

AI Frame-Worked Virtual World Application - The Ramification of Virtual World on Real World

Ashish Khurana
Scholar
Department of CSE
Amity University Gr Noida
aashishkhurana78690@gmail.com

Bhanu Prakash Lohani
Assistant Professor
Department of CSE
Amity University Gr Noida
bplohani@gn.amity.edu

Vimal Bibhu
Assistant Professor
Department of CSE
Amity University Gr Noida
drvimal@gn.amity.edu

Abstract— This paper contains the detailed information about the increasing technology in field of Virtual Reality (VR). The paper also present ideas for the future application of Virtual Reality and explaining different method to approach it. Virtual Reality until now just created a vision or a prototype that could be viewed in a 360-degree and Three-dimensional structural view, but with our approach towards proposing an idea of combining Virtual Reality and Artificial Intelligence (AI) together. The combination is going to break the limit of virtual world and making the virtual world much likely to the real world, a world with no limits free and full of imagination and creation. The approach to combine these two technologies has a great motto behind it, which will be explained more briefly in the paper.

Keywords—*virtual reality, haptic technology, motion sensor, machine learning, neural network*

I. INTRODUCTION

Virtual Reality (VR) is the computer technology that creates a realistic 3D environment with sound and images and other sensation. This technology is possible through virtual reality headset, which simulates you into an imaginary world. VR is not only allowing you to look around the imaginary world, but it also allows the user to interact with the virtual objects. The imaginary world is like living into another world, which is very similar to the realistic world, but the imaginary world is making some of our weird imagination coming true, which are not possible in real life.

Nevertheless, after combining Artificial Intelligence with Virtual Reality the entire limit will break and the face of Virtual Reality is going to change completely. The Virtual World is going to look much likely as the Real World with a slight of difference that this new world created will be full of imagination making and experience that are impossible in real world. The setup will be done virtually but it is going to give experience like real world [10][8].

The experience is going to be more realistic using the haptic technology. Technology, which recreates the sense of touch by applying forces, vibration or motion to user. This is used in Mechanical Simulation and can be assisted to create virtual object this is known as haptic technology.

Haptic technology gives the user a sensation of virtual object like the sensation and feel that person gets from touching the real-world object. The motion simulation is made very easier by using the motion sensor in the VR headset, which track the motion of your body from real world and replicates the motion in virtual world so hence by combining the haptic technology and motion sensor together the experience will be on to the next level.[4]

II. APPLICATION

A. Medical Field

Virtual Reality play very important role in the Medical field, teaching the Doctors and Aspiring Doctors, helping in performing the complicated operations through a Projected Prototype, which decreases the risk factor in performing a successful treatment.

Before going through the procedure of Operation a normal Body Scan to be taken and the scanned result, data set would be input into the Micro Controller chip of Virtual Reality Glasses. The projector of the Glasses will project a 3D Holographic image of the body scanned. It will be now easier for the doctor to find the disease and perform a practical prototype operation that is going to decrease the risk factor. In addition, the Aspiring Doctors could learn about complicated Body structure by clicking the real data set from their books, the data set being clicked by camera and a 3D visualization on the screen of your virtual box.

B. Education

Virtual Reality plays a very fruitful role in the field of education. Students could interact and study the models and structures explained in their books very easily. Virtual Reality is not helping the student in their subjects also its helping student in achieving their dreams like having interest in space, deep sea etc. VR creates an environment where students could experience how it feels to be in space or deep sea. [2][1]

C. Military Field

Virtual Reality helping the Military in many ways like Planning and designing a proper Defense for the Military Base, also projecting an action prototype sequence helping the soldiers to analyze the situation and the land before coming into action, in addition to the this their Military heads are able to give commands by knowing the actual situation of Battle Field.

Virtual Reality plans a proper Defense Mechanism for the Military by analyzing the real data set of land and neighboring land the data set are being captured by the satellite, which sends the data to the military camp base, and then the data is input the micro controller of AR Glasses. The Glasses project the exact situation of the battlefield and helps the soldiers to interact with the battlefield before going into action.

