



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 8, August 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com



Application of Virtual Reality in Various Fields

Nikhil Mishra¹, Mayur Mane²

U. G Student, Department of Information Technology, B.K.Birla college of Arts, Science Commerce (Autonomous),
Kalyan, Maharashtra, India¹

U. G Student, Department of Information Technology, B.K.Birla college of Arts, Science Commerce (Autonomous),
Kalyan, Maharashtra, India²

ABSTRACT: Virtual reality (VR) also known as computerized simulation has become major source of attraction in last few years. however very less people know about what VR actually is, how it work & its applications. In this document we will try to present the basics of VR & applications of this technology in various fields such as medical, military, education ,business opportunities, entertainment & gaming industries etc. Also in this document new research directions, technological frontiers and potential applications are pointed out. The possible positive and negative influence of VR on life of average people is speculated.

KEYWORDS: Virtual reality, past, present, future, application, research, advantages, disadvantages.

I. INTRODUCTION

Virtual Reality (VR) is a relatively new technology that opened many doors for researchers and entrepreneurs. There are many examples of scientists using this technology either to develop it further or to experiment with various attempts at its applications.

Furthermore, VR is also proving a commercial success and companies like Google, Microsoft, and Samsung are investing in its development. However, this technology has far more to offer than simple recreation. Aside from its use for various educational purposes, new insight is directing VR towards medical treatments and research, neuroscience, and complex data management.

Below, let us take a look on what VR actually is and how it works.

What is VR?

As the name itself suggest VR is a technology which brings one's reality into virtual perspective. It is a technology which helps its users to escape from physical world and diverge himself into a virtual world through VR headsets.

Scientists find this technology so alluring because it is able to substitute the physical landscape with a virtual one and in doing so it allows researchers to have more control over experiments. Basically, that means that VR allows us to create an environment simulation that we can interact with from the safety of our computer. Not only that, but our mind perceives the digital simulation as it would the real-life situation. That is, once immersed into the virtual world we perceive it similarly to our own. Therefore, we can use VR to monitor how our mind and body respond to certain stimuli.

How VR work?

Processing of virtual reality is a combination of both hardware and software. The hardware part is used for viewing purposes, while the software can help create the virtual environment. A simple example of this are the games, where a headgear attached with HDMI cables help transfer images from the box. This enables you to play a game of tennis with friends. In some cases, the phone becomes part of the hardware, as the smartphone gets clipped in a VR headgear and project images. But a phone needs to have a 60fps framerate or higher so that the picture is not over pixelated.

The VR glasses use a technology called head-tracking, which changes the field of vision as a person turns head. The technology may not be perfect for now. Still, it does offer an immersive experience. There is also eye-tracking which uses infrared to determine eye movements and helps determine depth in the picture. The motion tracking feature is still in development and will allow a person to walk around in the virtual world.



II. APPLICATION OF VR IN DIFFERENT FIELDS

Recent innovations have made it possible for people to exist in multiple different realities. As a result, we can say technologies will help to bridge the gaps between physical and virtual spaces.

Recognizing the potential, investors have accelerated their interest in the VR industry, even during a global pandemic. Often associated with gaming, VR has the potential to revolutionize operations across industries. During the Covid-19 pandemic, we've witnessed organizations around the world harness AI to deliver home-bound applications to citizens with a variety of new experiences.

Below, let us take a look on some application of VR in different field & how this technology can revolutionize today's industries.

Medical:

One of the biggest contributions of VR to modern science is in the field of medical research. We've already started to see entrepreneurs begins the use of VR to bring life-saving solutions to healthcare, particularly in medical education. Companies have started to create VR solutions for surgical training and are building tools that will support doctors and surgeons to create good outcomes with the help of VR.

Additionally, VR tools can enable doctors and other healthcare providers to continue to deliver personalized care experiences to their patients throughout the Covid-19 pandemic.

