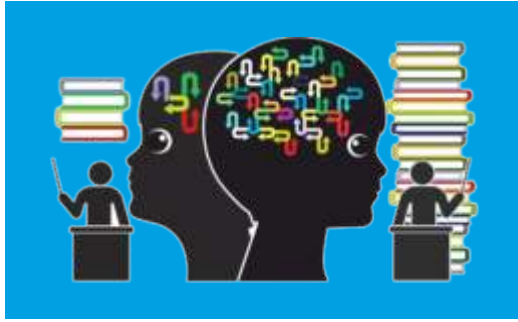# XTIC Chronicle

Special Edition | November 2024

Newsletter of Experiential Technology Innovation Centre
of IIT Madras, Chennai

INSIDE

India's first Academia-Industry XR Summit, AWE Nite, The Future of Learning, Human Wellbeing, Metaverse Meets Mother Earth, XR: A New Frontier for Education and Sustainability, Generative AI: The Architect of Infinite Metaverses, and many more

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About XTIC
Experiential Technology Innovation Centre

XTIC is an Indian Institute of Technology - Madras Community for Experiential Technology. It is India's 1st Research & Product Innovation Centre for Virtual Reality, Augmented Reality, Mixed Reality and Haptics.

CAVE - Consortium for Augmented and Virtual reality (VR/AR/MR) Engineering:

Under umbrella of XTIC, CAVE is the first consortium in India for XR Innovations (VR/AR/MR) in Engineering Mission in India (CAVE), is an India Specific group of academia, industries, startups, government bodies, at the IIT Madras.

CAVE is a part of a bigger vision of the XTIC in which we aim to make India as the XR Corridor for the world. Similar to the phrase "India is the IT corridor of the world", XTIC and CAVE aim to realize "India as the XR Corridor of the world" by 2040.

The CAVE's Engineering Mission is to promote engineering of XR technology development, not just using XR, and adoption of virtual, augmented, and mixed reality globally, particularly in India, with best practices, dialogue with all stakeholders, government policy makers, and research institutions. The CAVE is a resource for industry, academia, consumers, and policymakers interested in virtual, augmented, and mixed reality. CAVE shall have industry and domain specific group like AutoCAVE for Automotive, AeroCAVE for Aerospace, ArchCAVE for Architecture, IoTCAVE for Internet of Things and so on to focus work for adoption in that sector.

The main objective of this consortium is to enable members to create new advanced technologies and applications in XR together. Our research collaboration is with industrial sponsors and participants from industry, academic Institutes, government, Startups, Individuals, Medium Scale Enterprises and members.

What we do?

We are an innovation corridor that exists to support innovation in AR, VR & MR for IIT Madras projects and selected students in their pursuit to explore and guide to the journey of entrepreneurship. We are the catalyst who will accelerate growth, expedite the process, and envision a project or product to completion.

What we offer?

We give a wide array of services to become the innovative power of individuals through a network of highly-curated tutors and advisors, peer-to-peer interaction, and inclusive resource and programming support.

What we believe?

We firmly believe that wisdom paves the way for innovation, collaboration, and fitting together is vital as well. We also trust that by connecting like-minded people with shared goals and similar values, remarkable things happen. We believe in providing all the essential supports for innovation, including physical safety, transparency, empathy, compassion, connection, and the prospect for an inventive collision. We believe in revealing inherent value that can have a deep influence on marketplaces, on the world, and on the individuals, who come across these doors. We also instill our belief, we can be our creators.

Our Technology:
Virtual Reality
Augmented Reality
Mixed Reality
Haptics Technology

Our Labs:
Media Labs, AR/VR Studio, Haptic Lab, Maker Lab and Manufacturing Lab

For more details, please visit and join at
https://xtic.org/cave

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Metaverse to replace traditional lectures as an educational communication tool?

In the current climate of curriculum reforms globally the popular traditional lecture format has come under fire for its perceived lack of effectiveness.

Dr. M Manivannan
Professor
IIT Madras

The lecture format as a teaching style was useful when books and other written materials were either too expensive or not available easily at the time. Not true any more. Lecture was an important tool in the past, maybe from the time it originated in ancient India, where scholars would gather to hear philosophical discussions and debates. In medieval times, lectures were used primarily in religious contexts, where the knowledge and information was restricted to only a few, with scholars delivering sermons to large audiences. In the 19th and 20th centuries, lectures became a central component of formal education that was available for all, with educators using lectures to deliver information to large groups of students. With the advent of new technologies, such as the internet and multimedia tools, lectures have evolved to incorporate a wide range of audiovisual aids and interactive elements.

Despite its long history and continued popularity, the lecture format for learning faces several challenges. One of the major challenges is the passive nature of lectures, which can lead to disengagement and reduced retention of information. Lectures can be a one-size-fits-all approach that does not account for individual differences in learning styles and preferences. It is difficult to maintain students' attention and interest, particularly in the age of digital distractions. Lectures also require a significant amount of preparation and planning, and can be time-consuming to deliver. Finally, the lack of interaction and feedback during lectures can make it difficult for students to clarify their understanding of the material and ask questions.

Fundamentally, the lecture format is inappropriate for engaging students. Only a few students enjoy lectures lasting an hour or longer. Majority of the students have difficulty in acquiring new concepts that they do not yet comprehend. They get disoriented and their minds wander. Many students struggle with words, accents, or phrases. Many pupils are reluctant to express their confusion in a peer group, while others showboats themselves. And the results of unsolicited calling students can be shameful.

Research has shown that significant students show reluctance to express confusion or ask questions during lectures. According to a study published in the Journal of Educational Psychology, 75% of students reported experiencing confusion during lectures, but only 15% of those students actually asked a question to clarify their understanding. Additionally, a survey conducted in 1999 by the National Center for Education Statistics in the US found that only 26% of high school students reported feeling comfortable asking questions in class.

A survey conducted by The Better India found that 60% of Indian students reported feeling too shy or hesitant to ask questions in class, with many citing cultural factors such as respect for authority and fear of appearing unintelligent as barriers to participation. These statistics highlight the need for educators in India to create a supportive and inclusive learning environment where students feel comfortable expressing their confusion and asking questions, particularly in subjects such as engineering and science where a deep understanding of complex concepts is essential. The reasons for this reluctance to express confusion or ask questions vary, but may include fear of embarrassment or judgment from peers, lack of confidence in their own knowledge, or a belief that the instructor should provide all necessary information without prompting.

Although the lecture format is outdated and ineffective, they still remain a valuable means of communicating complex ideas and engaging students in critical thinking and discussion. In fact, the lecture format has evolved in response to the digital era, with many educators integrating multimedia elements such as videos, images, and interactive tools into their presentations. Additionally, live online lectures have become increasingly popular, allowing students to participate remotely from anywhere in the world during a pandemic. Lectures in Youtube videos can be paused and pondered and ask anonymous questions. The digital media through which these lectures are delivered comes with a host of challenges. The use of technology can be a double-edged sword as it can provide access to vast amounts of information, but it can also lead to digital distractions.

Digital distractions are one of the major challenges in engaging students in the cyber age through lecture format. With the widespread use of technology, students are often tempted to multitask and engage in non-academic activities during class, which can reduce their focus and engagement. Students may be tempted to browse social media or engage in other non-academic activities during class, which can reduce their engagement and focus. A survey conducted by Common Sense Media found that 47% of teenagers reported feeling addicted to their smartphones, and 78% checked their devices at least hourly, and they spend an average of 9 hours a day using digital media, including social media, video games, and streaming video. A survey conducted by Pearson Education found that 79% of Indian students reported that they use social media during class, with WhatsApp and Facebook being the most commonly used platforms.

On the positive side, a survey conducted by NPTEL in 2018 found that 82% of students reported that the online courses had a positive impact on their understanding of the subject matter. Additionally, the survey found that 60% of students reported that they completed the courses entirely on their own, without any external motivation or incentives. While this data suggests that NPTEL courses may be effective in engaging students and promoting self-motivated learning, it is important to note that these findings may not be

representative of all online learning contexts in India. Factors such as student demographics, educational background, and access to technology may all play a significant role in student engagement and attention in online courses.

