

FACULTY OF COMPUTER TECHNOLOGY

From Campus Director (CE)' Desk

VIRTUAL REALITY

What is Virtual Reality after all in simple terms? "Virtual" means almost or nearly and "reality" is state of things in human world. Thus, in computer or IT world, the term Virtual Reality is used for computer-generated, three-dimensional world, which a human can explore and interact with. The images appear real, of natural size and move as the person moves around or when he moves head or eyes. Thus this virtual world appears to be realistic as well as enjoyable. In essence, one's brain is tricked into thinking that something is real even though it isn't by devious imitations. Without a doubt, one needs the appropriate tools for the job, such as a set of VR glasses or a headset.



As very well said, whatever seems to be fiction today is likely to become reality few years down the line. VR is a good example of it. Today's developed VR was predicted through short Science fiction story, "Pygmalion's Spectacles", written by Stanley G Weinbaum In 1935. In this story, a professor invents a pair of goggles, that allowed the wearer to view a movie with sight, sound, taste, smell, and touch. The two early examples of VR technology are the 1939 View-Master, a stereoscopic visual simulator, and Morton Heilig's 1957 Sensorama multi-experience theatre. In 1968, the first head-mounted display (HMD) was developed. But the name "Virtual Reality " was invented in 1987, by researcher Jaron Lanier. Students in this issue of TechBytes have contributed detailed descriptions about the technology, hardware, usage, applications of Virtual Reality in domains other than games also, like health, education, architecture, defense, entertainment, training, ecommerce, etc. Advantages and disadvantages are also discussed. I am sure, after reading these articles, you will undoubtedly want to learn and explore more about the potential uses of virtual reality.

-Dr. Savita Gandhi

From Editorial Desk

Virutal Reality dangles in front of our eyes a vision of the media's future, changes in the ways we communicate, and the way we think about communication. The medium that tantalizes us so has gone by a number of names: computer simulation, artificial reality, virtual environments, augmented reality, cyberspace, and so on. More terms are likely to be invented as the technology's future unfolds. But the enigmatic term virtual reality has dominated the discourse. It has defined the technology's future by giving it a goal, the creation of virtual reality. Virtual reality is not a technology; it is a destination. This issue contains a gist of virtual reality with different articles contributed by the students of Faculty of Computer Technology, GLS University. Your suggestions are always welcomed to improve the further issues of TechBytes.

"Virtual reality was once the dream of science fiction. But the internet was also once a dream, and so were computers and smartphones. The future is coming."

Mr. Mark Zuckerberg

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Treatise

Virtual Reality (VR) - The Technology of Future

- Mr. Hammad Mansuri, MCA, Sem - III

Virtual Reality (VR) is a technology, by which we can create an immersive illusion of being someplace else. Through Virtual Reality, we can enter a computer-generated environment that gives the user the impression that they are completely involved in their surroundings. With the help of Virtual Reality (VR), users can engage and interact with 3d models instead of just watching them on a screen. It enables us to view heart surgery as if we were present in the emergency room, immerse ourselves in video games as if we are some characters in the game, travel the world while sitting at home, and much more.

Virtual Reality which is created by computers allows you to experience and interact with the 3D World that isn't real. Virtual Reality will give you the mental and physical impression that you are in the 3D world that is created by computers. You never lose the illusion created by the universe you are in because as you move your head, your head in the virtual world also moves [1]. These immersive illusions or Virtual Environment is achieved using the devices called VR Headset. VR Headset typically contains a head-mounted display that displays distinct images/videos for each eye and sensors that measure head motion such as gyroscopes, accelerometers, magnetometers, or structured light systems and stereo sound. Some examples of VR Headsets are Meta Quest 2 [2], PlayStation VR [3], and Valve Index [4].

Usage of Virtual Reality

Currently, VR Technology is being used in different domains. If we talk about car manufacturing industries VR allows engineers and designers to easily experiment with the design and construction of a vehicle. For years, industry leaders like BMW and Jaguar Land Rover have used virtual reality to obtain feedback on an early design before actually manufacturing the parts. VR is also proving itself very useful in the healthcare industry [9]. VR is helping in pain reduction where it provides different interactive games to create a distraction. This method is called Cognitive distraction. VR is also useful in telesurgery and also helps military veterans with post-traumatic stress disorder [2]. With the help of VR, we can also visit famous landmarks, and experience a different part of the world while sitting in the comfort of our homes. It also provides students with the chance to learn through experience instead of reading and writing. VR is also proving its worth in the fashion industry. With the help of VR, Fashion shows can now be seen virtually. So, we can say that VR is also very much useful in a wide range of industries besides gaming.

