Implementation of Gaming In Virtual Reality

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Abstract. In this research paper, will talk about virtual-reality in gaming. Basically the use of VR in gaming through exergames or video game is a new form of interactive gaming and it act like as a tool for rehabilitation. The main aim of virtual-reality in games is to improve the physical functioning of older adults as well as younger generation. Virtual-reality also include therapeutic play which helps in reducing anxiety & also reduces depression. If talk about the virtual-reality games we need a better experience while playing games so for increasing the gaming experience & keen more interest in gaming it can done by various tools that include various programming languages & algorithm are used that perform their different task in their field. Mainly the programming languages & algorithms that are used in virtual reality gaming that are:-C, C++, Python, Java, Swift, Javascript, C#.

The Web VR it is a javascript application programming interface that mainly provide supports for virtual reality devices, such as HTC Vive, Google Cardboard & OSVR. If we have to experience a real time gaming platform & 3D experience that offers you better gaming interface So for that we also need some hardware device that useful while playing virtual reality games. The hardware that are used for virtual reality games are:-3D mouse, 3D glasses, 3D screens wired glove, optical tracking sensors & motion controllers.

Keywords: Therapeutic role, 3D equipments, programming languages, rehabilitation techniques.

1 Introduction

Virtual reality play a lead role in our's life. Virtual reality have their application in many fields. If we talk about the application of virtual reality its mainly application in Games, Education, Health clinic & many more field where virtual reality is used. Before to learn about the various application of virtual reality firstly we have to understand what actually the virtual reality is? Basically, In my terms Virtual reality provides a virtual view or an imaginary view to viewers. Virtual reality is divide into virtual & reality. The basic definition of virtual is near and reality means what actually the human being is experiencing. So the complete meaning of virtual reality is near-reality. In technical terms we can say that VR is a term which is used describes three-dimensional, computer generated environment which can be interacted with by a person. Now we learn about the how the virtual reality is achieved. Virtual reality is mainly achieved & implemented using computer technology. There are ranges of systems that are used to achieve virtual reality that are:-headset, special gloves, 3D glasses etc. Virtual reality experience means only can be achieved where the person feels that they are present in that environment. For this it can also achieved by the sense of presence. For the sense of presence firstly there is need of the combination of hardware, software & system synchronization.

2 Literature Survey

Nowadays, role of games is increasing day by day in our daily lives. Games are not limited to only its user but also show it various applications in radar system.[1]With the advancement of new technology that enables advance gaming & virtual reality games using radar. In radar systems new techniques enable small motions & displacement that are to be tracked even in millimeter & centimeter for user control actions. Besides the advancement of VR games look for the shared bonus event. [2]Even VR game also offers many shared bonus event & interactive physically bonus event. By adding this feature in VR games it creates an opportunity for player to increase their physical skill & earn bonus from shared bonus or physical skill games. In Carnival like games it awards a bonus for their players for performing physical act & bonus it depending how you perfectly perform in a game & it also give an opportunity to players to enhance their gaming & competition level skills. With the help of these features in VR games created a different scenario & thinking in human mind's related to games. Normal games that we play in our homes are just for enjoyment or make ourselves relax but the VR games having their additional benefit beside enjoyment while playing games it also help in recovery of various disabilities & disorders. [3]In the stroke rehabilitation resulting in functional limitation of an upper extremity. VR games by using Wii gaming technology plays its major role in stroke rehabilitation therapy that result in better motor recovery with help of this therapy patients have to do some physical act that improve their skills & make themselves relax & provides the best experience of an extremely different enjoyment during treatment for their relaxation. VR using Wii gaming technology demonstrating benefit in motor proficiency, visual-integrative abilities and sensory integrative functioning. This technology proven successfully in rehabilitation techniques & also make easier for people to overcome fast from their disorders & from their disability. So, VR games have their application in mostly every field that creates its own unique platform that is also very beneficial for upcoming generation & will become an asset for our country. Nowadays, mostly school & colleges using VR platform so that the students can learn concept easily & implement them in real life. Introducing VR platform in school & colleges not only creates an opportunity for students but for teachers also to experience new technology & make themselves relax while teaching using VR technologies .[5]In today's era the way of teaching by teachers make students bore so students just parroting the things without learning the actual & practical concept. By Using VR platform in studies make students relax & help them also to learn concept in easier way. VR technology mainly the provides the real view that is most efficient & helpful to understanding something. By experiencing the concept s in real view that read in books creates a different mind set so students can learn it easily & enjoy while doing study. Nowadays young generation mostly prefer youtube channel, online courses & many more things so they can learn & understand concept easily. But VR technology not only enhances learning skills but also enhance motor abilities, physical skills while studying because it offers a real scenario to students to experience. VR technology also offers different platform of games for students

that is related to their study but in a different manner so they can feel relax after playing these games. These games are not enhancing only gaming skills but also make their mind sharp & enhance motor skills while playing these games.

