Implementing the Concept of Augmented Reality to Develop the World of Future Gaming

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Abstract: This paper reviews about implementing the concept of augmented reality to develop the world of future gaming. There are some primarily objectives that needs to be fulfilled for making a complete holodeck for future gaming. Some of them are physical interaction infinite world and total realism. Some of the under developing inventions like the Claytronics technology and virtual sphere helps us to construct a place where we can not only feels the computer world but also interact with it.

Keywords: holddeck, claytronics, game

I. INTRODUCTION

All of us live in a world with a unique 3-Dimensional structure still having difference in shape, size, color, texture at every corner. Virtual reality is the concept of modern science and technology in which we try to replicate and create a world which is very much similar to the real world in addition that it is lot more interesting and we can alter all the happenings in that world with a single click. All of us are familiar with the video games that we often used to play in front our TV or computer screen. But the twist is that in the concept of virtual reality we not only play those games we actually live it! All the five senses of the human i.e. vision, hearing, interaction, smell and lastly feel are to be implied in a virtual realistic system. This technology was started by a 3D screen and some speakers which later get advanced to head mounted glasses and the virtual sphere. This technology very much relates to the most fascinating ingredient of Star Trek series i.e. Holodeck. A holodeck is a virtual realistic system which consists of several machines that are working together to give a realistic experience to the user as the real world does.

II. AUGMENTED REALITY

The concept of virtual reality can be best described as:

"Augmented Reality is electronics simulations of environments experienced via head mounted eye glasses and wired clothing enabling the end user to interact in realistic three-dimensional situations."[1]

According to the modern science and technology the virtual reality system should be able to satisfy the three conditions specified below:

a. No boundaries
b. Physical interaction
c. Total realism

III. INFINITE WORLD

When we look at our design of a virtual world we would come to know that it is a cubical room of some inches which is not even closer to our real world. So in order to make our virtual similar to the real world we have to make it infinite without any boundaries which is in first thought looks next to impossible. But modern engineering has found a solution. The first step that was initiated in the direction of making the virtual world infinite is known as virtual sphere. As the name suggest it is a giant 10 foot sphere that is rested on a special platform that allows the sphere to move in any direction depending on the users step. Today it is used in military training, home gaming and some shows.

Figure 4: Front view of a virtual sphere

Figure 5: A cyber-walk Omni- directional treadmill

Another technology that emerges after the virtual sphere is known as Cyber-walk Omni-directional treadmill. It includes simple engineering techniques. It comprises of straps which is bound on a platform. These straps move horizontally allowing the user to move in horizontal direction. Further the platform move vertically allowing the user to move in any direction in two dimensions. This enables the user to walk endlessly on the same platform which gives the feeling of an infinite world.

IV. TOTAL REALISM

Total realism is the ability to create a magical world that is thoroughly realistic. This should include the basic need for the real world humans to interact with the virtual world i.e. vision. For this the most convincing grown technology is THE CAVE located at South Jersey Technology Park at Rowan University. The cave virtual automatic environment of just the cave is an immersive virtual reality environment where projectors are used to the project a specific picture on to the three, four or six sides of

a cubical room and the special 3D glasses are used to make it more realistic. But that's not all. What makes the thing so fascinating to the sci-fi science is that the picture projected on the walls of a room actually disturbs as you move your head. This is achieved by using cameras and trackers and synchronizing them with each other. The theory is that what you see from those glasses actually gets recorded by the chips installed in the glass which is then sent to the trackers and then to the cameras installed on the screen in the form of Infrared light which we can't see but the cameras do. When we move our head in any direction the recorded picture is sent to the camera which sends the signal to the projector to accordingly change the view. Moreover the pictures projected on the three sides of the cubes collaborate to become a 3D view with different views on their respective direction each controlled by a different computer. Not only that to give it a really interesting feature scientists have provide a real gaming experience with a controller and a receiver.


Figure 1. Front view of the cave virtual automatic environment
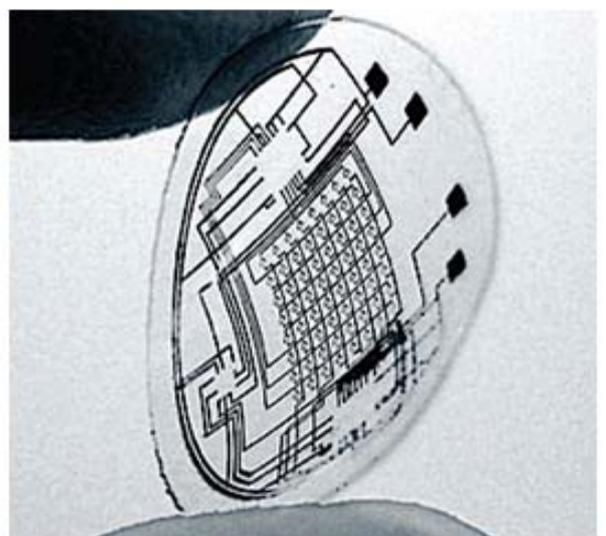
Figure 2: Contact lens with embedded technology

But is that all? I don't think so. Though for the 21st century it is much more fascinating and much like exploring but in the future it is definitely not enough. The solution can be instead of using macro screens controlled by equal size

computers we can think of something really small. Technology already allows us to think of the contact lenses which have LED's or the function of accessing the internet and displaying the result on your retina. In the future we will

be able to draw the huge world of virtual reality onto a tiny contact lens. [7]