D. Agriculture

Virtual Reality application in agriculture is not very much developed now and not very popular though but in agriculture VR plays a very fruitful role. The increasing global warming is decreasing very precious plant species from earth that can

be save by Virtual reality by studying the gene and plant of plant species and finding the way to combine their gene with other plant species to increase their existence. As doing experiment with the rare plant species could have a chance of failure which will extinct the plant species, so it helps the scientist to study and do the experiment visually with help of Virtual Reality technology. Creating your own virtual farm.[6]

E. Automobile

Designing and stimulation of car is possible through Virtual Reality. A car with new design and modification cannot be manufactured before trial and testing. This all made simpler with the help of Virtual Reality, person could test and take a trial of the car in the virtual world. Virtual Reality technology during the design stage of car making allows manufacturers to be creative and design concept models with minimum cost. This means many variants can be shown, modified and assessed during the early phases thus reducing the time and cost required for the overall process.

F. Architecture

In architecture Virtual Reality plays a very important role as it help the designer to visualize its work before constructing, it projects the 3D model of work and designer could make changes accordingly in its work through the 3D model projected. An example to understand its application in field of architecture is a man constructing a building on unlevelled land and there is risk that the building may fall if there is a natural disaster. With help of Virtual Reality technology, the architect could design and make changes accordingly in the holographic 3D projection and simulate the building and decreasing the risk factor and making building so strong that it will stay strong in every disaster. [13][14]

III. LITERATURE REVIEW

Mr. Morton Heling identified the basic concept of technology in late 1950. Being a cinematographer, he stimulated senses in cinema like the moving chair and virtual experience. The technology discovered by him at that time, it was known as sensorama. The concept was emerged, and Mr. Douglas took first execution to add a screen to computer to get a Virtual Reality experience this was first taste of VR. The first practical application was by a company philco cooperation in 1965. The experiment was of head sight that projected visual stimulation with the tracking system. Until 1989 VR become very popular in entertainment and gaming. Sony introduced PS4 with a special feature of VR [12].

The VR is cubical box, which generally covers head and eyes. It is connected through large PC, TV, or Smart Phone through an HDM1 cable or just putting your smartphone inside the box. The headsets contain two LED Screen for each eye and behind screen there are two biconvex lenses placed between the eyes and allows the user to change the position of lenses depending upon the vision of the user. The lenses reshape the 2D image of view of eye into 3D image by angling it [2].

Through VR you are able to see everywhere beyond limit we cannot say you are able to see 360 degree because for that you will need a big screen which is quite expenses but most of the VR headset allow the user to see 110 degree which is

very satisfying for the using. To interact in the virtual world the headset is connected to clips, which are clipped upon users fingers or console. They use haptic technology, which learns motion of your body, and do the same in virtual world like if you are waving in the real world the same it will be doing in the virtual world.

This allows the user to interact in the virtual world. The basic structure of VR could be improved by introducing a feeling sensor into it, which will give the user to experience and feel the virtual world. The user will be able to feel warm and cold as per the surrounding of the virtual world and if he is hit, he will feel the pain but will not get hurt in real world. Surely, he will experience or if the user is running in virtual world, he will be tiered, and his heart will be beating fast in real life. This thing will give user a great experience and allowing the user to go on certain adventures which are impossible in real life.[1]

IV. TECHNOLOGY USED

The basic technology applied in the modeling equations is VRML (virtual reality modeling language) which was first found in 1994. The technology of VR headset, which project the 3D model of the web-image, was found in 1997. The technology evolved from bisecting the image video into split screen and observing it from bi-focal lenses that projected 3D image.

To feel and interact with the computer graphical object or the virtual object haptic technology was introduced Gloves have an embedded system with vibration sensor module and flex sensor, which help the user to feel the virtual object like the Real-World object and interact with the Virtual object. The glove has flex sensor, which take the input of your motion of your hand and project the same motion into the Virtual World which help the user to interact and move around the Virtual World.