There are several studies that have investigated the impact of advertising on student engagement while using YouTube for educational purposes. According to a report by EdSurge, students spend an average of 10-15% of their time watching advertisements while using YouTube for educational purposes. A study conducted by the University of Rhode Island found that students were significantly more likely to click on an advertisement while watching an educational video on YouTube than while watching a non-educational video. According to a survey conducted by the Indian Society of Advertisers, digital ad spending in India is expected to reach Rs 58,422 crore in 2021, with YouTube being one of the most popular platforms for advertisers to reach a young and engaged audience. However, a study by Common Sense Media found that Indian teens spend an average of 4 hours and 38 minutes per day on their phones, with a significant portion of that time spent on social media and video platforms such as YouTube. These distractions can be particularly problematic during online learning, where students may be more likely to multi-task and engage with non-educational content during class time.

Students checking their digital devices during traditional lectures has added
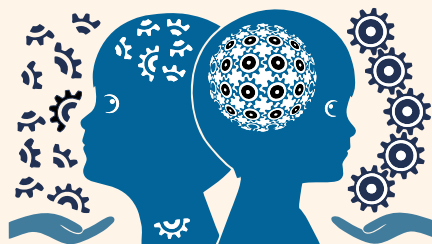
significant distractions. A survey conducted by the University of British Columbia found that 87% of students reported using their smartphones during class for non-academic purposes, such as texting or browsing social media. A study by the University of Nebraska-Lincoln found that students who used smartphones for non-academic purposes during class had lower test scores than students who did not use electronic devices or used them for academic purposes only. Another study by the University of Illinois found that using social media during class was associated with lower academic performance and reduced student engagement.

While technological tools for traditional lectures such as PowerPoint can be useful in enhancing the learning experience, they also can also distract the learners. The overuse of multimedia elements in presentations, such as animations and sound effects, can be distracting and take away from the educational content. The use of technology can promote passive learning, as students may simply sit and watch a presentation without actively engaging in the learning process. This can lead to a lack of critical thinking and reduced interactions and retention of information.

Attention, an important cognitive function, has been negatively impacted by use of digital technologies for learning. Students have developed shorter attention spans for lectures, which can make it difficult for educators to hold their attention for long periods. A study conducted by the National Center for Biotechnology Information at the US National Library of Medicine found that

students have a shorter attention span than ever before, with the average student's attention span ranging from 8 to 12 minutes. According to a study conducted by the Associated Chambers of Commerce and Industry of India, children in urban areas are increasingly prone to distractions due to factors such as digital media, video games, and social media.

In spite of many challenges with the lecture format, both traditional and digital avatar, it is still a popular choice for teachers and policy makers. All the stakeholders of education must be aware of these challenges with the lecture format and work to minimize distractions through the use of effective classroom management strategies. Addressing these challenges requires educators to consider alternative teaching methods that promote active engagement, interaction, and collaboration, while still delivering the necessary information to students.

The metaverse is emerging as a potential alternative to lecture format. It is a virtual space where users can interact with digital objects and other users in real time. In the metaverse, educators can create immersive learning experiences that engage students on a deeper level than traditional lectures. For example, students could explore a virtual representation of a historical site or scientific concept, interact with digital simulations, and collaborate with peers in real time. Additionally, the metaverse offers opportunities for personalized learning and self-directed exploration, as students can move at their own pace and pursue their own interests within the virtual space. However, the metaverse is still in its early stages of development, and there are many questions about how it will be integrated into traditional educational settings.

India's First Academia-Industry XR Summit:

A New Era of Collaboration and Innovation

> The upcoming XR Summit by XTIC marks a historic milestone as India's first XR event co-hosted by both academia and industry. While India has seen various AR/VR gatherings, these have traditionally been industry driven. This summit breaks new ground by uniting the academic and industrial sectors, a collaboration essential for nurturing innovative, skilled XR talent. Without this partnership, there's a risk of reducing young Indian talent to mere "digital laborers" in the XR space - a scenario this summit aims to prevent.

Rabindra Sah
Chief Technology Officer
Indian Register of Shipping

Distinguished global XR leaders, including Steve LaValle attending in person, and prominent figures such as Mel Slater and Mandayam Srinivasan from MIT Touch Lab participating online, will headline this event. Participants will have unique opportunities to network with industry experts, startups, and government agencies, gaining valuable insights and exposure to the latest trends and technologies in XR.

An exclusive highlight is the collaboration with the Augmented World Expo (AWE), a global VR/AR event that has been inspiring XR professionals since 2010. This summit will feature a special AWE Evening, offering a glimpse into what will eventually evolve into a full-fledged AWE event in India by 2026, with this year's participation serving as a trial run.

The summit will also celebrate the inaugural event of the CAVE consortium, established in 2022, with award presentations to recognize and promote

leading startups in the XR industry, fostering stronger networking within this rapidly growing field.

Adding to the excitement, the summit will coincide with the completion of an NPTEL course co-taught by myself and Steve LaValle, in which nearly 600 participants took part. The top 10% of students based on their performance will be specially invited to join the summit, underscoring the commitment to bridging academic learning with industry experience.

This summit not only sets the stage for ongoing innovation in XR but also marks the beginning of an annual tradition, with plans to expand internationally to New York and Los Angeles in 2025.

EXPOSURE THERAPY
USING
EXTENDED
REALITY

Prateek Khanna
Director
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Exposure therapy, a cornerstone in psychological treatment, has witnessed a transformative evolution with the advent of Extended Reality (XR). By immersing patients in simulated environments, XR offers a controlled and graduated approach to confronting fears and anxieties, **often yielding more rapid and enduring results than traditional methods.**

The World Health Organization (WHO) estimates that 19.1% of the global population suffers from some kind of anxiety disorder, which includes phobias. In other words 1 in 5 people experience some anxiety disorder, including phobias, in their lifetime. This translates to approximately 1 billion people worldwide suffering from anxiety disorder.

At its core, exposure therapy involves gradually exposing individuals to the situations or objects they feel anxious about. This process, whether in traditional or XR formats, is grounded in the principles of classical conditioning, where a conditioned fear response is gradually extinguished through repeated exposure.

Key advantages of exposure therapy include:

a) **Gradual Desensitization:** By systematically exposing individuals to feared stimuli, the therapy helps to reduce anxiety responses over time.

b) **Cognitive Restructuring:** Exposure therapy challenges distorted thoughts and beliefs about feared situations, promoting more adaptive thinking patterns.

c) **Behavioral Change:** Through repeated exposure, individuals learn to engage in behaviors they previously avoided, leading to increased self-efficacy.

d) **Improved Quality of Life:** Successful exposure therapy can significantly enhance individuals' daily functioning and overall well-being.

e) XR technology amplifies these advantages by providing highly immersive and customizable environments. For instance, a patient with acrophobia (fear of heights) can

be virtually placed on a skyscraper's edge, allowing them to confront their fear in a safe and controlled setting. The progression of exposure can be meticulously calibrated, ensuring a gradual desensitization process.

One of the most significant advantages of XR in exposure therapy is its ability to simulate a wide range of phobic stimuli. From claustrophobia to social anxiety, XR can recreate these environments with remarkable realism. This versatility expands the scope of treatment, making it accessible to a broader patient population. Moreover, XR offers opportunities for exposure to situations that might be impractical or ethically challenging in real life, such as combat-related trauma or natural disasters.

Beyond phobias and anxiety disorders, XR-based exposure therapy has also shown promise in treating post-

traumatic stress disorder (PTSD). By recreating elements of traumatic experiences in a controlled virtual setting, individuals can gradually process and reframe their memories, leading to reduced symptoms of PTSD. Additionally, XR has potential applications in treating obsessive-

compulsive disorder (OCD) by exposing patients to their feared situations or objects in a virtual environment.

While XR holds immense promise, it is also essential to appreciate its limitations. Issues such as simulator sickness, the need for specialized equipment, and the potential for over-reliance on technology require careful consideration. Additionally, the integration of XR into therapeutic practice demands specialized training for clinicians.

Despite these challenges, the potential

benefits of XR in exposure therapy are undeniable. As technology continues to advance, we can anticipate even more sophisticated and effective applications of XR in mental health treatment. From haptic feedback that simulates physical sensations to AI-driven adaptive treatment plans, the future of XR in exposure therapy is bright. By combining the power of virtual environments with therapeutic expertise, XR is poised to revolutionize the way we address phobias, anxieties, and traumas.

