

# **VIRTUAL REALITY AND GAMES TECHNOLOGY**

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## **Abstract:**

Virtual Reality systems have drawn much attention by researchers and companies in the last few years. Virtual Reality is a term that applies to computer-simulated environments that can simulate physical presence in places in the real world, as well as in imaginary worlds. Interactivity and its captivating power, contribute to the feeling of being the part of the action on the virtual safe environment, without any real danger. So, Virtual Reality has been a promising technology applicable in various domains of application such as training simulators, medical and health care, education, scientific visualization, and entertainment industry. Virtual reality can lead to state of the art technologies like Second Life, too. Like many advantageous technologies, beside opportunities of Virtual Reality and Second Life, inevitable challenges appear, too. This paper is a technical brief on Virtual Reality technology and its opportunities and challenges in different areas.

KEYWORDS :VIRTUAL REALITY ,GAMING ,BENEFITS,INTERACTIVE TECHNOLOGY

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## Introduction

Virtual reality is a term utilized for PC created 3d situations. that permit the client to permit and connect with exchange substances. Virtual reality (VR) and games technology (DG) are two similar areas which share many similar features.

among all the features three most important are as follows. Both of them have to focus on normal Human's to succeed (feeling of presence for VR, entertainment for DG). VR and DG exploit the breaking the technological barriers of several fields like image synthesis, electronics, electrical and medical etc. Finally, they both act sometimes in a virtual realistic world like flight simulator or therapy environment [1]. sometimes they allow the user to operate in an imaginary world which does not necessarily follow usual physical laws.

Similarly, the a hidden or unsuspected danger or difficulty to avoid is in common i.e. the race for more and more visual reality. But, firstly there is no guarantee success to DG and secondly realism is not the key point for a virtual reality where credibility is sufficient to create a feeling of presence.

This strong similarity between VIRTUAL REALITY and DIGITAL GAMES TECHNOLOGY is the reason why generally users get confused to.

though we will see later that the frontier is still here. Moreover, during last few decades there was a lot of exchange between VR and DG it's still impossible to play a virtual reality game at home. Our contribution, in this paper, is twofold, a presentation of two virtual reality games and some analysis on virtual reality games. We will first propose a rapid historical review on DG and a brief state of the art on VR.

Since 1995, revolution has been taking place in the use of virtual reality technology for medical and clinical purposes. The advancements in technological areas such as computational speed, graphics, image rendering, tracking bodies ,software authorization, and also in artificial intelligence has led to creation of cheap virtual reality systems that are capable of running on our personal computer. And these days non immersive virtual reality tools are used in developing console gaming systems

## 2. State of the art

The main goal of this section is not to give a detailed historical overview on the virtual reality and games, which would be out of the scope of this paper, but only here the main steps and evolutions.

### 2.1 virtual reality

What if we could explore the world around us like never before, what if we could be anywhere experiencing things that could be never possible, what if the possibilities were truly infinite, all this could be possible with virtual reality. Virtual reality, like other technologies takes advantage of several other scientific areas like cognitive science, computer graphics, electronics etc. A reality framework goes for submerging one or more clients in a simulated environment where he will have the capacity to feel and interface continuously on account of sensory-motor Interfaces. The ultimate goal of virtual reality is to create a feeling of presence of the virtual objects, but also a feeling of his self-presence in

the virtual computer generated environment. This feeling of presence can be achieved relying on five pillars which are immersion, interaction, real-time, emotions and cognitive science. It may be enthusiastic to make clear the function of each and every pillar. The immersion is a type of sensory stimulation which permits the perception of the virtual environment. The interaction enables the user not to remain as a