The VR is expanding worldwide but do you know that how are they working. The working explained in the simpler manner. Wearing the head mounted display upon your head and placing your mobile or electronic device into it. Which is projecting the image in a split screen, where both the split screen is showing same image and beyond the device case there are two bi-focal lenses, which show a three-dimensional image and VR display setup according to motion of head, and we could see 360 degree around the Virtual World.[2]

V. OUR APPROACH TOWARD VR

The recent invention of 8K chair and haptic gloves are the latest innovation that has taken place in Virtual Reality. It is been limited to only entertainment purpose but after the introduction of Artificial Intelligence to the system the limit is going to break, and the system is going to expand. Artificial Intelligence system will be able to see the immersion of eyes and adjust the video image accordingly to the comfort of user so that less strain effects the eye.

With the help of machine learning and deep learning, The AI input a support assistant for the user, which help and make the virtual world look more efficient. Through the research going upon its been concluded that by the combination of AI the virtual world will be more than realistic world.

A. The Realistic Virtual World

The Artificial Intelligence system will use Neural Network to do face cascading of a person and maintain a data set of that person and through help of speech recognition and body motion sensor machine will learn how a person speak and the body posture. Through machine learning and Neural Network, a virtual body created which is not less than a realistic body. haptic technology on the other hand will make the user to interact with the person like for example a person is about to die and is on the deathbed but due to help of this technology the person will remain alive in the virtual world. This will be very helpful in field of medical also as it will help a person to recover from depression as he will be able to see his loved one come back to him. AI will not only allow the user to just talk to the person it will allow the user to touch and feel the person. AI will improve the visual of the virtual world better and the interaction between virtual object and person will improve.

B. Virtual Reality Helping in Medical Field

You will be confused that can VR really help us to recover from addiction yes truly it can. Today VR has improved so much that it controls your mind completely it makes you believe that what you are seeing in the virtual world is true [6].

How is it helping? While into the virtual world user, forget about everything that is happening in real life and start believing what he is shown into the virtual world so we can use as a plus point like a person has an addiction of smoking and drinking alcohol daily, this will destroy his life so VR help you to recover from it. VR show the addicted person that he is drinking alcohol in the virtual world but in the real world he is just holding a glass of water which contain a medicine which taste like alcohol but actually is an antibiotic which will help him to recover from addiction.

C. Improved Basic Structure

The basic structure of VR headset is very large it could make more compact and Nano technology used. More components added into it like a feeling sencer into it, which will give the user to experience and feel the virtual world. The user will be able to feel warm and cold as per the surrounding of the virtual world and if he is hit, he will feel the pain. However, won't get hurt in real world but surely, he will experience or if the user is running in virtual world, he will get tired and his heart will be beating fast in real life. This thing will give user a great experience and allowing the user to go on certain adventures which are impossible in real life like climbing up a volcano or getting chased by a dinosaur. See VR can have many uses other than gamming if we try to explore more and invent many things then VR has unlimited uses.

D. Advanced Application

The experience is going to be more realistic using the haptic technology. Technology, which recreates the sense of touch by applying forces, vibration or motion to user. This is used in Mechanical Simulation and can be assisted to create virtual object this is known as haptic technology. Haptic technology gives the user a sensation of virtual object like the sensation and feel that person gets from touching the real-world object. The motion simulation is made very easier by

using the motion sensor in the VR headset, which track the motion of your body from real world and replicates the motion in virtual world so hence by combining the haptic technology and motion sensor together the experience will be on to the next level [3].

VI. FIGURES WITH EXPLANATION



Fig. 1. VR Explanation

The above figure 1.0 explain the virtual stimulation lab, in which person is wearing the VR headset with a microphone so the person could interact with AI assistant. The headset is designed in such a way that it cover head completely and the display screen is enabled with motion sensor which turn the video image 360 degree around according to the motion of head of user.