Pros of Virtual Reality

- One of the great features of virtual reality is how well it recreates the real world, even more than 3D and 8D. You can feel as though you are part of what is happening around you and even try to touch what you are seeing.
- Through the use of VR technology, you can watch movies, view videos, and play games, giving the user the impression that they are in another world. The audio and visual elements of Video have been integrated into VR. Additionally, it provides the user with an excellent gaming experience, a user feels like he is the protagonist himself in the game that he is playing.
- For military veterans and PTSD soldiers, virtual reality is helpful [2]. The simulations benefit the military patients by simulating real-life situations and allowing them to withstand incapacitating pressures. By enabling them to better comprehend the frightening surroundings, virtual reality also assists them in overcoming phobias.

Cons of Virtual Reality

- In respect of healthcare, VR is quite distressing to the eyes. The VR headsets project two tiny LCD monitors into each of your eyes very close to your eyes. Therefore, using a VR headset for an extended amount of time increases your risk of developing a variety of eye diseases, including eye strain, which is a prevalent issue. A lot of people experience motion sickness during extended sessions using VR.
- VR is very much addictive like drugs. As you spend more time in the virtual world, you become less connected to reality, which leads to VR addiction. The User might have no idea how much time they have already wasted playing video games.
- Another drawback of virtual reality is that someone who
 has received training in a VR environment may perform
 well there, but not in the real world. Therefore, it won't
 produce the same outcomes in the real world as it does in
 a virtual one.

Although Virtual Reality is used in various fields, it is still in the experimental stage. And also has many drawbacks which are not fully acceptable.

Future of VR

You may have experienced VR and had some amazing experiences. If you like to play video games then there are some amazing games you can enjoy in VR. It is also very helpful in different domains of technology.

We are going to see some amazing progress in the field of VR. Nowadays most VR applications can control users senses like hearing and sight. But in the future, we might see some other advancements in feeling other senses like smell and touch on the objects of the Virtual World. According to research conducted by IDC (International Data Corporation), the VR market will reach 15.5 billion euros by 2022 [10]. The market-leading companies are already working on the development of wireless headsets that can also display visuals at High definition, 4k or 8k definition with much more powerful processors. And especially after the outbreak of COVID-19 many companies are investing in virtual reality as the due to covid they were forced to postpone many conferences and sports events. This led to a significant increase in the popularity of VR technology. Hosting sports events with help of VR technology allow fans to enjoy the game even if they are on the other side of the world. The full-body suits are also available like Teslasuit [6].

While a VR headset simulates the world we can see and hear, this suit helps in feel our whole body inside that 3D world. And also, the integration of VR technology with Artificial Intelligence (AI) is inevitable in the future. So right now, virtual reality is not only talk and science fiction but it is part of our lives and probably will shape our future as well.

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Analysis of Virtual Reality in IT Industry

-Ms. Heena Tolani, MCA, Sem - III

Virtual reality describes the environment generated by a wearable device called a virtual reality headset or helmet. This makes a person feel and interact with his surrounding objects that appear to be real. The term virtual reality has gained attention since its application in video games, where players can feel the character and behave accordingly. Nowadays, its application covers nearly every field we can imagine. The information technology sector is no exception.

In the Information Technology (IT) industry, significant advances have been made and there are probably plenty more to come. The information technology industry has used virtual reality and provided a more user-friendly experience through its services and devices. In the following sections, we will see some of the virtual reality devices developed and adopted by IT companies.

Gaming

The gaming craze among teens and adults is growing day by day. Almost all of us have played video games where we controlled our characters using a remote control. Furthermore, many high-quality games have been available online, which we are able to play through computers and our smartphones. As a result of their graphics, people become attracted to and addicted to games. In the past few years, virtual reality has increased the level of gaming to an entirely new level. It has opened up a whole new world of gaming, providing players with an experience they have never experienced before. As a result of virtual reality, one feels as if he is a part of the game, playing an active role in it and not just watching it on a screen.

Facebook Reality Labs developed Oculus Quest 2, a virtual reality headset well known for games [1]. It runs the Android operating system and offers a lot of games and apps for entertainment [1]. It provides different experiences with different games, can stream movies from OTT platforms, and can explore the internet in a different way [2].

Virtual Meeting

Virtual reality is not limited to gaming, it is being used widely for practical purposes also. Virtual meetings have become a part of our daily lives since the pandemic. To enhance these meetings in the virtual reality world, Microsoft has come up with the Mesh platform [3]. It allows a person to share his space with others. One can feel the existence of others as if they are present in the same room. This will bring effective change as people from different locations come together and work cooperatively. This will help corporate people as well as students. Students can learn together and help each other. The productivity of industry will increase to a great extent as they work in a coordinating manner even being apart by geographical locations.