The benefit of VR can be split into different categories. Either we use VR to test certain abilities of the human brain, or we can use the technology to help in the treatment of mental and physical conditions. Lastly, there are many examples of VR simulations used in education especially in the field of medical treatment. Education is possible because this technology can help medical workers practice certain procedures without a need to work on a living patient or real tissue.

Earlier scientists often used other mammals to test their ideas about how the human brain functions. Since, it was very hard to handle and maintain human brains in laboratories. However, with VR it is now possible to observe human brain responses using Virtual Maze Neuroscience Application.

VR is also helpful in creating 3D representations of complex data sets that can then be observed in detail. One such experiment made a virtual projection of a brain-based on extensive scans. The scientist could later use this projection to observe the organ in detail. Furthermore, researchers believe they can make simulations of gene expression patterns of brain activity in the future. Through such endeavours, they hope to gain a deeper understanding of physiological processes as they happen in real life.

Military:

VR can be used to prepare soldiers for a real, live combat situation. It teaches ways of dealing with unexpected events, Ex: a sniper attack, but without putting themselves in danger. It is important that soldiers are taught how to react to dangerous situation where the wrong decision may mean the difference between life and death.

VR can help soldiers to teach about the importance of communication and following orders. Plus, it shows them ways of navigating and dealing with what is often a hostile environment. Here they learn how to deal with hostile locals as well as being on guard for the unexpected event such as IED's or suicide bombers.

VR cannot just be used for ground scenarios: it can also be used to train combat pilots, such as helicopter pilots who have to navigate an aircraft in difficult conditions, for example in night time flying pilots can use a flight simulator and wear a head mounted display (HMD) which enables them to experience a change in perception as they move their head. Hence, Air force is another branch of the services where virtual reality has been used to great effect. Flight simulations is the other way which can be used to train pilots across all branches of the forces and to great success. They are used to teach flying skills, how to deal with an emergency and communication with ground control. The simulator will contain a series of monitors which display images of a virtual landscape, for example a battlefield scenario. These images are presented in exactly the same way as if viewed through the windows of a real-world aircraft which require the trainee pilot to react accordingly. The simulator is set up to match a real aircraft. The fittings, equipment panel and other elements are in exactly the same place as they would be on a real aircraft.

Not only in air-force, VR simulation can be used in navy training as well although there is difference in layout cause a submarine simulator does not use monitor screens as windows which display images from the virtual environment. Instead, it relies upon instrument readings which help the crew to gauge the position of submarine and passage through



the water. Another training aid which makes use of virtual reality technologies is a 'virtual bridge'. The ship's bridge performs a range of important functions and is the 'mission control' of the ship. It contains a set of instruments and fittings necessary for the handling of the ship which require complex level skills.

A virtual bridge enables trainee naval officers to be taught seamanship, ship handling and how to cope with an emergency situation. The trainee crew learn about teamwork and dealing with emergencies such as a hostile attack by another ship by interaction with the device.

Education:

During the pandemic, we unveiled yet another valuable aspect of VR in the education sector, i.e., distance learning. When presented in physical classrooms became a point of the problem, Virtual reality bridged the gap and provided students and teachers to meet in virtual spaces. Here, the learning experience will be no less than a physical classroom as the involved people could share their presentations, exchange opinions and ideas, discuss things, and whatnot.

one of the aspects that seemed probable and promising to most educationists and trainers is to bring in complete destinations right to the four walls of the classrooms. Instead of disrupting a child's learning rhythm with the field trip, they suggest using a virtual field trip.

On average, a regular field trip, i.e., one to the park or a movie, aims to freshen up the students minds and engage them in a lighter subject. However, it demands an extra budget as well.

Virtual Reality, on the contrary, does the job in a matter of seconds. Using VR tools like Google Expedition we can take the students to all places. The great part is it preserves the learning part. Plus, you can conduct multiple of these. And even offer the kids a real-life experience since VR enables interaction within landscapes and with objects.