AR AND VR TECHNOLOGY IN PLANNING AND DESIGN OF AIRPORTS:
A Revolution in Aviation Infrastructure

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Augmented Reality (AR) and Virtual Reality (VR) technologies are transforming various sectors, and the aviation industry is no exception. These technologies are proving to be game-changers in the planning and design of airports, offering innovative solutions that enhance efficiency, safety, and passenger experience. This article delves into the impact of AR and VR on airport design and planning, with a focus on Indian case studies to illustrate their practical applications and benefits.

Understanding AR and VR in Airport Design

AR and VR technologies provide immersive experiences that can significantly aid in the planning and design phases of airport construction and renovation. AR overlays digital information onto the real world, enhancing the perception of the physical environment. In contrast, VR creates a completely virtual environment, allowing for detailed simulations and walkthroughs.

These technologies facilitate various aspects of airport design, including:

Visualization and Simulation: Architects and planners can create detailed 3D models of airport layouts, enabling stakeholders to visualize the design before construction begins. This helps in identifying potential issues and making informed decisions.

Training and Safety: VR can simulate emergency scenarios and operational processes, providing staff with realistic training experiences without any risk. This enhances preparedness and safety protocols.

Passenger Experience: AR can be used to improve the passenger experience by providing real-time information and navigation assistance within the airport, reducing stress and improving overall satisfaction.
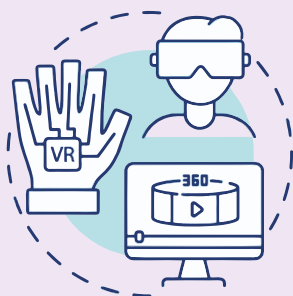
AR and VR in Indian Airports:

India, with its rapidly growing aviation sector, has been an early adopter of AR and VR technologies in airport design and operations. Here are a few notable examples:

1. **Kempegowda International Airport, Bengaluru**

   Kempegowda International Airport (KIA) is one of the pioneering airports in India to integrate AR and VR technologies in its planning and operations. The airport authority employed VR to simulate the design and layout of its second runway and terminal, allowing stakeholders to experience the design in a virtual environment. This helped in making crucial design adjustments before

actual construction, saving time and costs. Additionally, AR has been implemented to enhance the passenger experience. The airport offers an AR-based navigation app that helps passengers find their way through the terminal, locate amenities, and receive real-time flight updates.

2. **Chhatrapati Shivaji Maharaj International Airport** has utilized VR technology for training and operational purposes. The airport's management has developed VR-based training modules for security personnel, simulating various scenarios like security breaches and emergency evacuations. This has significantly improved the readiness and efficiency of the airport's security staff.The airport also employs AR to assist ground staff in maintenance and repair tasks, overlaying critical information on real-world equipment, thus enhancing accuracy and reducing downtime.

3. **Indira Gandhi International Airport, New Delhi**

   Indira Gandhi International Airport (IGIA) in New Delhi has integrated AR and VR technologies to streamline its design and planning processes. During the planning of its Terminal 3 expansion, VR was used to create detailed virtual models of the new terminal. This allowed designers and engineers to explore different design options and identify potential bottlenecks in passenger flow and logistics.Moreover, AR is being used to provide passengers with an interactive and engaging experience. IGIA's AR-enabled mobile app offers features such as virtual shopping, where passengers

can view and purchase products from airport stores through their smartphones.

Benefits and Future Prospects

The integration of AR and VR in airport planning and design offers numerous benefits, including:

Cost and Time Efficiency: By identifying and addressing design issues in the virtual phase, airports can avoid costly modifications during construction.

Enhanced Safety: VR-based training ensures that staff are well-prepared for emergencies, leading to improved safety standards.

Improved Passenger Experience: AR applications provide passengers with useful information and assistance, making their journey through the airport smoother and more enjoyable.

Looking ahead, the adoption of AR and VR in airport design is expected to increase, driven by advancements in technology and the growing demand for efficient and passenger-friendly airports. The Indian aviation sector, in particular, stands to benefit significantly from these innovations as it continues to expand and modernize its infrastructure.

AR and VR technologies are revolutionizing the planning and design of airports, offering innovative solutions that enhance efficiency, safety, and passenger satisfaction. Indian airports like Kempegowda International Airport, Chhatrapati Shivaji Maharaj International Airport, and Indira Gandhi International Airport are leading the way in leveraging these technologies to create state-of-the-art aviation hubs. As these technologies continue to evolve, their impact on airport design and operations is set to grow, heralding a new era of smart and efficient aviation infrastructure.

THE FUTURE OF LEARNING:
Embracing VR and AR in Education

Harish
Digital Marketing Executive
Vreon Tech India Private Limited

The way that technology is developed is changing the nature of education. Virtual reality (VR) and augmented reality (AR), revolutionizing how students learn and interact with information, are two of the most promising innovations. Institutions can provide immersive, captivating, and customized learning experiences that meet the varied requirements of students by incorporating VR and AR into the classroom. This blog will examine the possibilities for VR and AR in education, going over their advantages, difficulties, and prospective applications..

Understanding VR and AR in Education

Before delving into the applications of VR and AR in education, it's essential to understand what these technologies entail. Virtual Reality (VR) creates a fully immersive environment that allows users to experience a different reality through the use of headsets and other devices. Augmented Reality (AR), on the other hand, overlays digital information onto the real world, enhancing the user's perception of their surroundings. When applied in educational settings, VR and AR in education can transform traditional learning methods into dynamic and interactive experiences.

Benefits of VR and AR in Education

The integration of VR and AR in education offers numerous advantages that can enhance the learning process significantly.

Enhanced Engagement and Motivation

One of the most significant benefits of using VR and AR in education is the increase in student engagement and motivation. These technologies make learning more interactive and enjoyable, capturing students' attention and encouraging them to participate actively in their education.

Personalized Learning Experiences

VR and AR in education provide personalized learning experiences that cater to individual student needs and learning paces. By allowing students to explore content at their own speed, these technologies help to ensure a deeper understanding of the material.

Improved Retention and Comprehension

Research have indicated that when students are able to truly participate with the material, they recall it better. Through the use of VR and AR in the classroom, students can directly experience difficult subjects, improving their comprehension and long-term memory.

Safe and Controlled Learning Environments

VR and AR in education offer safe and controlled environments where

students can experiment and learn without real-world consequences. For example, medical students can practice surgeries in a virtual setting, gaining valuable experience without any risk.

Applications of VR and AR in Education

The use of VR and AR in education spans various fields and subjects, offering unique applications that enhance learning outcomes.

Science and Medicine

Virtual reality (VR) and augmented reality (AR) in science and medicine can give students lifelike models of intricate systems and processes. For example, medical students can perform surgery in a virtual operating room, while biology students can examine the human body in three dimensions.

History and Social Studies

Students studying social studies and history can go back in time and experience historical events firsthand thanks to the use of VR and AR in the classroom. Students can gain a deeper grasp of the past by using virtual reality to explore ancient civilizations or see important historical episodes.

Arts and Design

VR and AR in the classroom give students studying art and design additional avenues for project creation and visualization. With the use of these technologies, students can enhance their creative process by designing 3D models or visualizing their artwork in various settings.

Challenges of Implementing VR and AR in Education

Despite the numerous benefits, there are challenges associated with implementing VR and AR in education.

Cost and Accessibility

One of the primary challenges of adopting VR and AR in education is the cost of the technology and its accessibility. Schools and institutions may face budget constraints, making it difficult to provide the necessary equipment for all students.

Technical Issues and Support

The use of VR and AR in education requires technical expertise and support to ensure smooth operation. Schools need to invest in training educators and IT staff to handle any technical issues that may arise.

The Future of VR and AR in Education

The future of VR and AR in education

looks promising, with advancements in technology making these tools more accessible and affordable. As more institutions recognize the potential of VR and AR in education, we can expect to see widespread adoption and integration into various educational programs.

Increased Adoption and Integration

As technology continues to advance, VR and AR in education will become more prevalent. More schools and institutions will integrate these technologies into their curricula, providing students with innovative and engaging learning experiences.

