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May the New Year 2022 bring you more happiness, success, love and blessing! Praying that you have a truly remarkable and blissful year ahead! I would like to convey my new year wishes to faculty members and students. Due to covid restrictions I would suggest to follow the safety precautions.

I wish them all success.

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Extended Reality (XR)

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<u>*Introduction:*</u>

What Is Extended Reality (XR) and how is it Changing the Future? XR is new, exciting tech, and everyone is talking about it. But what does XR mean and when can you start using this technology? We'll take a look at how XR is different from AR and VR, and how it will integrate with new devices and the gear you own already. XR, cross reality or extended reality, VR (virtual reality), AR (augmented reality), and MR (mixed reality). We will see this extended reality topic in detailed below.

In XR is "reality-plus" tech using any kind of display? XR is VR plus AR. XR stands for "extended reality," an umbrella term that covers VR, AR, and MR. All XR tech takes the human-to-PC screen interface and modifies it, either by 1) immersing you in the virtual environment (VR), 2) adds to, or augments, the user's surroundings (AR), or 3) both of those (MR).

The term XR has been around for decades. It first popped up in the 1960s when Charles Wyckoff filed a patent for his silver-halide "XR" film, intended for photographing extremely bright light events, such as nuclear explosions.

More recently, the term has moved into the mainstream as device makers struggle to describe the different display upgrades they're working with. A couple of

examples are immersing gamers in the action by putting a screen (a smartphone display or headset) right in front of the eyes (VR) or adding game characters to real-world surroundings like in the popular Pokémon Go (AR).

What is XR?

However, it is not only the distance to information or to talents that extended reality addresses: XR solutions, such as 3D environments, significantly enhance obtaining valuable insights. They develop the new reality that allows humans to get new knowledge that they are not likely to gain using their eyes, imagination and intelligence.

XR technology

We used Google Maps to navigate, you've already used XR tech.

The confusion around XR tech is that the term is overused. As with other umbrella terms in the past like "digital" or "natural," there's a bit of a marketing gold rush in play as every big tech company hustles to brand their latest gear with the up-and-coming moniker.

Virtual Reality

VR, the computer-simulated reality, is a technology that allows humans to immerse into a reality that is entirely different from a real one or that replicates reality. In other words, it builds a digital reality that replaces a user's real-world one. Enabled by specific headsets, virtual reality

provides an environment with realistic images and sounds, while a comprehensive VR environment involves all five senses, including smell, taste and touch.

This approach provides humans with an opportunity to gain new experiences and come to be in places where they are unable to be at a specific moment of time. VR is widely used in the gaming and entertainment industries, as well as for various types of training. Depending on the final objective, the virtual reality may look very realistic or may resemble cartoon images.

XR vs. VR

Virtual reality (VR) is a subset of extended reality (XR). VR is an immersive computing or gaming experience where the user's entire field of vision is filled via the device's display. In some cases, this is as simple as a headset your smartphone fits into, so the phone's screen sits an inch or so from the viewer's eyes.

But while all VR is XR, not all XR is VR. For instance, augmented reality (AR) may use your phone's camera to superimpose game characters onto your smartphone's display, as if the character was in the room with you. That's AR, and it's also XR, but it's not VR.

Augmented Reality

Unlike VR, augmented reality is not a world that is entirely different from a real one. This technology augments the existing physical environment with specific features by enriching it with graphics, video, sounds and other data. It can be said that AR exists "on top of" our reality, as it just adds some attributes but does not change it completely. At the same time, users cannot interact with a synthetic environment. In other words, it puts an "overlay" on our world.

The cameras of mobile devices, as well as headsets, help humans put an overlay on their real world. This technology has found extensive use in the gaming industry and is applied for enhancing the presentation of sports events. Probably the most vivid example of its implementation is the Pokémon Go game.

XR vs. AR

AR is a subset of XR. AR captures live video of a device's surroundings and then adds visual elements to it, such as a Pokémon Go character in your living room, or educational mark up to your surroundings in a workplace or a historical area. Again, while all AR is XR, not all XR is AR. That is, you may play a VR video game with your phone in a VR headset. That's VR, and it's also XR. But it's not AR, because there's no "augmented" slice of the pie. You're not superimposing anything from the digital world onto a display of your surroundings.

Mixed reality

As the name suggests, mixed reality combines elements of both real and virtual environments and creates a new world where physical and synthetic objects come together and interact. Also, these objects can react to each other on a real-time basis. Flexibility is a key characteristic of this type of reality. That is why "mixed" environments compile the best attributes of each of the worlds – real and synthetic. Also, it makes the best use of augmented reality

and virtual reality. MR allows users to see the real world alongside with some

virtual objects that are anchored to a certain real point, which enables users to treat them as real objects.

XR vs. MR

MR or "mixed_reality" is a blend of two popular types of XR tech: VR and AR. To zero in on the terms, VR is immersion, such as when you use a smartphone screen in a headset to fully immerse yourself in gameplay. AR is augmentation, such as when you use an app to superimpose a digital tiger in your living room with your phone's display. MR would technically be a blend of both VR and AR, but the terms AR and MR tend to be interchangeable. However, there's a clear difference between MR and XR. In short, all MR is XR, but not all XR is MR.

