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Metaverse in Indian Health Sector – A Regime Shift

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Abstract

For a considerable amount of time, India's healthcare system has been struggling against a variety of challenges, such as a shortage of institutions and human resources that fall short of being appropriate. Primary, secondary, and tertiary care services were the three categories that comprised the Indian healthcare system's hierarchical structure, and there is an immediate need to concentrate on primary, secondary, and tertiary levels of medical treatment. Despite the fact that there are various challenges in the healthcare system, but primarily the attention is required to the following five "As": Awareness, Access, Absence, Affordability and Accountability of our healthcare system, because of these five issues people's health in India is at stake. We must prepare the healthcare system for a future that is both full of potential and full of unknown challenges, so let's be conscious for this and other problems and get ready to handle them, remembering that the fight against illness is the struggle against anything that is harmful for humanity[1,2].

In healthcare, the Metaverse is becoming increasingly popular. A wide range of technologies are projected to revolutionise healthcare, including Artificial Intelligence (AI), Augmented Reality (AR), Internet of Things(IoT), Virtual Reality (VR), Quantum Computing, and robotic systems. The advancements in augmented reality and virtual reality over the last few years have been astonishing. With the use of these devices, doctors are now able to perform complex procedures with great precision. In order to improve the functionality of medical devices and equipment, these components are also included into software and hardware [3].

The performed work relates to the study of the contribution of Metaverse in the health sector of India.

Keywords: *Metaverse, India, AIIMS, Health care, Artificial Intelligence (AI), Augmented Reality(AR), Internet of Things(IoT), Virtual Reality (VR).*

Introduction

For a considerable amount of time, India has been confronted with the challenge of dealing with inadequate infrastructure in the form of a shortage of medical institutes that are appropriately outfitted. In addition to this, the rate at which such medical teaching or training facilities are being constructed is far lower than what is required to meet the requirements of the current situation.

In spite of this, India has become a favourite destination for medical tourists due to the high quality and low cost of the country's private medical institutes. The cost of medical care in India is consistently ranked as one of the lowest in the world, making the country's medical industry one of the most sought after in all of healthcare.

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The speed with which every facet of society is undergoing transformation has had to be the most exciting aspect of life in the 21st century. The medical field in general, and particularly in India, has undergone a great deal of development recently. The healthcare business in India has reached an all-time high, as reflected by developments such as cutting-edge biomedical equipment and unthinkable surgical procedures carried out by robots.

As a result of recent advances in India's healthcare system, international students studying in the country might have high expectations for the quality of medical care they would receive in India's private hospitals. One thing that ought to be mentioned in this context is the amazing volume of new research that has been published in the past few years. The magnificent research-oriented approach that is being taken in India's healthcare system in the 21st century has led to an increase in the quality of both inpatient and outpatient care, which is a really good thing. However, the health industry in India is fighting for the infrastructure challenges. Hence, there is a significant demand for the healthcare staff to be trained with recent technologies, and the metaverse is the most recent one.

The term "Metaverse" has recently become the topic of conversation all over the world as people look forward to the profound changes it will bring about in many facets of life; nevertheless, the use of "Metaverse" in the medical field will be responsible for a sizeable amount of changes in the five "As" of the health care system i.e. Awareness, Access, Absence, Affordability and Accountability.[1,2,3,4]

Metaverse-Conceptual Briefing

The metaverse is the aggregate of all of the virtual worlds that have been created by utilising blockchain technology. When considering the metaverse, the fact that it is not a single location should be front and centre in your thoughts at all times. People are referring to the collection of new digital spaces as the next iteration of the internet. This term refers to the internet as a whole.

The metaverse enables users to navigate the expanding network of virtual landscapes while maintaining a single identity that may be used across all of them. This brings it closer to becoming a reflection of the world as we know it. You do not need to get a new passport each time you visit a different town, city, or country if you are travelling internationally. This applies to both domestic and international travel [5].