spectator of the experiment but to act according to it. By real-time we mean we have to maintain the coherence of the perception-action loop. The emotions that are achieved experience help the user to accept the experiment by distracting his attention from real world environment including the interaction devices and from the drawbacks of the application. The last pillar is the cognitive science which enables us to understand how can we create such an environment, that's a very useful point in order to improve the immersion and interaction efficiency. The applications of VR are numerous in number it is used simulator for the army and in aeronautics as flight simulators and in industries as 3d object modelling devices and also in medical field for the treatment of phobias, and other mental disorder, can be used in education and culture with the reconstruction of ancient sites and art. The concept of virtual reality has been aroused around for decades, even though the public came to know it in the early 1990s. In the mid-1950s, a cinematographer named Morton Heilig generated a theatre experience that would stimulate all his audiences' senses, drawing them in to the story much more effectively. He built a single user console in 1960 called the **Sensorama** that includes a stereoscopic display, fans, odor emitters, stereo speakers and a moving chair. He also invented a television with its head mounted and display designed to let a user watch television in 3-D. Users were passive audiences for the films, but many of Heilig's concepts would find their way into the VR field now a days, and next engineers from Philco Corporation developed the first HMD in 1961, and named it as the **Headsight**. The helmet which includes a video screen and tracking system, and then engineers linked a closed circuit camera system. The main intention of them is the HMD should be used in dangerous situations -- a user can observe a real environment remotely by hand, adjusting the camera angle by turning his head. Bell Laboratories also used a similar HMD for helicopter pilots. They linked HMDs to infrared cameras that was attached to the bottom of helicopters, which allows pilots to have a clear field of view while flying in the dark.

## DIGITAL GAMES

In 60's first digital game appeared like *Oxo* or *Tennis for two* [2]. This later worked with the help of an oscilloscope and was able to play with analogical computers. The first game console was produced by "*Magnavox*" and named it as "*Magnavox Odyssey*" was first made in 1972 for home based entertainment. during the same period a company named *Atari* was founded and became the source for world's famous game *Pong* [3].

Since the evolution, DG were outlined to be played by two people using two paddle controllers or by using interfaces like the "*light gun*" that enriched the gaming experience. Initially made for one single game, home game consoles immediately advanced to acknowledge multiple games prompted by the happening to several companies like *Nintendo* or *SEGA*. They proposed their

own consoles with dedicated games. At the end of the day, Atari innovated, in 1977 with his *Atari 2600*, by supplanting the basic beep by a genuine sound based on two mono channel. The first video game with three-dimensional content showed up in the early 80s and was called *battle zone*. during the upcoming years, diversions did not stop their improvement proposing better graphical content and scenario. For example, games like *Super Mario Bros*, *Final Fantasy*, *Dune II* or *Wolfenstein 3D* offered new sorts of gameplay. Case of 3D stereoscopic amusements have been discharged in 1995 and were playable with the Nintendo's Virtual Boy compact console. However, a large portion of the players were debilitated and the console was not exceptionally effective. With the entry of the Internet in 90s, another gaming knowledge is proposed to the players who can play against human far off players into steady virtual universes. A case of such a diversion is *Ultima online* made in 1997. Gaming interfaces advanced in the meantime than the computer games' democratization. It exists two classifications of interfaces: some committed to home gaming and others devoted to arcade. Coin-worked excitement machines have been extremely well known when they showed up amidst the 70s. Their primary favorable position is that they are devoted for one-single diversion. It implies that recreations have better graphical substance, and interfaces are identified with the gaming connection (the player can utilize a wheel, a weapon,) and infrequently the machine environment is adjusted for a superior inundation (stylistic theme, vibrations...). The principal home gaming interfaces were exceptionally straightforward like a little box with a solitary push catch and/or a knurl to diminish the assembling cost. Rapidly the mouse (1972) and the joystick (1980s) have showed up and got to be well known in view of the better communication with recreations. Last mentioned, interfaces that must be found when playing with coin-worked stimulation machines were accessible for home gaming (weapons, wheels, cushion). As of now the inclination is to give less and less meddling interfaces in request to expand the gaming background like the Eye Toy[4] (Sony), the Wiimote[5] (Nintendo), the Gaming amBX[6](Phillips)

### **WHAT IS VIRTUAL REALITY GAMING:**

Virtual reality gaming is the place a man can experience being in a three-dimensional environment and interface with that environment amid a diversion. This is a vital part of the diversion.

### **Bio-detecting:**

One method for recognizing a man's nearness in an amusement is bio-detecting. These are little sensors which are connected to an information glove, suit or even the body and record developments made by that individual in a 3D space. Those developments are translated by a PC and trigger an assortment of reactions inside that space.