Conclusion

The integration of VR and AR in education marks a significant shift in how students learn and interact with information. By offering immersive and personalized learning experiences, these technologies have the potential to revolutionize education and prepare students for the challenges of the future. While challenges remain, the benefits of VR and AR in education far outweigh the obstacles, making them essential tools for the modern classroom. As we continue to embrace these innovations, the future of education looks brighter than ever.

Navin Manaswi
CEO
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GENERATIVE AI:
The Architect of Infinite Metaverses

Imagine stepping into a universe that's not bound by the laws of physics, a realm where your wildest dreams take shape at the speed of thought. This is the promise of the Metaverse, a digital frontier that is poised to reshape our lives. Yes, that is sort of "Ready Player Me". But how do we build such vast and immersive digital worlds? The answer lies in the extraordinary potential of Generative AI.
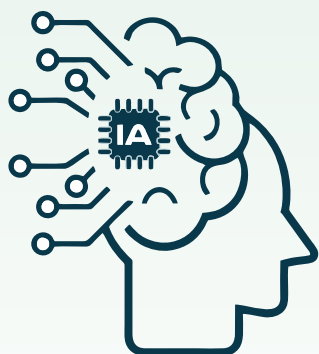
Generative AI, the technology capable of creating everything from art and music to code and entire simulations, is the key to unlocking the Metaverse's infinite possibilities. It's like having a legion of architects, designers, and storytellers at your fingertips, all tirelessly working to construct virtual experiences beyond our imagination. **Generating 3D contents** including Avatars and **3D reconstruction** are the basic requirements of the Metaverse. **Interactive Storytelling and Personalization of the 3D world** are the key factors of successful Metaverses. So we can see GenAI as the key enabler of the Metaverse.

Mark Zuckerberg, CEO of Meta, shares this vision, stating, "We believe the Metaverse will be the successor to the mobile internet and we believe that Generative AI is going to be the foundational technology that makes this possible."

This isn't just about creating visually stunning environments; it's about crafting living, breathing digital worlds. Generative AI can populate these worlds with unique characters, each with their own personalities and backstories. It can

generate dynamic narratives that unfold based on user interactions, creating truly personalized experiences.

NVIDIA CEO Jensen Huang sees Generative AI as the catalyst for a new era of creativity. **"Generative AI is as significant as the invention of the PC itself,"** he declares. "It's a technology that will impact every industry."

The impact on the Metaverse is already evident. Companies like Roblox are using Generative AI to empower users to create their own games and experiences, leading to a surge in user-generated content. Startups like AI Dungeon, KoBoldAI are utilizing AI to generate interactive text-based adventures, blurring the lines between storytelling and gaming.

We can see the rise of startups that use Generative AI to accelerate the Metaverse. Startups like Promethean AI, Anything World are building 3D content runtime; Startups like Fable Studio, Arcturus, Replica Studio are building Avatars, volumetric video capture and voice overs. Startups like Latitude, InworldAI, DeepStory and Hidden Door are building personalized and interactive gaming environments. On top of that, NVIDIA's Omniverse platform is a powerful toolset for creating and collaborating on 3D worlds and

simulations, utilizing AI for various tasks like physics simulation and asset generation.

In parallel, Metaverse related Hardware development also starts using Foveated Rendering and Adaptive Resolution for

Content Optimization, Ergonomics and Thermal management for Design

Optimization and Virtual Prototyping and User Testing for Testing and Validation. All the above approaches are being powered by Generative AI.

While the potential is immense, it's important to acknowledge the challenges ahead. Ensuring that Generative AI is used responsibly and ethically is crucial. Striking the right balance between human creativity and AI assistance will be key to creating truly meaningful Metaverse experiences.

As Satya Nadella, CEO of Microsoft, aptly puts it, **"We are at the dawn of a new era of AI. Our goal is to democratize AI, to make it accessible to everyone, and to use it to solve the world's biggest challenges."**

The Metaverse, powered by Generative AI, holds the promise of connecting us in ways we never thought possible. It could revolutionize education, entertainment, work, and even social interaction. It's a future where our imagination is the only limit, and where Generative AI is the architect of our dreams.

The journey is just beginning, but one thing is clear: Generative AI is set to redefine our digital landscape, and the Metaverse is the ultimate canvas for this technological revolution. The possibilities are infinite, and the future is waiting to be built.

EXPLORING THE METAVERSE:
A Balanced Look at the Next Internet

In this dynamic landscape, understanding our role in adapting to new technologies is critical. Recognizing this, I wrote Exploring the Metaverse : Redefining the Reality in the Digital Age to provide insights that separate inflated expectations from genuine opportunities. The book equips you with a balanced and informed perspective on the promises and challenges of the metaverse.

Exploring the metaverse in five parts:

Defining the metaverse: Delve into the history of digital revolutions and the origin of the metaverse. We'll explore various definitions, expert perspectives, and address common misconceptions to arrive at a well-rounded understanding.

Building blocks of the metaverse:

Explore the technological foundation of the metaverse, including XR, IoT, Cloud, Blockchain, and advancements in AI. You'll gain insight into how these advancements collectively pave the way for the metaverse.

The metaverse in action: Explore hundreds of use cases of real-world applications spanning diverse industries. From revolutionizing gaming & entertainment to fostering virtual social interactions, transforming travel

Kuldeep Singh
Head of XR Technologies
Thoughtworks Technologies
India Pvt. Ltd.
Gurgaon

The term "metaverse" has become a buzzword, encompassing everything from virtual game worlds to the next iteration of the internet. While some may dismiss it as hype, immersive technologies like XR are quietly integrating into our daily lives through social media, virtual collaboration, and digital experiences. Computer vision and AI are constantly blurring the lines between the physical and virtual worlds.

experiences, enhancing fitness routines, and revolutionizing healthcare practices. Discover how the metaverse is reshaping retail and commerce by reimagining property and assets. Moreover, witness the enterprise

metaverse's capacity to enhance skilling and reskilling efforts, while ensuring greater compliance with safety standards

Metaverse concerns:

While the Metaverse offers exciting possibilities, it also presents potential pitfalls. This section addresses concerns regarding identity protection, privacy, and sustainability, ensuring readers are aware of potential risks.

Making of the metaverse:

Understand metaverse solution ecosystem, technologies and tools. Focus on shaping up standards and practices. Learn about the ongoing collaborative efforts to strengthen the technology while fostering awareness and responsible adoption among academia, industry, governing bodies, and the public.

Join the Conversation:

"Exploring the Metaverse" concludes with a call to action, urging collaboration and responsible engagement from all stakeholders. The book empowers you to be part of shaping the future of technology, and the next internet.

https://www.amazon.in/Exploring-Metaverse-Redefining-reality-digital-ebook/dp/B0D1QR28RT-

https://in.bpbonline.com/products/exploring-the-metaverse

Unveiling the Metaverse: Exploring the Next Frontier of Digital Reality

The internet has evolved through different phases:

- **Web 1.0:** A decentralized, local, and 2D internet focused on text-based information and community-driven forums.

- **Web 2.0:** Our current internet, centralized and controlled by a few major companies. It includes texts, images, audio, and video, and is truly global but still 2D.

- **Web 3.0 (The Metaverse):** A decentralized, global, and 3D internet. It incorporates all current formats of information and is immersive by design.

Unlike the 2D internet, the 3D Metaverse allows for spatial memories and a more humanized interaction. It includes:

- **Virtual Reality (VR):** Complete immersion in a virtual world.

- **Augmented Reality (AR):** Overlaying virtual elements onto the physical world without interacting with it.

- **Mixed Reality (XR):** Interacting with both virtual and physical worlds simultaneously.

An example of interactive reality is the "Portal installation" between New York and Dublin. These portals, with their mono-circular screens, provided 24/7 live video streams of the streets in both

SACRED SPACES IN METAVERSE

The Metaverse, or 3D Internet, isn't just a technological innovation—it's poised to significantly impact our society, culture, and lifestyles. To understand why, let's look at the past and the potential future of the internet. When the internet first emerged, many dismissed it as a fad. Few anticipated how it would revolutionize the world, evolving from simple text exchanges to sharing live experiences globally.

cities. However, the portals had to be temporarily closed due to incidents of people cursing and engaging in discriminatory acts. This article came to me with the title - "Portal Installation temporarily closed due to Public behavior". I'll tie this example later on within this article.