The Advantages of XR Reality

Is extended reality good for business, or does it just improve user experience? Companies that apply environments powered by the technology do get valuable benefits, such as:

- The provision of an unusual experience. A dive into a radically different reality allows companies to provide their users with the possibility of visiting places of interest or experiment something without leaving the house.

- Efficient information uptake. XR provides its users with a more realistic view of their subject matter, which allows them to be trained in a more effective manner.

- Safe training. Those who need to practice in high-risk conditions, such as military or chemists, can train safely from conventional classrooms.

The Disadvantages of XR Reality

In spite of the above-mentioned tempting opportunities of XR, it has the following drawbacks:

Compromised privacy. As with any other technology, XR is prone to cyber-attacks, in particular, to data hacks. It can result in serious damage, since XR-related solutions have access to tons of private information.

Reduced social engagement. Extended reality provides numerous ways of amusement, which may completely engross human minds and may threaten to eliminate the necessity for communication. Although XR allows people to communicate, it enables it in a different way that lacks contact and personal interaction.

Physical harm. Long-term application of VR devices and augmented reality glasses may cause eye disorders, nausea, faintness and headache.

The high cost of implementation. The development and implementation of XR solutions and devices that support this technology are extremely expensive, which is why it may come at a high cost.
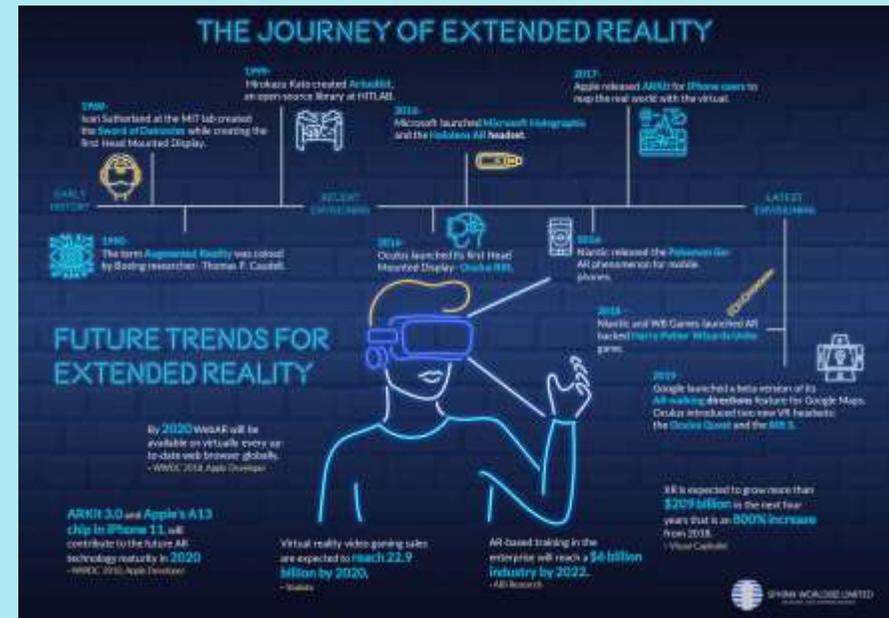
Entertainment Industry

Video games are the main consumer of extended reality technology as their share accounts for 34%. It is no wonder, as the business success of the companies of the kind relies heavily on the ability to provide a full-fledged immersive experience. However, it is not only video games that derive benefits from XR capability to create a comprehensive participation effect and allow users to dive into another reality. Entertainment events, such as concerts, exhibitions and sports events, can also thrive on AR, VR and MR. By what means? Instead of hustling in overcrowded museums or stadiums, people can visit the Louvre museum or watch the World Cup final while

sitting at home but feeling completely immersed into the event. Yet another example is the Denver Museum of Nature and Science, which already uses AR to fully convey the message of its exposition to visitors. The technology enables visitors to see dinosaurs instead of their fossils.

Real Estate

Extended reality solutions can be of great help for real estate agencies. They allow potential customers and tenants to view properties without having to physically be there. It saves time for all of the parties involved and makes the process of choosing less tiring. Another example of XR application in real estate is architecture and interior design. The technology will provide specialists and their customers with a comprehensive view of the project, which helps avoid mistakes and unexpected surprises. HouZZ, a design company, relies on augmented reality to help their customers imagine their future furnishings. They have created an online app that allows users to get ideas for home improvement. By the way, the agency claims that this app increases purchase probability eleven fold.

Healthcare

Medical imaging is another area that benefits from extended reality, and modern MRIs and CT scan make extensive use of this technology. It enables the 3D representation of human bodies instead of the traditional 2D imaging, which improves the efficiency of diagnosing. Also, this technology considerably expands the opportunities for surgical training, as students can practice on virtual patients.

Manufacturing

Komatsu, a large manufacturer of construction, mining and utility equipment, has also adopted XR for the training of equipment operators. To avoid multi-million losses caused by improper use of costly machines, they provide training for operators distributed across the globe. General Electric has improved the efficiency of their workers that wire wind turbines by 34%, as the company provides AR-based assembly information.

Rush your ideas to

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