Aging is process that all have to face in their life but VR helps & also shows its advancement in reducing aging process .[4]By using VR technologies people can manage their life & can reduce their aging because VR games provides different rehabilitation techniques so the people overcome those problems who are suffering from their disabilities by birth or disorders VR games includes physical therapy interventions that mainly increase functional strength & balance to reduce falls in older results. So, from birth to death VR games shows that it is an asset in our life because it is providing techniques that solves all our problem in every field & creates an opportunity to everyone to enhance their skill in gaming, education & maintaining the body balance.

3 Features of VR [8]

Virtual World:-

In this feature of VR an imaginary vision exist from the real world. Mainly it provides experience to user to feel real world in imaginary view.

Immersion:-

In this feature of VR user mainly cuts form the real world on a sensory level. In this VR headsets are used for creating whole field of vision & headphones are used to achieve the results with sounds.

Sensory feedback:-

This feature of VR mainly which is uses to track the position of user so that the computer track the changes in positions.

Interactivity:-

To feel & interact with real world experience in virtual environment we need virtual elements so can easily interact with the games & many more things.

4 DEVICE THAT ARE USED FOR VR TECHNOLOGIES [6]

Devices that are used for virtual reality are as given below -

1. **Head Mounted Displays**- HMD is similar to the helmet that mainly holds the visual & auditory displays.
2. **Cave** - The Cave is an immersive VR facility which is used for interaction in engaging environments.
3. **Gloves** --It is mainly used for natural interaction with objects.
4. **3D Mouse** - With the help of 3D mouse user can produce different position in 3D environment. So it can easily experience real world.
5. **Space Ball**s
6. **Video camera and shadow**
7. **Voice recognition technique**
8. **Biological sensor**
9. **Full body suit**

5 Applications of Virtual Reality [7]

Video games

Nowadays, there is no doubt video games create a special & different place in Human's life. Through Video Games specially in virtual reality we can overcome with problems that is related to our physical health, mental health & motor development growth. VR games mainly provides real time experience to user So user can easily interact with the game & can enjoy it & make themselves relax.

Education

VR also play its essential role in education also. It makes easy for students to learn & catch things easily because by giving education using VR student can experience in real way & get more interest in that so they can easily understand & experience that thing.

Social apps

VR in social apps create its major role by providing different types of features to users..It gives opportunity to users to play games, share media etc.

Tourism

VR also play vital role in tourism. It mainly provides the advantage to those tourist who want to experience that place before going there. By Creating that virtual environment so that user can experience that place from their home.

6 Implementation of Gaming in VR

In this will talk about the virtual game in 3D with the google VR plugin. This game works in both ios & android. This game is mainly based first person zombie shooter. In this the users act as a shooter which is for shooting the zombie that is in the game. This game (steps shown in Fig.1 to Fig. 10) provides real time experience to user.

Step 1: In the first step we firstly setup the scene.