For instance: you wear an information glove which has sensors connected to it. You wear this as a feature of a driving amusement. These sensors record the way your hand moves as a major aspect of this diversion, say, when turning the guiding wheel in a specific bearing.

These developments are bolstered back to a PC which then examinations the information and utilizes this to change your activities into the proper reactions on the screen.

It sounds somewhat specialized yet it is a smart method for distinguishing the developments of a player amid a diversion and utilizing these to impact what goes ahead in that amusement. This implies you, the player, turn into an indispensable part of the amusement. This is known as an 'immersive affair'. On the off chance that you have watched movies, for example, 'The

Lawnmower Man' then you will be acquainted with the possibility of a man investigating and communicating with items in a virtual world. Innovation has proceeded onward from that point forward so the experience is prone to be far superior to that appeared in the film.

### **3D INTERNET:**

Also, how about we not overlook the web. There are recreations software engineers who like the possibility of a three dimensional web in which you can investigate sites powerfully. Instead of tapping on a connection and filtering the data on a page you will have the capacity to physically touch that page and control it. Think about a page as an area which you can investigate at your relaxation.

This sort of cooperation is seen in virtual universes, for example, Second Life which permits you to associate with others in a 3D situation. Second Life is talked about in more detail in a different article.

### **Virtual reality Languages:**

This is for you in-your-face techies. There are a few dialects utilized as a part of virtual reality which include:

VRML (Virtual Reality Modeling Language): this is the most punctual VR dialect for the web.

X3D: this has subsequent to supplanted VRML

3DML: this empowers somebody to visit a site by means of a module

COLLADA (Collaborative Design Activity): this permits document trades inside 3D programs.

It has been contended that a genuine virtual reality environment is based upon the utilization of a HMD (head mounted display) and/or information gloves. A web based 3D world does not utilize any of this thus can't be viewed as a virtual situation. Be that as it may, not everybody concurs with this announcement.

How does VR work? How does wearable tech make you believe you're remaining on Mars when you're really going to chance upon the kitchen counter? We'll be clarifying how virtual reality headsets work here.

How about we begin with a few nuts and bolts.

The headset set-up is being utilized by Oculus, Sony, HTC, Samsung and Google and normally requires three things. A PC, console or cell phone to run the application or diversion, a headset which secures a presentation before your eyes (which could be the telephone's showcase) and some kind of input - head tracking, controllers, hand following, voice, on-gadget catches or trackpads.

Complete submersion is the thing that everybody making a VR headset, amusement or application is pointing towards - making the virtual reality encounter so genuine that we overlook the PC, headgear and Accessories and act precisely as we would in this present reality. So how would we arrive?



## THE BASICS OF VIRTUAL REALITY:

VR headsets like Oculus Rift and PlayStation VR are frequently alluded to as HMDs and all that implies is that they are head mounted presentations. Indeed, even with no sound or hand following, holding up Google Cardboard to put your cell phone's showcase before your face can be sufficient to get you half-inundated in a virtual world.



FIG 1. VIRTUAL REALITY HEAD SET

The objective of the equipment is to make what seems, by all accounts, to be an existence size, 3D virtual environment without the limits we normally take up with TV or PC screens. So whichever way you look, the screen mounted to your face tails you. This is not at all like AR which overlays illustrations onto your perspective of this present reality.

The future: Virtual reality versus increased reality

Video is sent from the console or PC to the headset through a HDMI link on account of headsets, for example, HTC's Vive and the Rift. For Google Cardboard and the Samsung Gear VR, it's as of now on the cell phone opened into the headset.

how does VR work

VR headsets utilize either two sustains sent to one showcase or two LCD shows, one for every eye. There are likewise lenses which are set between your eyes and the pixels which is the reason the gadgets are regularly called goggles. In some occasions, these can be acclimated to coordinate the separation between your eyes which fluctuates from individual to individual.

These lenses center and reshape the photo for every eye and make a stereoscopic 3D picture by calculating the two 2D pictures to copy how each of our two eyes sees the world marginally in an unexpected way. Have a go at shutting one eye then the other to see singular items move about from side to side and you get the thought behind this.