The Rise of Social Media and Impact on Culture

Social media, a significant byproduct of the internet, has deeply integrated into our daily lives. It has become

Preyan Mehta
Creative Generalist
CEO and Owner
Preyan Mehta Labs

synonymous with the words Internet and Mobile Phones not just within Social discussions, but also within Scientific Publications. It mirrors physical social interactions in a digital space—urban squares are like Meta feeds, cafes like WhatsApp groups, and posters like Meta ads. Despite its benefits, social media is often blamed for issues like shortened attention spans, FOMO (Fear Of Missing Out), increased suicide rates among the youth to name the few. The Metaverse's immersive nature could significantly alter our cultural fabric. Web 2.0 has already shown how digital interactions can lead to both positive movements (like "Black Lives Matter") and negative consequences (like the spread of misinformation and anonymity-driven irresponsibility).

This disruption stems from our brains struggling to handle the vast scale of global interactions facilitated by algorithms that prioritize attention-grabbing negative content over positive content. For example the article regarding the "Portal Installation" surfaced for me with a Negative connotation, instead of Positive because the algorithm wants people to click on it.

The Future of Sacred Spaces in the Metaverse

Sacred spaces, such as temples, mosques, churches etc hold deep spiritual and cultural significance. These places are often seen as sanctuaries where individuals gather to seek peace, connect with the divine, and find community. In the Metaverse, these sacred spaces might transform into entirely new forms, blending technology with spirituality in ways we've never experienced before. Imagine entering a vast space inspired by cosmos, where an AI-powered, personalized deity interacts with you. This virtual god, imbued with artificial intelligence, could answer your questions in real time, providing guidance and support tailored specifically to you. The experience would be immersive, with the AI communicating through a humanized voice, creating a sense of personal connection and spiritual presence. These virtual sacred spaces would not be confined by physical limitations. They could connect people from all over the world, allowing for a shared spiritual experience that transcends

geographical boundaries. At the same time, they could foster local communities by creating virtual environments that feel familiar and culturally significant. For example, imagine a digital version of your house or your city, but instead of people and amenities you could find quests which would help you find the spiritual answer you were seeking while interacting with the AI.

The integration of these sacred spaces into the Metaverse would offer a continuous and personalized spiritual experience. For instance, you could access your virtual place of worship at any time, from anywhere, and still feel a profound sense of connection and belonging. The immersive nature of the Metaverse would enable these experiences to be rich and engaging, activating all your senses and creating a powerful spiritual journey. Additionally, these virtual sacred spaces could be linked to physical locations, creating a hybrid experience. For example, a person could only enter a certain Virtual experience by entering a specific area in a a physical temple.

In conclusion, the Metaverse represents not just a technological advancement but a profound cultural shift. It will reshape how we interact, socialize, and find meaning in our digital age. By blending technology with our deepest spiritual and cultural traditions, the Metaverse could create new ways for us to connect with each other and the divine, making the world feel both smaller and more interconnected than ever before. This transformation will redefine our notions of community, spirituality, and the sacred, leading us into a new era of digital and cultural evolution.

"Avatars and Branded Gear:

Crafting Digital Personas in Immersive Virtual Narratives"

Aditya Mani
Founder
Yologram Style Private Limited

The Role of Avatars in Digital Persona Creation

Avatars serve as the primary interface between users and the virtual world, acting as a digital extension of their identity. The design and customization of avatars allow users to project their desired self-image, blending reality with aspiration. This process of avatar creation is not merely cosmetic; it is deeply tied to the psychology of identity formation. Users select attributes, attire, and accessories that align with their personality, social status, and cultural affiliations.

YOLOgram's advanced avatar platform exemplifies the importance of these digital representations. By offering a wide range of customization options, from facial features to fashion choices, YOLOgram enables users to create avatars that are both unique and reflective of their individual identities. The company's emphasis on high-quality visuals and realistic textures ensures that these avatars are not only aesthetically pleasing but also immersive, allowing users to fully embody their digital personas within virtual environments.

Introduction

In the digital age, the concept of identity has transcended the physical realm, extending into virtual spaces where avatars serve as digital representations of users. These avatars are not merely placeholders; they are carefully crafted personas that embody the traits, preferences, and aspirations of their creators. With the rise of immersive technologies, such as augmented reality (AR) and virtual reality (VR), these digital personas have become central to the user experience in virtual environments. The integration of branded gear within these narratives further enhances the depth and authenticity of these personas, subliminally influencing user behavior and brand perception.

This paper explores the role of avatars in shaping digital personas and the strategic placement of branded gear within immersive stories, drawing on the expertise and innovations pioneered by YOLOgram, a leader in the field of digital fashion and avatar creation.
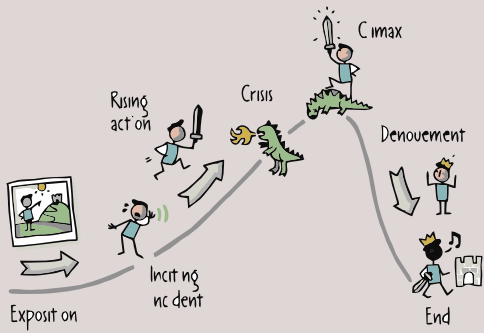
Subliminal Branding in Immersive Narratives

Incorporating branded gear within the narrative framework of virtual environments is a powerful tool for influencing consumer behavior. Unlike traditional advertising, which can be intrusive and disruptive, subliminal branding within immersive stories is seamless and organic. When users equip their avatars with branded attire or accessories, they are not just consuming a product; they are integrating it into their digital identity. This form of branding is highly effective because it leverages the emotional connection users have with their avatars.

YOLOgram's approach to integrating branded gear within its immersive platforms is a testament to the effectiveness of this strategy. By collaborating with leading fashion brands, YOLOgram offers users the opportunity to outfit their avatars in designer gear, which not only enhances the visual appeal of the avatar but also subtly reinforces brand loyalty. This integration is done in a way that feels natural to the user experience, ensuring that the branding message is both received and embraced without disrupting the immersive narrative.

Use Cases and Impact

Several use cases illustrate the impact of avatars and branded gear in shaping digital personas and influencing consumer behavior. In one example, YOLOgram partnered with a luxury

fashion brand to create a limited-edition virtual collection. This collection was made available exclusively to avatars within a popular virtual world, where users could purchase and wear the items. The virtual collection quickly became a status symbol within the community, driving demand for both the virtual and real-world versions of the items. Another use case involved the integration of branded gear within a narrative-driven AR experience. Users could unlock exclusive gear for their avatars by completing in-game challenges, creating a sense of achievement and further deepening their connection to the brand. These examples highlight how subliminal branding within immersive narratives can drive engagement, foster brand loyalty, and ultimately influence purchasing decisions.

Conclusion

As digital personas become increasingly integral to the user experience in virtual environments, the role of avatars and branded gear in shaping these identities cannot be overstated. YOLOgram's innovative approach to avatar creation and subliminal branding demonstrates the potential of these technologies to not only enhance user immersion but also drive brand engagement in a meaningful way. As immersive technologies continue to evolve, the intersection of digital identity and branded content will likely become a key area of focus for both researchers and industry professionals alike.
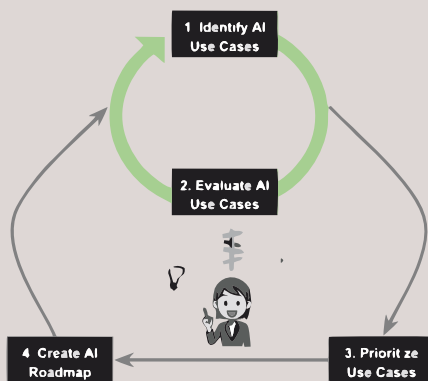
METAVERSE MEETS MOTHER EARTH:
Extended Reality's Green Revolution

Arkarag Chaudhuri
Industry Analyst
Zinnov Management Consulting
Bangalore

XR: A Game-Changer in Environmental Communication

The way we communicate in sustainability and environmental sciences is on the brink of a radical transformation, thanks to the rapid advancement of extended reality (XR) technologies. The Metaverse, an immersive digital space gaining momentum, is positioning XR to create a deeper, more urgent pro-environmental mindset across global audiences. As the climate crisis escalates, so too does the need for innovative approaches to communicate the complexities of environmental challenges. XR offers a new frontier in this effort, transforming how we experience and engage with sustainability data.