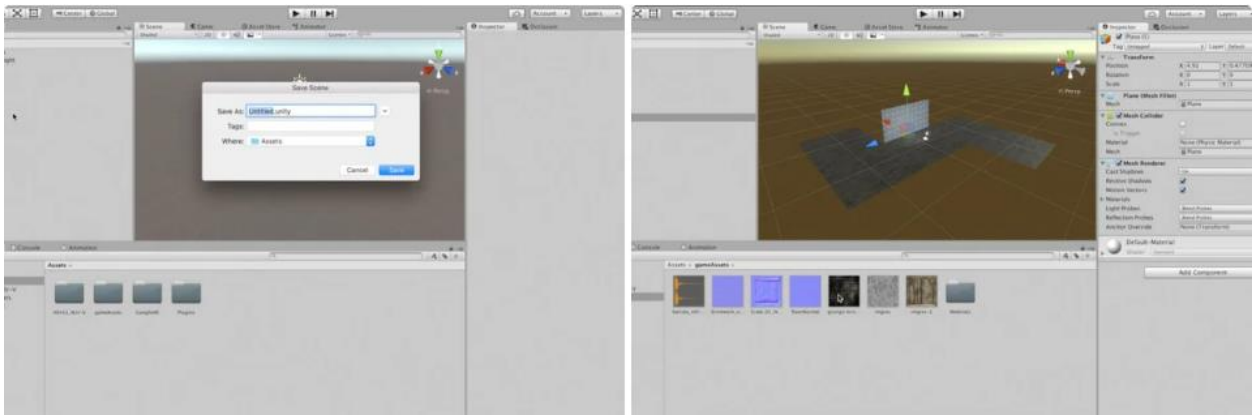


Fig. 1. Make a new Unity project

Firstly create a unity project & call it whatever you want. Now, move to the build, file setting & add the platform whatever you want i.e android or ios. Right click on hierarchy & create a 3D object plane. Drag the silver texture from the assets folder into the plane off wherever you want to choose floor normal map.this not only add the texture but also the Unity lighting system to project. Now click on hierarchy & add a point light, position to the top of over a plane. Now copy & paste 4 times as shown in image above.

Step 2: Complete the Scene

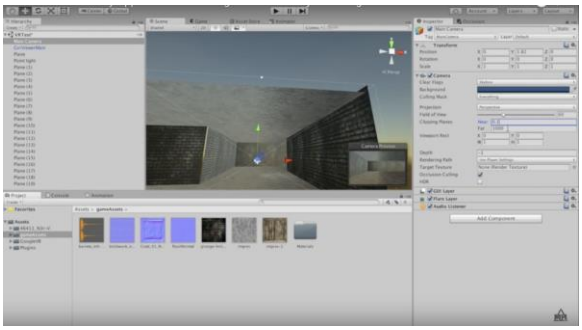


Fig. 2. Add brick texture

Now, create another plane & add the brick texture. Now you have to transform the controls on the top right so the brick pattern faces the right direction. Now, Copy & paste to make all walls same. Select the floor the planes & rotate them in the same time so it will facing down to ceiling. Now, create a 3D object & add the wooden texture to the normal wooden map. In the last, you have to copy & paste & scattered it wherever you want.

Step 3: Bake Navigation Mesh

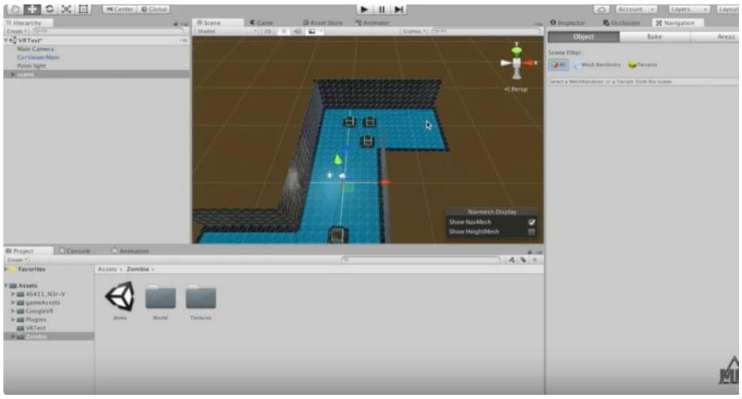


Fig. 3. Making Navigation Mesh

Now, this time to add zombies before adding zombie we have to know firstly how zombies will move & in which area. Create an empty game object & rename it scene & drag all the planes. This is to organize our scene. Go to the window, navigation a new window will appear to the right. Now we have to create a mesh where zombies can move there i.e walking areas for zombie.

Step 4: Lets Add Some Zombies.

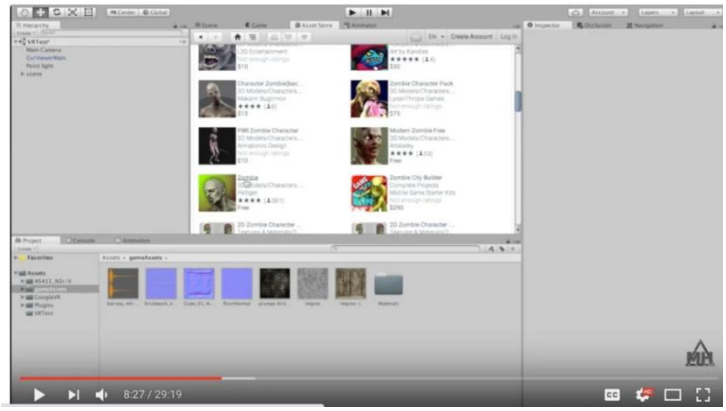


Fig. 4. Working on Zombie Mode

From the asset store search for free zombie character & import it. The character that is chosen from asset store rename as ZOMBIE. Now, Remove the animator component & add the animation component. There are two characters of zombie that have to be drag & drop in our play view i.e zombiewalk & zombiefall. Now, add a nav mash agent component to zombie & change its speed & stopping distance. Add a capsule collider component so it can surrounds zombie head. Now, only way to kill a zombie with a headshot.

