly in real-time as you move your head. That made possible by wearing a hmd which is similar to a giant motorbike helmet consisting of two small screens in front of each eye a blackout blindfold that obstructs all other light thereby eliminating potential distractions that may come from real world. The two screens display slightly different stereoscopic images creating a almost real 3-d perception of virtual world. Hmds in most cases also have in-built accelerometers which are position sensors so the motion of body and head can be detected i. e which way they're tilting or pointing to and accordingly adjust the picture. The major problem with hmds is that they're quite heavy which can be tiring if worn for long periods; to circumvent it some of them are even mounted on stands. But hmds don't have to be so elaborate and sophisticated: on the other hand Google has developed an affordable and low-cost pair of cardboard goggles with in-built lenses that convert a smartphone into a crude hmd. Immersive rooms are an alternative to putting on hmd where one can sit or stand inside a room and on its walls changing images are projected. As you move into the room the images on the walls will change accordingly. Flight simulators use this technique using images of various landscapes or cities and as airport approach is projected on-to large

screens positioned just outside a mock cockpit. It has also been noticed that giving people the ability to handle virtual objects has greatly contributed and has been a big part of vr. This is done using datagloves which are sensors fitted in ordinary gloves wired to the outside to detect hand motions. Chapter 2 history of virtual reality: in 1950 flight simulators were built by us air force to train student pilots. In 1965 a research program for computer graphics called the ultimate display was laid out. Until that time vr was just a concept and wasn't very popular.

In 1988 commercial development of vr began. In 1991 first entertainment vr system was released. In current century the virtual-reality has seen rapid technological advancements and developments. Especially in case of mobile technology the pace of development has exploded and due to extensive use the prices have been driven down. The meteoric rise of mobiles with high-density displays and 3d graphics has empowered the whole generation with vr devices in their hands. The gaming industry has continually grown and driven the development of consumer virtual reality. Recently tech companies like Google have built virtual reality products like Google cardboard a d-i-y headset that uses a smartphone to drive it.

Companies like Samsung have taken this concept further with products such as the galaxy gear which is mass produced and contains smart features such as gesture control.. 7 fig. 2. 1 8 chapter 3 types of virtual reality: windows on world wow with this kind of system also known as desktop vr the user sees the 3-d world through the window of the computer screen and navigates through the space with a control device such as a mouse. Like immersive

virtual reality this provides a first-person experience. One low-cost example of a through the window virtual reality system is the 3-d architectural design planning tool *virtus walkthrough* that makes it possible to explore virtual reality on a Macintosh or IBM computer. Developed as a computer visualization tool to help plan complex high-tech filmmaking for the movie *The Abyss* *virtus walkthrough* is now used as a set design and planning tool for many Hollywood movies and advertisements as well as architectural planning and educational applications.

A similar less expensive and less sophisticated program that is starting to find use in elementary and secondary schools is *virtue vr law 1994*; *pantelis* and *immersive vr*: usually when we think of virtual reality it is largely immersive systems involving computer interface devices such as a hmd fiber-optic wired gloves position tracking devices and audio systems providing 3-d binaural sound. Immersive virtual reality provides an immediate first-person experience. With some applications there is a treadmill interface to simulate the experience of walking through virtual space. And in place of the hmds there is the boom viewer from *fake space labs* which hangs suspended in front of the viewers face not on it so it is not as heavy and tiring to wear as the hmd. In immersive vr the user is placed inside the image; the generated image is assigned properties which make it look and act real in terms of visual perception and in some cases aural and tactile perception *brooks 1988*; *tribute 1990*; *legault 1991*; *markoff 1991*; *minsky 1991*; *gearing 1992* there is even research on creating virtual smells; an application to patent such a product has been submitted by researchers at the southwest research institute *varner 1993 telepresence: the concept of*

cyberspace is linked to the notion of telepresence the feeling of being in a location other than where you actually are.

Related to this teleoperation means that you can control a robot or another device at a distance. In the Jason project children at different sites across the u. s. Have the opportunity to teleoperate the unmanned submarine Jason the namesake for this innovative science education project directed by Robert Ballard a scientist at the woods hole oceanographic institute eds 1991; Ulman 1993; McClellan 1995 fig. 3. 1 augmented vr: a variation of immersive virtual reality is ar where a see-through layer of computer graphics is superimposed over the real world to highlight certain features and enhance understanding. One application of ar is in aviation where certain controls can be highlighted for example the controls needed to land an airplane. And many medical applications are under development taubes1994b recently for the first time a surgeon conducted surgery to remove a brain tumor using an augmented reality system; a video image superimposed with 3-d graphics helped the doctor to see the site of the operation more effectively.