Exploring the Realities: VR, AR, and MR in Action

XR is an umbrella term for virtual reality (VR), augmented reality (AR), and mixed reality (MR), each playing a unique role in this evolution. VR transports users into fully digital environments, allowing for a complete immersion in simulated ecosystems or environmental phenomena. AR layers digital objects onto real-world surroundings, offering a dynamic and enhanced view of our environment. MR, a blend of the two, enables interactions between real and virtual elements, fostering an experience that merges physical reality with digital insights. Together, these technologies can go beyond traditional forms of communication, opening up new pathways for education, awareness, and action.

The Rise of Augmented Econarratives: Engaging with Immersive Storytelling

Where traditional media may rely on linear storytelling or static data

presentations, XR enables what can be called an augmented econarrative—an experience-rich, interactive way of conveying scientific information. Imagine walking through a simulated Amazon rainforest, experiencing deforestation in real-time, or seeing rising sea levels swallow coastal cities through VR. These types of immersive experiences not only present scientific facts but also invite users to engage emotionally, fostering an eco-agency—the capacity to take informed, proactive steps in environmental preservation.

Revolutionizing Education: XR in the Classroom

One sector where XR's influence is already making waves is education. The COVID-19 pandemic pushed schools into an unprecedented phase of home-based learning. As classrooms closed, the limitations of traditional education

became glaringly apparent. Teachers, students, and institutions struggled with connectivity issues, limited access to digital devices, and the need to engage students remotely. In response, XR has emerged as a potential solution to these challenges, offering immersive, interactive learning experiences that could revolutionize how environmental sciences are taught. The potential for XR in environmental education is enormous. For students, the opportunity to "visit" endangered ecosystems, explore the effects of pollution, or simulate solutions to climate

challenges could make sustainability issues more relatable and urgent. Educators could better illustrate complex concepts through virtual or augmented experiences, making lessons more engaging and impactful. By bridging the gap between data and experience, XR not only enhances learning but also motivates action, potentially inspiring the next generation of environmental stewards.

Bridging Virtual and Real: XR's Impact on Sustainability Awareness

As we look to the future, XR's role in shaping the narrative of environmental science communication cannot be understated. By offering a tangible,

immersive connection to ecosystems and environmental data, this technology could help accelerate the shift toward a more sustainable world. The Metaverse and XR are not just buzzwords; they represent a new era of communication, where the environment is no longer an abstract concept but a lived, interactive experience. The challenge now is to

Image Courtesy: Unsplash

harness this potential responsibly and effectively to ensure that the next chapter in sustainability communication drives real-world change.

XR: A Catalyst for Change in Sustainability

The rapid expansion of extended reality (XR) is transforming how we approach environmental challenges. Companies like Lenovo, Meta, Pico, and HTC VIVE are leading the charge with innovative hardware, while seamless integration with software is driving immersive learning and collaboration. XR allows us to experience environmental data in real-time, making abstract concepts feel tangible and urgent. As this technology evolves, it holds the potential to inspire unprecedented action. But the real challenge is whether we are ready to harness this power for meaningful, lasting change. The future of sustainability is no longer just about raising awareness—it's about immersive, interactive engagement that has the power to reshape our world for the better.

Explore a World

XR SUMMIT
2024
November 16-17

IIT MADRAS TO HOST INDIA'S FIRST ACADEMIA-INDUSTRY XR SUMMIT

Thriveni P
Sr. Program Coordinator
XTIC, IIT Madras

The XR Summit at XTIC, IIT Madras, aims to bridge academia and industry, featuring global XR pioneers like Oculus co-founder Steve LaValle, MIT Haptics Lab founder Prof. Mandayam Srinivasan and Prof. M. Manivannan, Faculty Head, XTIC, IIT Madras

eXperiential Technology Innovation Centre (XTIC), an IIT Madras Institute of Eminence Centre in Virtual Reality and related fields, is hosting India's first Academia-Industry supported 'eXtended Reality' (XR) Summit.

'eXtended Reality' (XR) refers to Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR). IIT Madras is uniquely positioned to lead this effort, thanks to its cutting-edge Haptics Lab and the IoE Center for VR and Haptics.

Extended Reality (XR) key 2024 trends:

- Enhanced Hardware: XR devices are now more powerful and compact, with improved headsets offering higher refresh rates and better resolution, making VR/AR more accessible without external computing.

- AI Integration: AI enhances XR through smarter, adaptive experiences, real-time object recognition, improved NPC behavior in VR, and AI-driven tools speeding up content creation.

- Enterprise Adoption: Industries like healthcare and education use XR for training, remote assistance, and data overlay, boosting productivity.

- Metaverse Growth: XR drives the metaverse as a social and work tool, merging digital and physical spaces for collaborative, immersive remote work.

- Inclusivity: Features like voice control and customizable interfaces are expanding XR access to users with disabilities.These trends point to a future where digital and physical realities merge seamless.

The XR Summit, scheduled to be held on 16th and 17th November 2024 at IIT Madras campus, will bring together key stakeholders in experiential technology at a pivotal moment in the era of rapid technological advancements and digital transformation. As 'Digital India' continues to rise, it is vitally crucial to evaluate the current landscape of experiential technologies and address the existing skill gaps to ensure sustainable growth and innovation.

Global XR leaders will be addressing in the event. Prof. Steve LaValle, the co-founder of popular Oculus, Prof. Mandayam Srinivasan the founder of MIT Hapticslab, Prof. Mel Slater, XR Psychology, and others are few of the keynote speakers.

The Last Date to register for this Summit is 9th November 2024. Industries, Start-ups and Researchers working in the extended Reality Sector can register through the following link - https://xtic.org/xr-summit or https://xrsummit.xtic.org The XTIC is India's First Research & Product Innovation centre for Virtual Reality, Augmented Reality, Mixed Reality and Haptics. It is working towards creating an innovation corridor to support innovation in AR, VR and MR for IIT Madras projects and selected students in their pursuit to explore and guide to the journey of entrepreneurship.

Highlighting the significance of this Summit, Prof. M. Manivannan, Faculty Head, XTIC, IIT Madras, said, "This event marks India's first Academia-Industry supported XR Summit. While there have been numerous AR/VR events in India, previous XR gatherings were exclusively industry-led. The XR Summit is unique in bringing together academia and industry, a crucial collaboration for driving innovation. Without this partnership, there is a risk that young talent in India could be reduced to mere 'digital labourers' in the XR field."

Prof. M. Manivannan, also the Head of Haptics Lab and a faculty in the Department of Applied Mechanics and Biomedical Engineering, IIT Madras, added, "Global XR leaders like Steve LaValle will be attending in person, with others such as Mel Slater and Mandayam Srinivasan from MIT Touch Lab joining online. The event also offers opportunities to network with industrialists, startups, and government agencies, alongside the chance to meet global XR experts."

Prof. M. Manivannan was a visiting Scientist at the Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts General Hospital (MGH) of Harvard Medical School (HMS) in Boston, National Institute of Standards and Technology (NIST), Maryland This summit will also feature collaboration with 'AWE' (Augmented World Expo), a premier global VR/AR event since 2010 that has been inspiring a community of professionals, innovators, and creators in XR. This year, XTIC, IIT Madras, will host an exclusive 'AWE Evening' during the summit, laying the groundwork for a full fledged AWE event in India by 2026.

As the inaugural event for the CAVE consortium founded in 2022, XTIC, IIT Madras, will also be announcing several awards to honour and promote the contributions of startups in XR, creating further networking opportunities within the industry.

Keyur Bhalavat
Founder & CEO
Plutomen Technologies
Private Limited

Imagine a classroom where students can travel back in time to witness historical events, dive into the depths of the ocean to study marine life, or even experience the effects of climate change firsthand. This is no longer a dream, but a reality made possible by Extended Reality (XR) technologies.

XR, encompassing Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), offers immersive, interactive, and impactful learning experiences. By blurring the lines between the physical and digital worlds, XR has the potential to revolutionize education and sustainability.