Another effective way through which VR can help students is to play the textual content in 3D in video and audio forms, making it easier to understand. It also contributes to picture memory. Thus, helping the students with better retention of knowledge.

Given the effective uses above, Virtual Reality is far more engaging than the current forms of learning. It encourages student participation and compels the locked minds to step out and think. Previous studies suggest that students spend about one-fifth of their online lecture time scrolling or browsing on their mobile devices.

VR addresses this quite well. With so many things happening around, it is almost impossible for an eager student to get carried away by something else. A VR-based learning experience demands constant attention and participation.

Also, students discover their hidden capabilities and potentials. They master their existing skills. As they pay more attention to learning, and themselves, they unravel their true potential. Thus, it maximizes the learning output.

Entertainment & gaming industries:

Humans continuously seeks new and innovative ways to relax and energise which leads many to the theatre or concert hall. However today, generation is changing and VR can play a crucial factor in changing today's method of entertainment.

This also refers to the use of virtual reality in museum and historical settings, virtual reality can be used to construct virtual walkthroughs of these sites which enhances the visitor's experience.

Plus, this is a useful way of challenging attitudes towards heritage sites such as museums and to encourage more people to visit and take part.

These settings employ as a means of communicating information to the general public in new and exciting ways. There has been a move away from the traditional type of experience associated with museums, galleries and visitor centres. The old model was that of passive engagement in which people viewed the exhibit but did not get involved to an experience in which interaction is the main feature. Interactive displays form a large part of many exhibitions and particularly appeal to children. Children are often difficult to attract to a museum or gallery as they tend to see this as a boring experience. But the use of interactive technologies such as virtual reality has changed that perception and opened up these spaces to a new audience.

VR concerts can give fans around the world a front row seat to some of the hottest bands for a fraction of the price of VIP admission. Not only in concerts but also for watching movies VR can play crucial factor and make viewers get immersive in VR movies which is more entertaining than watching movies in theatre.

Also, VR can provide more entertaining games in which users can immerse themselves in VR environment which would be totally different experience from today's computer games. A VR game might involve a 3-D image that can be explored interactively on a computing device by manipulating keys, mouse or touchscreen. More sophisticated and immersive examples include VR headsets, wrap-around display screens.



VR gaming control may involve a standard keyboard and mouse, game controllers or motion capture methods. More complex VR rooms may include treadmill floors or similar methods to further the user's sense of freedom of movement and feelings of immersion within the virtual environment. In other VR gaming setups, the user may be confined to a limited area surrounding a computer but have free range of motion within the area. As technology will progress, virtual reality gaming hardware will mature to the point that VR headsets offer a great experience with little lag or nausea.

III. BUSINESS OPPORTUNITIES

Technologies that have changed world of business in past generations are namely web & pc. It is said that VR can become the third technology that can revolutionize future business opportunities and it can be bigger than web itself. VR training allows you to deliver large amounts of complex information in a way that's more easily absorbed than conventional video or a book. For example, teaching someone how to operate a machine. Using VR to place the person being trained at the machine itself, and walking them through how to operate it in a virtual environment, will mean that the employee is much more familiar with operating procedures when they ultimately use the machinery in real life.

Millions can be saved by eliminating the need to build full-scale working prototypes, by carrying out initial exploration of ideas in VR. Today this is used in aircraft design, with Boeing and Airbus both extensively using simulated digital spaces to design and test new features and models.

Rather than visit a physical showroom, customers leading increasingly digital lives will simply put on a headset and appear in a virtual one. Once there, they can interact with sales assistants – which could be virtual representations of real humans, or, more likely as time progresses, AI constructs operating independently of direct human control.

If a customer wants to try out your new car, furniture or kitchen utensil, VR will let them do it without leaving their homes. Of course, real-world showrooms are likely to remain a part of the marketing landscape for some time, as for many products there will be a point where consumers want to see and feel the physical product. But for early-stage market research and quickly getting an overview of a brand's product range, VR will increasingly offer a convenient alternative. Pilots have relied on sophisticated simulators for decades. But the million-dollar-plus, room-sized simulation suites are starting to be replaced by more cost-efficient and portable VR solutions.