E-commerce

Nowadays, online shopping has become common. Many Ecommerce stores have entered the market and people have also normalized online shopping. People carefully read every description of a product especially clothes before buying. They check out photos and videos before purchasing a product. When a product has been delivered, many times people return it because it does not meet their expectations. Hence, some people opt for local shopping because they are able to try the products first. To raise the level of E-commerce stores, virtual reality can be an incredible technology to adopt. Also, some E-commerce stores have already adopted it [4]. Virtual reality will bring a dramatic change to online shopping. Using it, customers can get to see the product from every angle, feel it and get an actual idea about the product. Also, customers can try out products (clothes, shoes, etc.) through avatars that look exactly like them. The result will be a higher level of customer satisfaction, which leads to increased sales for E-commerce companies. Customers will also be more attracted to them as they will get an amazing experience. In addition, this will reduce product returns.

Shopify, an E-commerce company, developed a virtual reality application named Thread Studio. It can be run on the HTC Vive or Valve Index headsets [5]. Thread Studio takes people to a virtual photo studio where they can try different t-shirts and customize them. One can create his design and try a t-shirt on the model which gives a 3D view. Then the t-shirts can be printed and delivered.

Social Media

Social media usage has gone up significantly since the pandemic, and people are spending a lot of time on social media platforms. They like to have conversations, explore and share content. People feel connected to one another even if they are not physically together. Meta Platforms developed Facebook Horizon, a new world for social media users [6]. Facebook Horizon enabled Facebook users to meet their friends through their avatars in a never seen environment. They used to meet and explore the world together, and build their own world through the tools available. Also, they used to hang out and play together. Facebook Horizon was later transformed into Horizon Worlds, a video game having features of game creation for Oculus headsets [6]. It concentrates more on creativity, using the best tools. So, virtual reality provides a whole new and surprising experience in all the areas it is adopted. And it's not done yet. It's still evolving, and it could make a big difference to our lives.

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Applications of Virtual Reality in Different Fields of Life

- Mr. Anas Memon, MCA, Sem - III

Education

We could never think about having such kind of technologies before, but nowadays it is being adopted for almost all the student age groups. Virtual Reality in Education Sector gives students a feeling of interest towards learning. Students can experience events just by sitting in their classroom. Additionally, students can use a virtual career projection and do creative activities for themselves to make themselves more appropriate in terms of skills and values [3]. Virtual reality is an organized, comprehensive, and engaging setup where the students can easily and simply learn things by watching them, relating to them, and by being a part of whatever they are learning, they can see 3-dimensional images, and with other technologies like the internet of things in education, it can be more technologically advanced and engaging [3]. Earlier, students use to learn everything by just reading and writing based on the past or the upcoming imaginary future they expect. But after the arrival of this technology, students can watch all the events just like they watch movies and remembers them easily without any hard work. The events or images seen by the students through VR last longer in their minds, allowing them to continue to recall what they have learned. With all these, students also need a break from their traditional learning environment of classrooms and blackboards, in this case, field trips are also very important. But in situations like Covid-19 Pandemic, the educational institutes were closed so trips could not be possible. In such a scenario, Virtual Reality is the best option which not only helps you to experience the place sitting in your classroom but is also costeffective and time-saving. IoT-based devices can also be used in conjunction with VR graphics, which can simulate the temperature and wind effects of the location in the classroom, thereby providing more details and sharpness to the experience.

Military

The military has embraced virtual reality and uses it for training The Army, Navy, and Air Force all of them use it. Virtual Reality is particularly useful in this field because of the risk this field demands from a person. In a risky situation like combat or fighting, soldiers have to react in a very appropriate manner because even a minor mistake can lead to menacing situations. So, before the actual combat situation, soldiers can train themselves exactly how to react upon such situations with the help of Virtual Reality without any risk of death or serious injuries [4]. Soldiers can simulate specific scenarios, for example engaging an enemy, in a safe environment so that they can experience it without the real-world risks and also in a very costeffective way from other traditional methods. A typical simulation will include several scenarios, for example, coming under fire in a hostile environment, which the recruits will have to deal with. The system will show a change in weather conditions, which adds to the realism of the experience [5]. It also helps new recruits to get familiar with different weapons which they can come across on a battlefield. Unlike their real-life counterparts, virtual weapons do not harm their owners. They look, feel, and function like their reallife counterparts. As part of virtual reality combat training and simulations, these devices provide training and practice in skills and techniques needed for frontline combat action to new soldiers (or other personnel). Virtual Reality also helps in Air force using Flight Simulators. They are used across all branches of the armed forces to train pilots, and they have been highly effective.