Step 5: Add Some Code to Your Zombie.

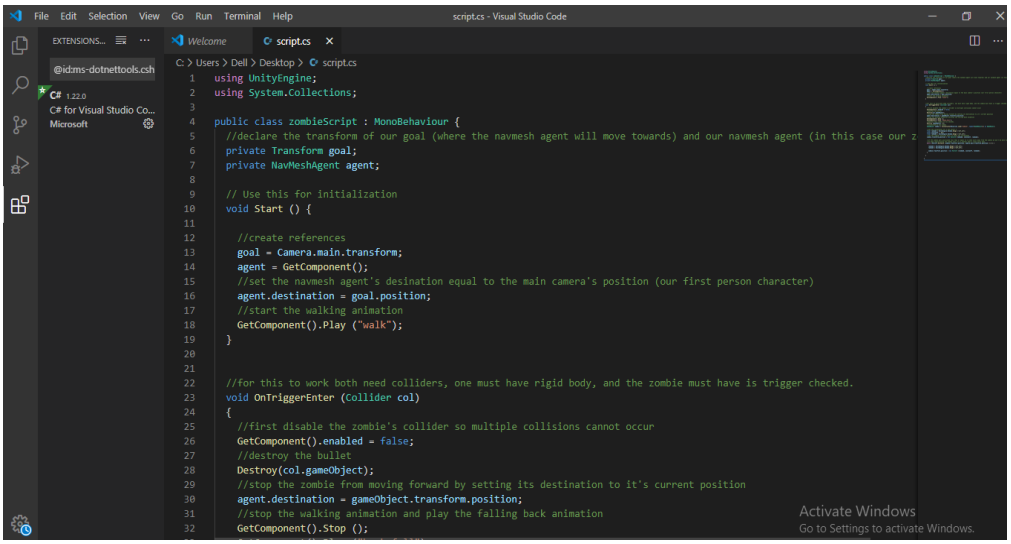


Fig. 5. Code for Zombie

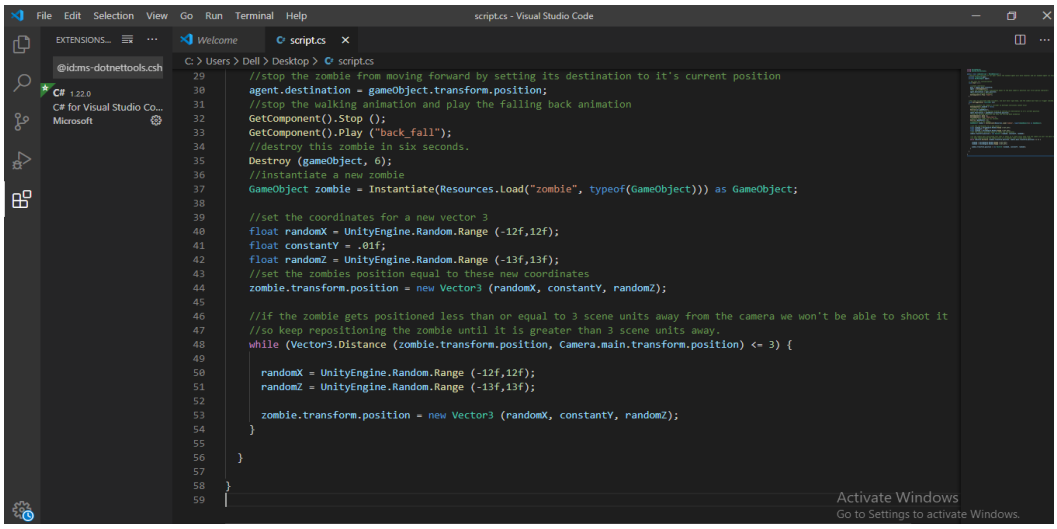


Fig. 6. Code for Zombie

Step 6: Almost There!