XR: A New Frontier for Education and Sustainability

XR in Education: A Paradigm Shift

XR is transforming traditional education methods by providing:

- **Immersive Learning Experiences:** By creating realistic simulations, XR can bring abstract concepts to life. For instance, students can explore the human body in 3D, witness historical events unfold, or practice complex surgical procedures in a safe virtual environment.

- **Personalized Learning:** XR can tailor educational content to individual student needs and learning styles. Adaptive learning platforms powered by XR can provide personalized feedback and support.

- **Enhanced Collaboration and Problem-Solving:** XR fosters collaborative learning by enabling students to work together in virtual spaces. This promotes teamwork, communication, and critical thinking skills.

XR for a Sustainable Future

XR is not only reshaping education but also playing a crucial role in addressing global sustainability challenges:

- **Environmental Awareness and Education:** XR can raise awareness about environmental issues by immersing learners in virtual ecosystems and simulating climate change scenarios.

- **Sustainable Practices and Solutions:** XR can be used to teach sustainable practices, such as waste reduction, energy efficiency, and renewable energy. It can also be employed in designing and testing sustainable urban planning and architecture.

- **Citizen Science and Community Engagement:** XR can empower citizens to participate in scientific research and environmental monitoring. Virtual volunteering and community engagement initiatives can be facilitated through XR platforms.

Digital Twins: A Powerful Tool for Education and Sustainability

Digital twins, virtual replicas of physical

objects or systems, can be integrated with XR to enhance learning experiences and drive sustainable solutions. By creating digital twins of real-world environments, students can explore complex systems, experiment with different scenarios, and develop innovative solutions. For instance, students can analyze the impact of climate change on ecosystems or design sustainable cities by interacting with digital twins.

Challenges and Future Directions

While XR and digital twins offer significant opportunities, challenges

such as accessibility, affordability, and technical limitations need to be addressed:

- **Accessibility and Affordability:** Making XR technology accessible and affordable to all is crucial. Equitable distribution of XR resources is essential to ensure inclusive education.

- **Technical Limitations and User Experience:** Technical limitations like motion sickness and limited field of view can hinder user experience. Continuous advancements in technology are needed to address these issues.

- **Ethical Considerations:** Ethical implications, such as privacy concerns and potential for manipulation, need to be carefully considered. Developing ethical guidelines and regulations for XR development and deployment is essential.

Conclusion

The integration of XR and digital twins has the potential to transform education and sustainability. By providing immersive, personalized, and data-driven experiences, these technologies can empower learners and drive innovation. As we move forward, it is essential to embrace these technologies and harness their power to create a more sustainable future.

XR in Education
Revolutionizing Learning and Nurturing a Sustainable Future

Extended Reality (XR) the umbrella term incorporating Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), is revolutionizing education by providing immersive and sustainable learning opportunities to everyone. My exploration of VR, initiated by the foundation course on AR and VR conducted by IITM and the sponsored Oculus Quest HMD device by Prof. M. Manivannan IITM, has empowered me to introduce immersive and interactive experiences inside the classroom and it transformed the students' engagement with learning to a joyful and memorable one.

Dhayananth K B
Teacher & XR Developer
GHSS, Kanjampatti
Coimbatore, Tamil Nadu

The Impact of XR on Educational Experiences

1. An unforgettable Journey through History and Culture Visualize the students who virtually explore the magnificent Taj Mahal or walk along the corridors of the Egyptian pyramids. These VR project initiatives have fascinated my students by bringing history and global culture directly into our learning environment in a jiffy. The enthusiasm and admiration reflected in their expressions as they "walked" through these renowned sites were truly elevating the learning experience.

2. Unraveling the Wonders of Space My VR exploration project of the solar system granted students a close-up experience with the planets, stars, and galaxies—an opportunity that is unimaginable within the limitations of a traditional classroom setup. This immersive journey through space kindled the curiosity by provoking the students to investigate each astronomical object to pose questions and visualize the complex astronomical concepts in real-time, giving an unforgettable and enjoyable yet impossible journey.

3. Creating Engaging, Hands-On Learning In contrast to traditional lessons, which may sometimes lead to diminished attention, these VR experiences maintained student focus, rendering the learning process both unforgettable and enjoyable at the same time. The interactive aspect of these virtual reality experiences has proven to be beneficial in understanding the complex concepts with enthusiasm. For example, while students traversed the solar system, they were able to witness the planetary rotations, different layers in atmospheres, and the immense distances between the stars, offering an in-depth level of engagement and a deep understanding that a textbook could never provide.

Benefits of XR in Sustainable Education

1. Reducing the needs for Physical Resources Virtual tours to landmarks such as the Taj Mahal and the Egyptian pyramids have given an immersive journey, but at the same time, they reduced the resources, such as printed materials, any other physical models, or without worrying about the expenditure.

2. Immersive Remote Learning and Accessibility XR also promotes immersive remote learning the students can revisit the lessons, explore additional details at their own pace, and engage with globally recognized sites whenever they want. The VR laboratory, where students can handle any dangerous chemical experiments without any fear and without any cost.

3. Fostering Empathy and Global Awareness Building empathy by virtually transporting students into other cultures, environments, and time periods is one of the XR's significant impacts. It cultivates a deeper appreciation for the heritage and the cultural diversity, imbibing a sense of respect towards the unity in diversity.

Students' Experience and Excitement

The enthusiasm and joy given by this VR experience are beyond measure. Observing their inspirational attention, their engagement throughout the time, and their thought process after experiencing the VR tour is a powerful testament to the effectiveness of the immersive learning. A particularly unforgettable moment was when students explored the Egyptian pyramids. Even the students who were quiet in the normal class participated very enthusiastically and put forth many questions regarding the lives of ancient Egyptians. Likewise, many students were inspired by the tour of the solar system and asked questions related to their careers as astronauts, astronomers, and about the scientists; they could feel the vastness of the space and galaxy, which is beyond the limitations of the traditional classroom.

During the Taj Mahal tour, the students were fascinated by the unique architectural features of the monument. They admired the craftsmanship and raised questions about the history surrounding this global marvel. This virtual tour imprinted a newfound respect for historical landmarks and the necessity for preserving the monuments. Thus, XR creates emotional connection and unforgettable, enduring memories, which surpass the traditional conventional method of learning process.

XR – a new frontier in education

Extended reality contributes towards a greener and more inclusive educational system. It develops practical skills by providing an immersive, interactive, and sustainable learning experience. By increasing the attention span and making learning into an engaging, enjoyable and unforgettable one, XR will be the new frontier in education by creating possibilities far beyond the confines of our classroom walls.

Academia Integrates VR Simulators in Curriculum

The Centre of Relevance and Excellence in Industrial Safety (TIFAC-CORE), supported by the Department of Science and Technology (DST) of the Government of India, at Mepco Schlenk Engineering College (Autonomous), Sivakasi, Tamil Nadu, India, has integrated Haptics and VR based Fire Safety Simulator from Merkel Haptics, CAVE member into the practical curriculum for their M.E. - Industrial Safety Engineering programme!

With this partnership, students now gain access to cutting-edge, immersive fire safety training that goes beyond traditional methods. By using our simulator, students experience high-stakes, lifelike fire emergency scenarios and practice Standard Operating Procedures (SOP) in a controlled, safe, and realistic environment. This hands-on approach empowers future safety engineers with essential skills and confidence to handle real-world fire emergencies effectively.