Fashion

Virtual reality was introduced to the fashion industry and has taken over the industry. A number of advancements such as AR Try-On, virtual dressing rooms, and virtual stores have enabled fashion shows to exhibit in virtual form, while virtual shopping has been booming. In the fashion retail industry, AR and VR are being used in real-world scenarios [6]. Prada has partnered with YouTube VR and VEER for its virtual reality project. You can have a look at Virtual Reality implementation by Prada on this link [7]. Along with that, Virtual reality also has benefits in the fashion industry like the clothing that has become faulty in physical form is destroyed, but in virtual reality, it is easily erased at the press of a button thereby reducing pollution tremendously [6]. Virtual Reality can save a massive amount of resources by designing and creating garments online. VR let customers try on a wide variety of colors, patterns, and sizes without going through a frustrating dressing room experience. People who dislike the hassle and stress of traditional shopping will love virtual dressing-room software. This feature can save customers time and make their shopping experience facilitating to buy a product and seller to increase their sales.

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Virtual Reality in the Health Sector Industry

- Mr. Faisal Shaikh, MCA, Sem - III

We have been witnessing the effects of VR technology on the world for a very long time. In the area of VR technology, we are also always introducing new research. By offering a virtual environment in which a user can interact and experience the sensations of that virtual world, VR technology gives us the ability to simulate a wide range of possibilities and also delivers a 3D model of that potential that can be both look and feel. The increase in demand for virtual reality technology is driving up the level of technology being developed in this field. VR technology was first only used in the gaming and entertainment industries, but it has since moved to many major worldwide industries. And many industries are already benefiting from this in positive ways. We can see that the healthcare industry has already accepted many of the uses of VR technology because VR in the industry has been a major topic of debate for a very long time. Robotic surgery, medical equipment, training, education, simulation, and other applications are gaining popularity, and there is a good probability that many in the healthcare sector will adopt them as well. This article will discuss the application of virtual reality technology in the field of healthcare.

Training and Medical Education

The use of VR technology by doctors, students, practitioners, and physicians can increase their knowledge and learn new abilities before participating in real practice with a patient, according to a number of previous studies [1]. In fields that require technology and are absolutely critical where we cannot afford human errors that can have a negative impact on patient safety, such as the field of neurosurgery, this is also helping in removing the human errors that were present when learning doctors were operating on a patient. Many companies are creating 360-degree videos, 3-D models, and interactive material that makes it easier for practitioners and medical students to learn skills. It also allows students to practice riskfree, difficult life-saving techniques, which allows for maximum learning. The safety of patients is not compromised by 3D simulations, which give surgeons and students a better opportunity to practice before operating on actual patients [2].

Webinars

VR Technology for Surgery

Surgery has become simpler and less dangerous thanks to VR technology, and these procedures are slowly but surely finding a market. With the aid of VR, we are now able to use robots to perform procedures where accuracy and risk are more important, which a regular human cannot do with that success rate. especially in procedures like neurosurgery that call for greater precision.

Using this technology, we may reduce risk and save time while also calling any top doctor in the world for that specific case to do a remote operation on a patient without being physically present there, especially in emergency situations where we cannot wait for a surgeon to travel from practically the other side of the world because time is limited. This type of surgery is known as "Tele-Surgery"[2][3].

VR for Pain Management

With the aid of VR technology, a patient who undergoes daily routine treatments, such as harsh burn treatments, can feel less pain. VR aids with pain relief, Dr. Sam Sharar (2015), an anaesthesiologist at the University of Washington, asserts that patients would experience less pain if their attention is diverted by an immersive virtual environment [2]. We refer to this technique as "cognitive distraction"[3] because the patient is taken to the virtual world during treatment, tricking their minds into thinking they are busy doing other things there. This causes them to feel less pain during treatment.

Many doctors and medical practitioners use this technique because it includes interactive games, creates a realistic atmosphere where burn victims received therapy, and helps with limb pain management therapy also. VR technology offers a simple, risk-free alternative to medication for pain management [3].

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Balancing and Enhancing Human Health

Faculty of Computer Technology organized a webinar on "Balancing and enhancing Human Health" for the students of MCA, on 5th October, 2021. The guest was Dr. Shilpa Agarwal, Director, Medilink Hospital. A total of 150 students attended the webinar. The webinar was co-ordinated by Dr. Prerna Agrawal.

The guest started the webinar by explaining the importance of health with the quote "Health is wealth". She briefed about the physical health, social health and spiritual health. Balancing all these different types of health are equally important in a human being's life.

