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Mind Controlling Virtual Reality Gaming

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Abstract**—***There are many way to control Virtual Reality Games using motion controllers, haptic gloves and even full body motion controlling suits. The Fundamental focus of this research is to prove how gaming in virtual reality can help not only the gamers but also patients (Children and Youth especially) who are in terminal stages in hospitals.This Research shows how it helps the patients to live a life in another world.With the help of mind controlling the VR game the patient does not need to exert any energy and can enjoy a seamless experience of the VR world. In this way the patients will also forget their suffering.*

Keywords—Brain Activity, Gaming, Mind Controlling, Neural Waves, Virtual Reality.

I. INTRODUCTION

Virtual Reality is a way in which the user can experience real world places or experiences in a virtual world.Virtual Reality enables a user to move around and perform various actions in the virtual world. Virtual Reality lets a user interact with other players or items in the virtual world. Virtual Reality lets a user interact a virtual world with the help of VR gear which can be a head-mounted display or VR joysticks or even full body suits.[1][10]

Mind controlling VR is currently being developed by a company called Neurable, they make this possible by reading the brain activity of the user. With the help of this the user is able to control the objects in the VR world with his/her brain. According to them the user just has to think of the object or action that the user wants to perform and that action can be performed.[4][5]

This technology helps the patients who cannot move their body to move it in the virtual world. This gives them the feeling of what it means to walk and interact with the world especially the patients who cannot walk. This technology even helps patients who are in terminal stages or who are sick since birth. It gives them a second chance in life to enjoy their life like the rest of the world.

Patients who are under constant suffering because of various treatments or by constant medication can also enjoy this experience by forgetting about their illness/sickness in life and enjoy their experience in the virtual world.

II. TYPES OF VIRTUAL REALITY

There are mainly three types of virtual reality which are used these days.[2][8]

1. Fully-Immersive
2. Semi-Immersive
3. Non-Immersive

2.1 FULLY – IMMERSIVE VR

In this type of Virtual Reality the users are made unconscious of their physical body and surrounding environment. The users interact with the system with their senses, which are nerve impulses in different degree of fidelity.[6] These types of system can be possible only if it's a fully virtual world, then it should be able to reproduce our senses and more fantastical feelings, thoughts and more. These type of system makes it possible to control the operations of the VR world with our mind.

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These Types of VR gives users a more realistic experience possible with complete sight and sound. With this you will feel like you are actually physically doing the things in the virtual world.[11]

2.2 SEMI – IMMERSIVE VR

In this type of Virtual Reality the users are fully aware of all their experiences since most of the experiences done by the user is done physically. These types of system are mostly used for educational and training purposes.[12] These systems are mostly seen when companies need to train employees in a particular hardware or some kind of vehicle which is expensive.[11]

We mostly see these types of system when training piolets for flight simulations or training a formula 1 driver to handle racing on the track. These types of technology helps to save hardware cost and also helps to decrease the loss of life.[7]

2.3 NON – IMMERSIVE VR

These types of system are usually seen in most of the games. These systems are seen by both the eyes of the user's i.e. on a display unlike VR which has one display for each eye. These systems gives the users the experience of the virtual world but the user does not feel immersed in the virtual world. These systems gives the user the perception of the image in two dimensional height and width while fully immersive gives users the perception of three dimensional that has height, width and depth.[9]

III. MIND CONTROLLING VIRTUAL REALITY

This technology makes use of fully-immersive VR which helps to scan the brain with the help of 6 dry EEG (Electroencephalography) sensors. With the help of this they use signal processing and real time machine learning techniques to identify which neural features correlate with stress, calm, performance and other cognitive states and then they turn them into actionable insights.[3]

FIGURE 1:Neurable DK1 VR-Compatible brain sensing device.[3]

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TABLE 1
COMPARISON BETWEEN CURRENT VR SYSTEMS AND MIND CONTROLLING VR SYSTEMS

Sr. No.	Feature	Current VR	Mind Controlling VR
01.	Usability	It is easy to use but requires a lot of body movements and can make you exhausted pretty fast.	It is easy to use but does not require any body movements and the user does not get easily exhausted.
02.	Control	Most of the operations are controlled with the help of VR controller or VR gears.	Most of the operations are controlled with the help of the user's brain.
03.	Simulation	Simulation systems can be easily made to train people how to use a particular equipment.	Simulation systems can be a little tricky since the user will not easily understand how exactly he must use the system in the real world.
04.	Applications	It can be used for entertainment, medical, education , training, etc.	It can be used for entertainment, medical and educational purposes.
05.	Immersion	These systems can be used in fully, semi and non-immersive way.	These systems can be used only in fully immersive way.

TABLE 2
MIND CONTROLLING VRADVANTAGES AND DISADVANTAGES

Sr. No.	Feature	Advantages	Disadvantages
01.	Usability	Users can easily control the system with the help of their brain, Operations can be easily carried out by the user just thinking about what the operation should be.	If a user has any brain damage then the user won't be able to use the system.
02.	Immersion	The system will be fully immersive so the user will perform all the operations while having their body in a constant state.	Since the body will be a constant state for some time there can be body pain.
03.	Applications	It can be used for entertainment, medical and educational purposes. Medical purposes here is to give users a psychological relief from the pain during treatments.	It cannot be used for simulation purposes.
04.	Users perception	Users can easily enjoy their life in the virtual world since most of the operations which will be done will feel as it is done in real life.	Users won't know the difference between the real world and virtual world after long period of use of Virtual Reality.

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IV. CONCLUSION

From this we can conclude that Virtual Reality game has certain advantages as well as disadvantages. It helps the people to go into a different world i.e. Virtual world. But we also need to consider the variety of new sensors and displays technologies dealing with different kind of stimuli, issues regarding the level of immersion may arise. Also, what could be the optimal combination of these technologies depending on the kind of stimulated Virtual Reality and the proposed games?

User-related studies, such as the level of engagement, satisfaction, learning or skills improvement needs also to be investigated. It aims to provide a collection of high quality research articles that addresses broad challenges in both theoretical and applied aspects of Virtual Reality games, including new software and hardware developments and user-related studies.

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