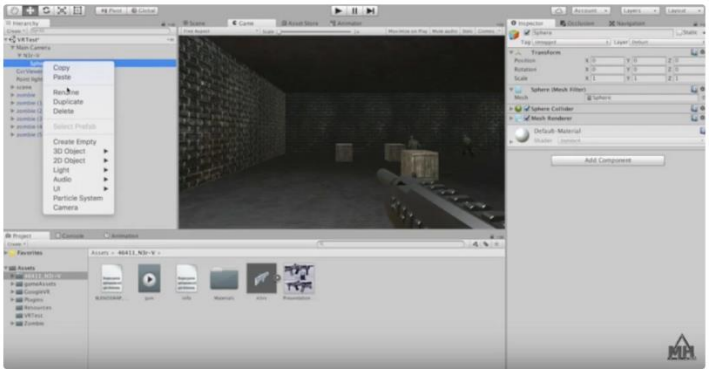
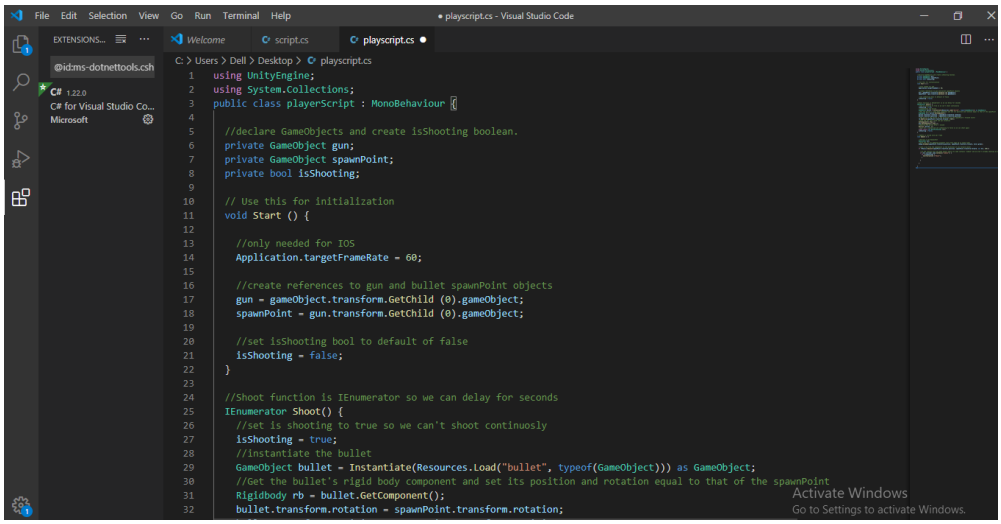


Fig. 7. Creating a bullet

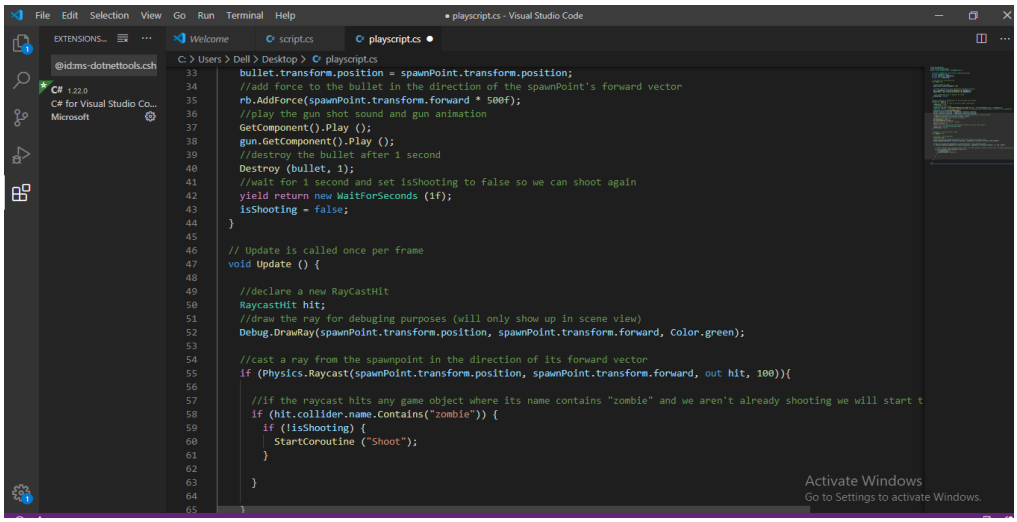
Now, create a folder in asset folder & call it resources. Drag & Drop Zombie in the folder that you have create & place it anywhere that you want in scene. Now, after creating zombie we have to create bullet. Create a sphere & scale it down to 0.1. Now, drag & drop the bullet in the folder that you have created. Now, drag the gun in play view scene. Now, reposition your gun so it will point in the centre of the screen & you can easily view in play mode. Now, Right click on the gun & create a 3D object & call it spawn point. Now, scale down it to 0.1 across the board point at the tip of gun.