XR Summit Agenda

[16th November – DAY1]

Time	Session	Location
8:30 am – 9:30 am	Registration	ICSR entrance
9:30 am - 10:00 am	Inauguration – Ms. Divya Innocent, IAS, MD Tamil Nadu Skill Development Corporation (TNSDC) Prof. Steven M. LaValle, Professor, University of Oulu Prof. M. Manivannan, Professor, Dept of Applied Mechanics and Biomedical Engineering	ICSR Auditorium
10:00 am – 10:40 am 10:00 am – 10:20 am 10:20 am – 10:40 am	Plenary Talks Prof. Steven M. LaValle, University of Oulu Ms. Divya Innocent, IAS, MD Tamil Nadu Skill Development Corporation (TNSDC)	ICSR Auditorium
10:40 am – 11:00 am	Tea Break	
11:00 am – 11:30 am	Keynote 1: Manifestations of Misogyny in Cyberspace & Gender Justice Ms. N.S. Nappinnai – Sr. Advocate, Supreme Court	ICSR Auditorium
11:30 am – 12:45 pm	PLEASE REFER TO DAY1 – TRACKS AGENDA SHEET **Track A** AI, Gaming, AVGC — ICSR MAIN AUDITORIUM **Track B** Healthcare — HALL1 **Track C** Education and Skills Development — HALL2	
12:45 pm – 1:45 pm	Lunch Break	ICSR lunch room
1:45 pm - 2:05 pm	Plenary 3: Prof. Marimuthu Palanisamy, University of Melbourne	ICSR Auditorium
2.05 pm – 2.30 pm	Workshop 1: Neuroscientific Approach to Learning – Mr.Mohsin Memmon	ICSR Auditorium
2:30 pm – 2.50 pm	Ms. Richa Gupta, Doctoral Student, MIT *Augmented Reality and Artificial Intelligence for E-Commerce*	ICSR Auditorium
2:50 pm – 3:20 pm	MOU Signing event	ICSR Auditorium
3:20 pm – 3.40 pm	Tea break	Outside ICSR Auditorium
3:40 pm – 4:00 pm	Shri. Mohit Soni, CEO, Media and Entertainment Skills Council	ICSR Auditorium
4:00 pm – 4:20 pm	Reports on MIPS MIT Hackathon NPTEL Course Newsletter Experience Centers Academic Partner programs	ICSR Auditorium
4:20 pm – 5.00 pm	PLENARY 4 - 20 mins each Prof. Mandayam Srinivasan, UCL, Founder of MIT Touchlab Prof. Thenkurussi (Kesh) Kesavadas, Vice President for Research & Economic Development, SUNY, Albany	ICSR Auditorium
6:30 pm – 9:30 pm	AWE evening	IITM Alumni Centre, IITM Research Park

XR Summit Agenda

[DAY1 Tracks Agenda Sheet: 11.30 am – 12:45 pm]

DAY1	Track 3 ICSR MAIN AUDITORIUM	Track 2 HALL1	Track 1 HALL2
11:30 am -12:45 pm	**AI, Gaming, AVGC**	**Healthcare**	**Education and Skills Development**
11:30 am – 11:45 am Regular talk 15 min	Dr.Kaushik Mitra	Dr. Padmapriya Merkel	Prof. Samir Mukherjee
11:45 am – 12:30 pm 40 minutes of panel discussion	Mr. Kuldeep Singh (Thought Works)* Mr. A. Ramesh	*"Transforming Medical Education and Training with XR"* Dr. Muthu Singaram HTIC *	Dr. Anna LaVelle*
	Mr. Mohit Soni(MESCIndia)	Dr. Padmapriya Merkel	Prof. Lata Dayaram
	Dr. Pravin Nair (EE)	Dr. M. Saravanan, Ericsson	Ms. Padmashhri
		Dr. Kamala A	Ms. Deepa (skillveri)
	Mr. Bala (Atral)		Ms. Nappinnai
	Prof. R. Rajkumar (SRM)		
	Mr. Alagarsamy Mayan		
12:30 pm – 12:45 pm 3 startups 5 min each	Mr. Prashanth (Trimble)	Dr. Padmapriya, MBBS, Salem	Mr. Srinivasan Y Ms. Ashwini (RVCE) Ms. Malliga
9:00 am – 9:30 am	Registration for newcomers		ICSR entrance

[17th November – DAY2]

9:00 am - 9:30 am	Registration for newcomers				ICSR entrance
9:30 am - 10:40 am 9:30 am – 9:50 am 9:50 am – 10:10 am 10:10 am - 10:30 am	PLENARY 2 - 2 speakers Prof. Mel Slater, University of Barcelona Dr. Denis Gracanin, Virginia Tech KEYNOTE 2 Ashish Kulkarni, Chairman of AVGC-XR Forum, FICCI				ICSR Auditorium
10:30 am – 10:50 am	Tea Break				
10:50 - 11:10 am 11:110 - 11:30am	Keynote 3 – Dr. Anna Yershova LaValle, University of Oulu **Keynote 4:** Dr. Praneeth kumar Chakravarthula, University of North Carolina				ICSR Auditorium
		Track 1 Cybersecurity, Ethics	Track 2 iHUB	Track 3 Design and Manufacturing, Retail (E-Commerce), BFSI	
		ICSR MAIN AUDITORIUM	HALL1	HALL2	
11:30 am -12:45 pm	PLEASE REFER TO DAY2 - TRACKS AGENDA SHEET				
12:45 am -1:45 pm	Lunch Break				ICSR Auditorium

XR Summit Agenda

[17ᵗʰ November – DAY2]

	ICSR Auditorium	Hall 2	Hall 3	ICSR Auditorium
1.45 pm - 2.15 pm	Samsung team: Foundations of 3D Vision Perceptions	Workshop: Neuroscientific Approach Learning to	Hackathon	
2.45 pm - 2.15 pm	Samsung team: Scene Perception			
2.45 pm - 3.00 pm	Tea break			
3.00 pm -3.30 pm	Samsung team: Motion Tracking and Rendering of Articulated Bodies in 3D	Workshop: Neuroscientific Approach to Learning	Hackathon	
3.30 pm -4.00 pm	Samsung team: Rendering & Graphics			
4:00 pm – 4.15 pm	Tea Break			
4.15 pm - 5.45 pm	Samsung team: Hands-on Session - Modelling and Tracking Humans in 3D - 90 min		Hackathon	
5:45 pm – 6:00 pm	Vote of Thanks, NEXT YEAR'S PLAN			ICSR Auditorium
6:00 pm – 7:00 pm	Awards Evening			ICSR Auditorium

[DAY2 Tracks Agenda Sheet: 11.30 am – 12:45 pm]

DAY 2	Track A ICSR MAIN AUDITORIUM	Track B HALL1	Track C HALL2
	Cybersecurity, Ethics	iHub	Design and Manufacturing, Retail (E-Commerce), BFSI
11:30 am – 11:45 am Regular talk 15 min	*"Blockchain in the metaverse"* Ms. Padmashri Suresh	Dr. Shankar*	Ms. Manica Walia
11:45 am – 12:30 pm 40 minutes of panel discussion	Dr. John Augustine*	Dr.Shankar*	Mr. Ashok Maharaj*
	Prof. Steve LaVelle	Ms. Lopa Misra	Mr. Rabindra Sah
	Mr. Padmashhri (HCLTech)	Dr.Vishakha	Ms. Manica Walia
	Dr. M. Saravanan, Ericsson	Dr. Somjit	Dr. Palaniappan Ramu
			Mr. Keyur Bhalavat
			Bismita Nayak
12:30 pm – 12:45 pm 3 startups 5 min each	Ms. Aswini Priyanka Rajendran	Dr. Vishaka Lopa Mishra	Mr. Gaurav Mr. Praharsh Anurag Ramachandran A Mr. Vinoth E

AWE Nite: Chennai - India
Agenda & Schedule
16 Nov-2024 (Saturday) at IIT Alumni Center, Chennai

Timming	Topic	Speaker
5:30 PM - 6:30 PM	Registration	
6:30 PM - 6:40 PM	Setting up the context : AWE Chennai Nite XR : The Global Eco System	Ramesh Anumukonda Founding Partner, A Plus Associates LLP
6:40 PM - 7:00 PM	Metaverse Economy: Opportunities Risks & the path of responsible innovation	Mahesh Ramamurthy Founder CEO, SatoriXR
7:00 PM - 7:20 PM	Redefining Education: XR as a Catalyst for Immersive Learning Experiences	Ganesh Rajagopal
7:20 PM - 7:40 PM	The Future of work: Building XR-Enabled workspace & Hybrid Collaboration Model	Kathirvel
7:40 PM - 8:00 PM	XTIC : IIT Madras projects	Kaushik Mitra
8:00 PM - 8:30 PM	Fireside Chat: XR for Human Connection and Collaboration	Dr. Steven M LaValle and Prof. Manivannan moderated by Mr. Rabindra Sah- CTO, Indian Register of Shipping
8:30 PM - 10:30 PM	Dinner, Drinks & Networking	

DISCLAIMER