One vital way VR headsets can expand drenching is to build the field of perspective i.e. how wide the photo is. A 360-degree presentation would be excessively costly and pointless. Most top of the line headsets manage with 100 or 110-degree field of perspective which is sufficiently wide to do the trap.

What's more, for the subsequent picture to be at all persuading, a base edge rate of around 60 outlines for each second is expected to abstain from faltering or clients feeling debilitated. The present yield of VR headsets goes way past this - Oculus is fit for 90fps, for example, Sony's Project Morpheus of 120fps.

## Head TRACKING



FIG2.HEAD TRACKING

Head tracking implies that when you wear a VR headset, the photo before you move as you gaze upward, down and side to side or point your head. A framework called 6DoF (six degrees of flexibility) plots your head as far as your x, y and z pivot to quantify head developments forward and in reverse, side to side and shoulder to bear, also called pitch, yaw and roll.

There's a couple of various interior segments which can be utilized as a part of a head-following framework, for example, a spinner, accelerometer and a magnetometer. Sony's PSVR likewise utilizes nine LEDs specked around the headset to give 360-degree head following on account of an outside PS4 camera observing these signs, Oculus has 20 lights yet they are not as brilliant.

Head-following tech needs low idleness to be successful - we're talking 50ms or less or we will identify the slack between when we turn our head and when the VR environment changes. The Oculus Rift has a stunningly minimized slack of only 30 milliseconds. Slack can likewise be an

issue for any movement following inputs, for example, PS Move-style controllers that quantify our hand and arm developments.

At last, earphones can be utilized to expand the feeling of drenching. Binaural or 3D sound can be utilized by application and amusement designers to take advantage of VR headsets' head-following innovation to exploit this and give the wearer the feeling that sound is fighting against eminent loss, to the side of them or out there.



## **MOTION TRACKING**

Head tracking is one major point of interest the up 'til now unreleased premium headsets have over any semblance of Cardboard. Yet, the enormous VR players are as yet working out movement following. When you look down with a VR headset on the primary thing you need to do is see your hands in a virtual space.

For some time, we've seen the Leap Motion accessory - which utilizes an infrared sensor to track hand developments - strapped to the front of Oculus dev units. We've additionally attempted a couple explores different avenues regarding Kinect 2 cameras following our thrashing bodies. Be that as it may, now we have energizing info choices from Oculus, Valve and Sony.

Oculus Touch is an arrangement of model remote controllers, intended to make you have an inclination that you're utilizing your own hands as a part of VR. You snatch every controller and use catches, thumb sticks and triggers amid VR amusements. So for example, to shoot a weapon you press on the hand trigger. There is likewise a framework of sensors on every controller to recognize signals, for example, indicating and waving.

### **Conclusions:**

Progressive advances have happened in the ranges of VR and intuitive advanced diversion innovation, and this has bolstered innovative work that has focused on vital societal-level human services challenges in ways unrealistic previously. Also, the base is positively set up in the

home to drive further advanced endeavors at encouraging positive wellbeing dispositions and conduct change. It is no more a stretch to consider that effective VR and intelligent computerized diversion frameworks will soon gotten to be normal equipment in the "advanced estate." The beginnings of this now exist as cutting edge amusement consoles and stereo TVs that can be coordinates with enormous quantities of remote clients. Such registering, presentation, and cooperation drive could serve to advance wellbeing important exercises that influence social engagement and connection and subsequently give another crucial fixing to uplifting state of mind also, conduct change. Getting from these advances in

framework and access, the idea of exergaming may now give advanced alternatives to spurring sound physical action in an undeniably inactive populace of kids at danger for stoutness and diabetes.

Be that as it may, a critical examination exertion is still required to decide the adequacy and included estimation of VR and exergame applications for diminishing weight and moving forward the administration of diabetes. As noted already, early results propose that playing as of now accessible dynamic exergames utilizes altogether more vitality than inactive exercises, yet this movement does not achieve the level of power that would coordinate playing the real game, nor does it convey the suggested day by day measure of exercise for youngsters. No less than two noteworthy headings for future examination are proposed to test the viability of cutting edge VR recreations for weight reduction and diabetes administration. These headings concentrate on engagement and energy expenditure.

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