Step 7: Add Some Code to Your Camera



```
using UnityEngine;
using System.Collections;
public class playerScript : MonoBehaviour {

  //declare GameObjects and create isShooting boolean.
  private GameObject gun;
  private GameObject spawnPoint;
  private bool isShooting;

  // Use this for initialization
  void Start () {

    //only needed for IOS
    Application.targetFrameRate = 60;

    //create references to gun and bullet spawnPoint objects
    gun = gameObject.transform.GetChild (0).gameObject;
    spawnPoint = gun.transform.GetChild (0).gameObject;

    //set isShooting bool to default of false
    isShooting = false;
  }

  //Shoot function is IEnumerator so we can delay for seconds
  IEnumerator Shoot() {
    //set is shooting to true so we can't shoot continuosly
    isShooting = true;
    //instantiate the bullet
    GameObject bullet = Instantiate(Resources.Load("bullet", typeof(GameObject))) as GameObject;
    //Get the bullet's rigid body component and set its position and rotation equal to that of the spawnPoint
    Rigidbody rb = bullet.GetComponent();
    bullet.transform.rotation = spawnPoint.transform.rotation;
```

Fig. 8. Code for Camera



```
    bullet.transform.position = spawnPoint.transform.position;
    //add force to the bullet in the direction of the spawnPoint's forward vector
    rb.AddForce(spawnPoint.transform.forward * 500f);
    //play the gun shot sound and gun animation
    GetComponent().Play ();
    gun.GetComponent().Play ();
    //destroy the bullet after 1 second
    Destroy (bullet, 1);
    //wait for 1 second and set isShooting to false so we can shoot again
    yield return new WaitForSeconds (1f);
    isShooting = false;
  }

  // Update is called once per frame
  void Update () {

    //declare a new RayCastHit
    RaycastHit hit;
    //draw the ray for debuging purposes (will only show up in scene view)
    Debug.DrawRay(spawnPoint.transform.position, spawnPoint.transform.forward, Color.green);

    //cast a ray from the spawnpoint in the direction of its forward vector
    if (Physics.Raycast(spawnPoint.transform.position, spawnPoint.transform.forward, out hit, 100)){

      //if the raycast hits any game object where its name contains "zombie" and we aren't already shooting we will start t
      if (hit.collider.name.Contains("zombie")) {
        if (!isShooting) {
          StartCoroutine ("Shoot");
        }

      }
```

Fig. 9. Code for Camera

Step 8: Click Play!

Fig. 10. Game Play View

Now, Click on play & feel the real game view. If the gun is pointing at the zombie then you will spot a green light from the tip of the gun. Rotate the spawn point until the line pointing straight out the gun barrel. To play again click on exist mode. This is how you can play game & enjoy the game with complete interest in VR.

7 Conclusion

Games & VR have been increasingly adopting technologies & also enhancing the gaming experience. However, in upcoming time it will also provide many more features to users & help in every sector as we already saw that how virtual reality shows its application in education, healthcare, games & many more fields. Multiplayer VR games that combines the best & various features of traditional computer games. For a moment, it would be more interesting & relaxing in future studies to include an assessment of the level of cybersickness perceived by the player during gaming experience because it has direct negative impact on user. With this context, the study provides evidence that playing a VR games in not difficult than playing through a desktop display. So, playing VR games provides you a better experience & also acts as an asset in many fields. In the upcoming years as more research is done & find that VR has its applications in home as well as at workstation. As the computers become more faster, & will be able to create more realistic images to simulate reality better. It will be interesting to see how it enhances in the years to come in various fields. It may also be possible that in the future person can communicate with another person with the help of virtual phones. “Nippon Telephone and Tele-graph (NTT) in Japan are developing a system which will allow one person to see a 3D image of the other using VR techniques”. So, from this can conclude that our future is in virtual reality.

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