V.   PHYSICAL INTERACTION

A virtual realistic system should not only be able to make us see the real world in a virtual background but should also have the ability to interact with the user. In simple words we should be able to touch and feel what is in the virtual world. Moreover it is not practically possible to include all the elements used in the different types of virtual world. Therefore we need something that can change its shape according to our requirements, something that can be called matter but can change its shape, size and color according to our need. We call it programmable matter. Developed by Carnegie Mellon University, US by the great scientist Seth Goldstein in June 2002, catoms or programmable matter is ready to bring a revolution in today's modern electronics. According to him catom is defined as:

A group of tiny modular robots that can communicate with each other and can change their shape, size and color according to the surrounding catom. In this way they create voids which move towards the edge to give it a different look each time it is disturbed.[6]

In its basic design, the catom is a millimeter size unit that comprises of:

a.   A CPU.
b.   An energy store such as onboard battery.
c.   A network device.
d.   A video output device such as LCD or LED.
e.   Sensors like pressure sensors and photo sensors.
f.   A means of locomotion
g.   A mechanism for adhering to other catoms.

By this technology catoms can change its shape into anything depending upon our requirements and interest and in this way we can make our virtual world more realistic and interesting. One example of the claytronics technology is blinky blocks which can change their color according to a specific pattern.
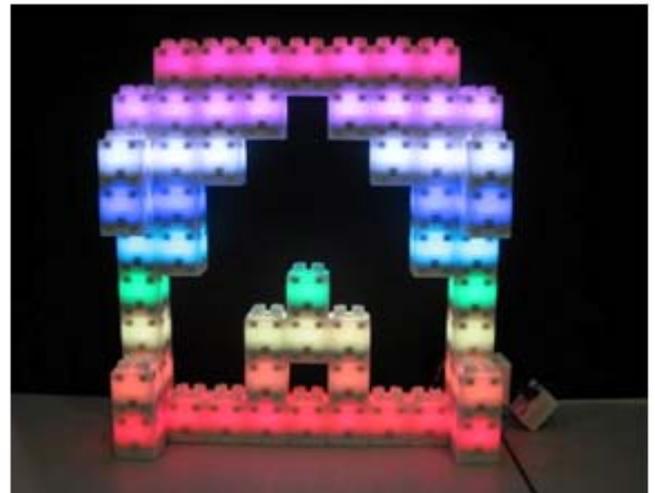
Figure 3: Applications of the programmable matter and claytronics

Till now we are able to visualize fifty percent of our virtual world. It is consisting of a cubical room with speakers installed everywhere. The sight of the walls of our virtual room will not matter since our eyes contain a lens that project the whole 3D picture of our virtual background onto our retina. To make the environment more realistic we can include solid interactive objects made of programmable matter that will change its shape according to the background. Now the question that arises out of everybody's mind is can our virtual world be infinite as our real world? Until now our model of a virtual universe is almost complete. The only thing remaining is to implement all the above discussed technologies onto a single unit. However in order to make our virtual world more fascinating as well as adventurous some extra features can be added into it.

So far we have discussed all the various methods to construct a virtual world that is very much similar to our real world and we can interact with this virtual world through our senses like vision, hearing, touch and interact. But there is something that is missing i.e. the smell factor. According to a study, there are about 10,000 aromas that are present in our universe which combines in a specific proportion to give a definite unique smell same as the color combination. So to make our virtual world more realistic we can have ten

thousand canisters hanging on the roof that produce different aromas which further can constitute to different smell according to the background. Though this is not as easy as the color combinations but still there is very much chance that we can obtain it.

Another advanced feature in the field of virtual reality is something that allows the user to feel and to experience that is experienced by the virtual world. The device used in known as Computer Combat Jacket. Presently it is used by the computer game players to experience the shot or blast that the virtual player is experiencing. The jacket consists of several sensors that form a 3D framework of the user in the real world and matches it with the identical 3D framework of the virtual player. Using 3 dimensional coordinates system it detects which part virtual framework gets affected by the gunshot and sends the signal to the pressure gauge which applies different amount of pressure depending upon the impact of the shot.

VI.   APPLICATIONS

The concept of virtual reality could be a great boon to us. It can be applied in different fields depending upon the area of interest and focus. Some of the currently used and future possible applications are listed below:

a. It can be used in military training where the environment of a battle war can be simulated on a screen.

Having no limitations of space the trainee can move in any direction according to the need and can have real battle experience without risking his own life.[3]

b. It is being applied in gaming zones where the players not only play the game with a remote control but they experience it around themselves. This makes the game more fascination and interesting.

c. The technology of virtual reality can be very helpful for explorers especially space explorers. The satellite images which will be get can be projected on our 3D screen and can be experienced and explained in a more efficient way.

VII. CONCLUSION

So far we are discussing various methods of creating a virtual world with a real life experience. Virtual world is a place where you can find, explore and experience the world which is not practically possible with your physical appearance. This can be achieved through a science fiction yet possible discovery in the future of mankind known as Holodeck. A holodeck is a group of various machines and computers working together to form a virtual environment where we can interact with the virtual world through our senses i.e. vision, hearing, smell, feel and interact. The most common use of virtual reality today is in the gaming zones where people can interact with the environment of the games. But in the distant feature it is believed to go beyond that and can be a very useful tool for the modern technology.

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