IV. CONCLUSION

VR technology has the potential to change many research practices and it also has real applications that are already helping people with several issues. Researchers, across the fields, do not have to fear their lack of knowledge about VR cause most companies are helping researchers develop VR experiments. Simian Virtual Reality was built for the same purpose. So, you can hire someone to help you program and model the experiment. Also, they can help you get the necessary equipment for your needs and budget. This just goes to show how far the technology advanced and what opportunities it offers scientists.

Virtual Reality is transforming every sector quite well. We are stepping out from the pages and taking our learning experience to real-life, which, in turn, helps to give birth to more practical minds than ever. Virtual reality also offers a whole new world of opportunity for those living with physical or mental disabilities. People lacking legs can now enjoy the exhilaration of reaching a mountain peak or swimming in crystal-clear waters.

Though VR has certain problems for now but we can say as this technology progressed and maximum peoples will start to get benefits from it, those problems will have its cure for sure.

All this means that Virtual Reality is no longer science fiction. It is integrated into our present and, in the coming years, it will lead to advances that will shape the future.

REFERENCES

1. Psocka, Joseph (1 November 1995). "Immersive training systems: Virtual reality and education and training". *Instructional Science*. 23 (5): 405–431.
2. Horowitz, Ken (28 December 2004). "Sega VR: Great Idea or Wishful Thinking?". Sega-16. Archived from the original on 14 January 2010. Retrieved 21 August 2010.
3. Cipresso, P., ChicchiGiglioli, I. A., Alcañiz Raya, M., & Riva, G. (2018). The past, present, and future of virtual and augmented reality research: a network and cluster analysis of the literature. *Frontiers in psychology*, 9, 2086.
4. Fox, J., Arena, D., & Bailenson, J. N. (2009). Virtual reality: A survival guide for the social scientist. *Journal of Media Psychology*, 21(3), 95-113.
5. Garrett, B., Taverner, T., Gromala, D., Tao, G., Cordingley, E., & Sun, C. (2018). Virtual reality clinical research: promises and challenges. *JMIR serious games*, 6(4), e10839.



6. Hoffman, H. G., Richards, T. L., Coda, B., Bills, A. R., Blough, D., Richards, A. L., & Sharar, S. R. (2004). Modulation of thermal pain-related brain activity with virtual reality: evidence from fMRI. *Neuroreport*, 15(8), 1245-1248.
7. Mazurek, J., Kiper, P., Cieřlik, B., Rutkowski, S., Mehlich, K., Turolla, A., & Szczepańska-Gieracha, J. (2019). Virtual reality in medicine: A brief overview and future research directions. *Human Movement*, 20(3), 16-22.
8. *Computers & Education* 147 (April 2020). A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda.
9. Alexander, T., Westhoven, M., and Conradi, J. (2017). "Virtual environments for competency-oriented education and training," in *Advances in Human Factors, Business Management, Training and Education*, (Berlin: Springer International Publishing), 23–29.
10. Virtual reality and its military utility, February 2011, *Journal of Ambient Intelligence and Humanized Computing* 4(1), DOI:10.1007/s12652-011-0052-4.
11. Alaker M, Wynn GR, Arulampalam T. Virtual reality training in laparoscopic surgery: a systematic review & meta-analysis. *Int J Surg*. 2016; 29:85–94.
12. Jul 31, 2017,12:28am EDT,The Amazing Ways Companies Use Virtual Reality for Business Success, Bernard Marr, Enterprise Tech.
13. Rizzo A, Kim GJ. A SWOT analysis of the field of virtual reality rehabilitation and therapy. *Presence Teleop Virt*. 2005; 14:119–46.



**Impact Factor:
7.569**



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details