Medical Metaverse

The idea of a metaverse has been floating around for a good number of years. But what exactly does the term "metaverse" entail when used to digital health?

The majority of today's innovations in healthcare technology are focused on the development of medical software applications. These applications provide users with the ability to interact with digital content, such as by managing ERP data or exchanging medical photographs.

The ultimate objective of the companies that sell products and services related to the healthcare metaverse is to eventually combine the digital and the physical worlds into a single, shared, virtual open space that can host a variety of activities, such as the planning of surgical procedures, next-generation telemedicine consultations, and virtual therapy sessions.

If you're curious about how that goal will be accomplished, the answer is that it won't be all that difficult. A user will just require a virtual reality (VR) headset, augmented reality (AR) glasses, a low-cost add-on that transforms a smartphone into an extended reality (XR) gadget, or any other type of XR device in order to enter the metaverse [6].

Metaverse in healthcare–Technical Trends

Three primary technical trends are converging in the Metaverse, and each has the potential to have an impact on healthcare in its own way. However, if they work together, they could open up new avenues for the delivery of healthcare and, as a result, cut costs while also enhancing patient outcomes. Virtual telepresence, digital twinning, and the blockchain are just a few of the new technologies that are changing their role in metaverse, where are exploring its ability to create a real distributed internet [7]. Technological application of these metaverse technologies, in health care sector is discussed below :

- Telepresense : It is also known as telemedicine, which refers to the practise of providing medical care over the internet or by phone. A spike in interest occurred during the Covid-19 outbreak. Only 43% of healthcare facilities have the capability to treat patients remotely before 2020. Currently, that percentage is at 95% Using a video or phone conversation, doctors and nurses are able to identify that majority of the patients

with minor problems may be treated much more quickly and effectively. than they were able to in the past using only a physical examination. In the metaverse, this will persist. Virtual reality, on the other hand, is a game-changing technology that allows for a higher level of immersion, making it possible for a platform or application to be considered a part of the metaverse.

Patients are no longer constrained by their actual location when it comes to telemedicine sessions, particularly with virtual reality. Put on a pair of headsets, and you'll feel like you're sitting in the same room as the top doctor in India for your particular problem. You can have scans and tests done at a facility near you, and the results can be sent to a specialist no matter where they are located. Particularly important in places like India, where medical personnel are in short supply, and for patients in isolated locations who would otherwise have to travel long distances to see a healthcare professional.

Therapy is another area in which it can be extremely effective. For example, psychologists and psychiatrists are already using virtual reality (VR) in aversion therapy, where patients are able to Interact in a safe environment where every aspect of the encounter may be precisely watched and regulated [7]

- Digital Twin : By creating a digital twin from actual data, researchers can better understand the real-world counterpart they're studying. In the metaverse, patients could have their own digital twins[7].
- Blockchain : The majority of people are familiar with blockchain technology because it serves as the basis for crypto currencies such as Bitcoin. However, blockchains are essentially just distributed encrypted databases that make it possible for data to be stored and exchanged in a secure manner in a way that can only be altered by the data owner themselves. It is widely believed that smart contracts play a critical role in the metaverse concept, as they allow for decentralised communities to be controlled democratically by smart contracts and to keep track of digital "ownership" of digital surroundings or even objects.

Managing and securing the personal health information is the most obvious use case for these technologies in the healthcare industry[7].

Metaverse – Healthcare Challenges:

Healthcare in the metaverse will face issues such as data security, data interoperability, and laws, which necessitates the development of new infrastructure, standards, and processes. The metaverse is confronted with these three major issues: cyber security, privacy, and interoperability. Without addressing these three issues, the metaverse may not flourish as a popular platform and may only serve the game industry. However, once this issue is addressed, it might be used to handle today's healthcare challenges in the most efficient and cost-effective manners possible.[8,9]