She also discussed different ways for balancing physical, Social and spiritual health. One can take care of physical health by proper exercise, Detoxification of body, proper movement therapy and Restful sleep. One can take care of Social health by proper food, good education, maintaining economic stability and having proper health care system. One can take care of spiritual health by giving back, serving a purpose, maintaining good energy, self-discovery and believing in miracles.



Corporate Etiquettes

The faculty of Computer Technology organized a webinar on "Corporate Etiquettes" for the students of MCA, on 25th June 2022. The guest was Ms. Vidhi Bhatt, Tech Lead, Third Rock Techkno. A total of 150 students attended the webinar. The webinar was coordinated by Dr. Prerna Agrawal.

The guest started the webinar by explaining the importance of etiquette in the real life. She also focused on the different types of etiquettes important for the Corporate like Email etiquettes,

telephonic etiquettes, office etiquettes, hygiene etiquettes, etc. She focused on each of them very keenly and also described how to manage each of them properly in day-to-day life. Students also interacted with her and she solved all their doubts of them properly. The session ended with a keynote on maintaining basic etiquette in personal and professional life.



Cyber Crime and its Prevention

The webinar on "Cyber Crime and its Prevention" was organized by GLS FCT on 27th Oct, 2021 for the students of MCA. The guest speaker of the session was Mr. Viral Parmar. He is a serial entrepreneur who runs ComExpo Cyber Security Foundation a non profit organization in India. He is a Developer Advocate, Productivity Hacker, Open Source Strategist, Technology Evangelist, Community Liaison, International Tech Speaker. The main agenda of the session was to make students aware about how cyber crimes occurs and how to prevent them.

Being an active cyber security expert, Mr. Viral, with the help of case studies and live cases he came across his career, explained how cyber crimes are attempted because small mistakes while accessing our devices. This awareness can help students to prevent themselves from being a victim. This eye opener webinar was liked by students as they were taking active participation in solving queries. The seminar was coordinated by Dr. Prerna Agrawal and Dr. Pooja Ajwani.



Digital Marketing

The workshop on "Digital Marketing" was organized by GLS FCT during 3 rd - 5th February 2022 for the students of MCA Semester-II. The guest speaker of the session was Mr. Abbas Kapasi, Digital Marketing Consultant. The main agenda of the session was to make students aware about how the marketing can be done using online platform. Mr. Abbas covered important topics of digital marketing like Search Engine Optimization, PPC, Video Marketing, Social Media Marketing, Affiliated Marketing, Re-marketing, Content Marketing, Influencer Marketing, Email/SMS/WhatsApp Marketing, Lead Nurturing. He also showed how to use online tools for performing digital marketing. The session was interactive as students were keen to know how these techniques work practically. The seminar was coordinated by Dr. Pooja Ajwani.



Menstrual Health and Hygiene

The webinar on "Menstrual health and hygiene" was organized by GLS FCT on 1st April, 2022 for the female students and faculty members of MCA, MSC IT, PGDCA and iMSC IT. The guest speaker of the session was Mrs. Nitya Chaudhary, GlobalHuntFoundation. The main agenda of the session was to make female students aware about health and hygiene to be taken care of during menstrual days.

Mrs. Nitya, explained how to avoid the problems faced during menstrual days and what can be done to improve the mental health during those days. She also explained the myths that are related to those days. The cycle of puberty and menopause was also explained by her. The audience cleared their doubts which shows their keen interest and on the other side the speaker also enjoyed answering the questions. The seminar was coordinated by Dr. Pooja Ajwani and Prof. Vinita Nair.



Workshop on Youth Empowerment & Skills (Art of Living)

FCT Programme organized a workshop on "Youth Empowerment & Skills (Art of Living)" focusing on how to improve Mental Health and how it influences our relationships, work performance, mindset, happiness and physical health. The workshop was conducted by Ms. Bina Patel and Ms. Kavita Lakkad. The workshop was held on 28th January 2022 and was coordinated by Dr. Prerna Agrawal. She explained various aspects of living life happily and peacefully. She also focused on various aspects of managing the stress level in day-to-day life. She shared her experience and knowledge of how to find happiness in the life and how to balance the mind in tensed situation.

She emphasized on the significance of yoga, meditation, spiritual activities and conveyed the importance of it to live healthy life. Few steps of pranayama and meditation were also demonstrated by Ms. Kavita during the session.

Solutions to the few problems were addressed during the session. Problems such as freedom from inhibitions and fear, stress-release leading to higher energy levels and better concentration, improved immunity and stamina, increased clarity of thought and alertness which helps in improving work performance. The workshop was received by students and faculty members.



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