In the figure above the person is wearing VR gloves which has a transmitter, receiver, flex sensor and vibration module. Working of the gloves is as follow:

- The flex sensor senses the motion of hand and send the data to the transmitter on the user hand glove.
- The glove takes the input data and send to the receiver of VR headset, which show the exact virtual movement of hand.
- When the user interacts with virtual object the receiver of gloves senses the interaction and activate vibration module which give real life experience if touching virtual object.[13][14]

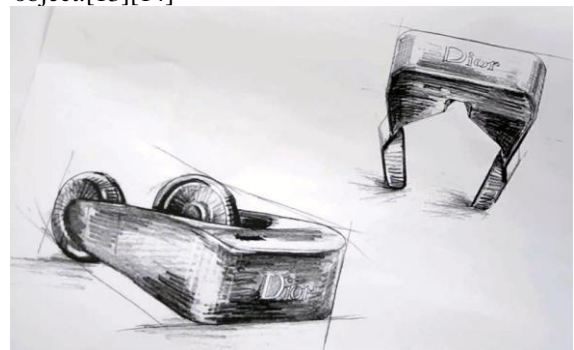


Fig. 2. VR Headset

The figure 2.0 explain the structure of HMD (Head Mounted Display) or the VR box. The box is made up of hard plastic in a cubical structure. The cubical box has a display screen at the end, which can be connected by our PC, or the TV screen beyond the screen there is small space that is compatible for your phone to be placed. Beyond the screen there are two bi-focal lenses each one for eye which show the 3D image of the image shown on the screen.

The VR box are expensive upon the technology used upon them and the material used to construct it but on the other hand, it could be made a lot cheaper by google cardboard. It is a structure provided by google so that a person sitting at home could easily design its VR headset. Figure 2.1 explain google cardboard.

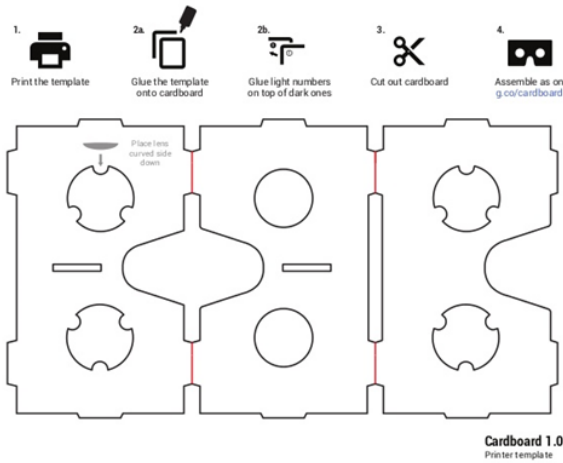
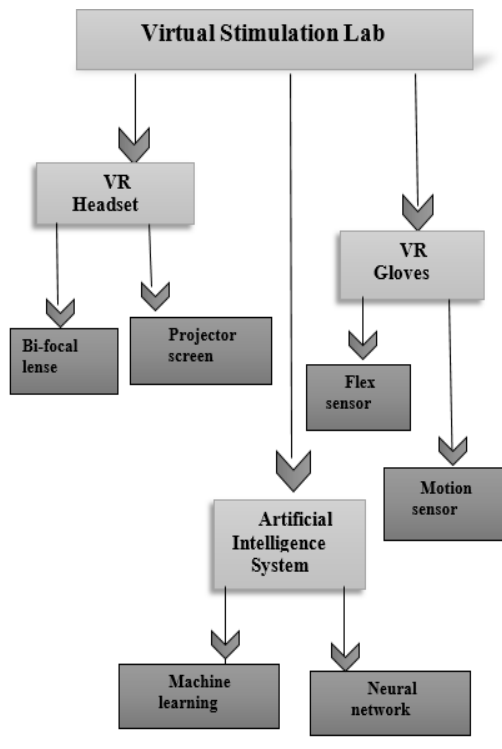


Fig. 3. Google cardboard

VII. BLOCK DIAGRAM



The above block diagram explains Virtual Stimulation Lab.

VIII. CONCLUSION

With the help of machine learning and deep learning, The AI input a support assistant for the user, which help and make the virtual world look more efficient. Through the research going upon its been concluded that by the combination of AI the virtual world will be more than realistic world.

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