Metaverse – Global Market Potential

Health care and the metaverse may seem like an odd couple right now, but experts in the field say they have a lot in common, and hence the healthcare market is explicitly exploring the compatibility and synchronization with metaverse .There are several factors which are expected to drive the market growth, this includes an expanding global patient pool, an increasing demand for patient satisfaction, and advancements in the healthcare sector's technology. Additional factors that are expected to drive market growth include an increasing number of businesses that focus on the metaverse, collaborations to develop advanced augmented reality and virtual reality for increasing patient output along with the environment of surgical procedure, and also to increase investments in research and development activities.[10]

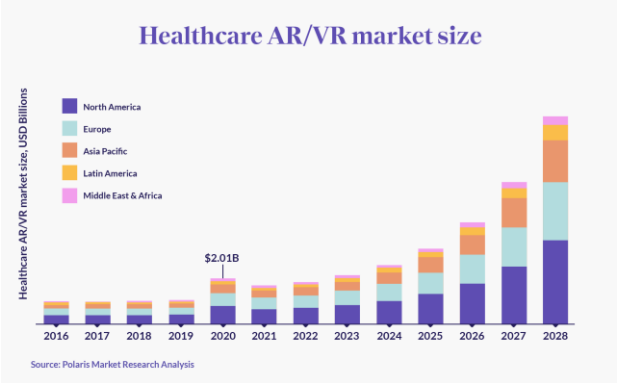

Fig-1 Augmented reality and Virtual Reality Growth Pattern in Health Care – Metaverse[11]

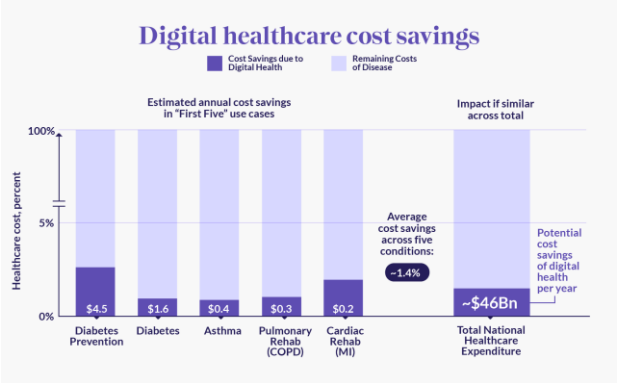

Fig-2 Digital Health Care – Cost savings[11]

The Healthcare Metaverse Segment has seen major breakthroughs. Surgeons in India now have access to ImmersiveTouch Metaverse! A virtual reality organization based in Chicago has partnered with AIIMS to help plan and train surgeons.[12]

- In March 2022, ImmersiveTouch and Mayo Clinic established a Strategic Collaboration.
- In January, 2022, AIIMS(All India Institutes of Medical Sciences, New Delhi), implemented new digital surgery technology from ImmersiveTouch.
- Also, ImmersiveTouch received FDA approval for a new set of medical diagnostic and treatment planning tools, In November 2021.

The Metaverse Market is dominated by firms such as Meta Platforms (Facebook), Roblox, Epic Games, NVIDIA Corporation, Microsoft, Tencent, Intuitive Surgical, and others. New players are expected to enter the healthcare Metaverse market as public awareness of the metaverse grows and government policies become more supportive.

It is becoming increasingly difficult for rivals in the Metaverse to keep up with corporations that are rapidly expanding their networks and infrastructure. Additionally, organisations are employing more up-to-date and safe methods of communication to lessen the impact of external threats.

Conclusion

There has been an explosion of interest in the metaverse concept over the last few years, coming from a wide range of individuals, businesses, and organisations. Next-generation internet infrastructure is being built around it. The potential of Metaverse in healthcare is being explored by tech titans around the world. Every day, the technology that powers the metaverse improves. Its potential medicinal uses are anticipated to advance along with it, and several new players will enter the market as a result.

India is also taking the lead with various collaborations, both in Government and Private sector. The intervention and involvement of metaverse in health care industry is quite promising and one should be optimistic, for the future of health care in Indian subcontinent. The mission of reaching the unreached seems to be quite possible through the implementation of metaverse in health care sector.

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