

Metaverse

THE NEXT INTERNET
REVOLUTION



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Introduction

Metaverse is an interconnected 3D virtual world where people can be who they want to be, explore without restrictions, and communicate with others from anywhere around the world. The Metaverse is an evolution of existing web technologies including augmented reality (AR), mixed reality (MR), and virtual reality (VR). Fundamentally, the Metaverse is the formation of a virtual universe wherein human avatars are presented through technology.

Organizations develop metaverses for a variety of reasons such as entertainment, education, business, medical scenarios and many more. But Let us understand the metaverse with an example. The Covid-19 outbreak forced several employees to work from their home. While majority continue to telecommute even after two years, there is a strong yearning to the workplace possibly because they miss the camaraderie at work such as the workplace atmosphere, team lunches, and the coffee banter. Now, what if Zoom, a renowned American communication technology company developed a virtual 3D atmosphere, which could allow them to sit at their home workstation and experience the same workplace environment. It won't be exactly like the real office, but it'll be near, and as technology advances, it'll become even more so. Hence, in such cases metaverse could be a boon for these employees.

Metaverse, according to Meta Platforms, is the next version of mobile internet to experience physical activities , however Vishal Shah, vice president at Meta, stated that Metaverse is not a replacement for physical experiences, but rather a new way to experience the internet. Also, Facebook emphasizes that the development of Metaverse would be a joint effort including multiple companies spanning from tech giants to start-ups.



Milestone Events

Neal Stephenson was the first person to introduce the term **"Metaverse"** in his science fiction novel, Snow Crash. Later, in the same year, Jaron Lanier, founder of VPL Research introduced virtual reality music instruments (VRMI) for the first time in his performance "Sound of One Hand" in Chicago.

1932

1992

2000

2006

2013

2017

2020

Metaverse primarily began gaining attention through gaming and in 2006 for the very first time The Roblox Corporation released their famous game **"Roblox"**, that allowed users to create their own Metaverse (virtual world) in the form of a game. With the launch of Roblox the concept of Metaverse became more popular as it enabled users to create their own gaming world and avatars to engage with other Roblox users over the internet from any part of the world.

As the Metaverse progressed, the gaming industry continued to offer new releases. In 2017, Epic Games, an American video game development firm, released its popular free-to-play online multiplayer game **"Fortnite Battle Royale"**. CEO of Epic Games Tim Sweeney described Fortnite's user experience as a Metaverse because it was a virtual 3D space that united gaming and non-gaming elements such as hosting in-game concerts for players to attend the event as their avatars.

In 1932, the term **"virtual reality"** was introduced for the first time in the article "The Virtual Reality of Theater" which was written by the French writer Antonin Artaud. In one the section of the article, the author sowed the concept of virtual world where things were identical to the real world.

At the turn of the 21st century, IT research firm Gartner introduced the term **"supranet"** to describe the confluence of the virtual (digital) and physical worlds. The term referred to an advanced human interaction that was intended to engage individuals in a virtual environment over the internet. Until then, Metaverse was only visualized as a vision for merging the virtual and real spaces together.

From 2013, devices to experience Metaverse started to enter the market. In this year, Oculus, a division of Meta Platforms, introduced a Virtual Reality (VR) headset **"Oculus Quest"** to experience gaming in the Metaverse. This headset supported positional tracking with six degrees of freedom, using internal sensors and an array of cameras in the front of the headset rather than external sensors.

Again in 2020, the gaming industry continued to lead the Metaverse space when Nintendo Co., Ltd. a Japanese multinational video game firm, launched **"Animal Crossing: New Horizons"**, a social simulation game where players interact with flora, fauna and villagers in an exquisite Metaverse world.

Path-Breaking Year

2021 was the go-to year for the swift development of the Metaverse. From Facebook's rebranding to Microsoft's announcement of its corporate collaboration platform "Mesh for Microsoft Teams", 2021 witnessed string of developments. Some of the intriguing progress in 2021 that contributed to reshape the Metaverse include:

On 28 October, 2021 Facebook's CEO Mark Zuckerberg announced at the Facebook Connect, that the company would rebrand as "**Meta**" to reflect its significant investment in the Metaverse.

In November 2021, Microsoft announced a feature "**Mesh**" for Microsoft Teams at the Ignite 2021 conference. Mesh for Microsoft Teams will start to roll out in preview in the first half of 2022. The feature will allow people in different physical locations to join collaborative & shared holographic experiences where people can join virtual meetings, send chats, collaborate and so on.

Mercobank, one of the world's leading digital banks, announced the plans to enter the **NFT (Non-Fungible Token)** market, indicating a step to enter the Metaverse space. Mercobank CEO Ramon Vicente de Vera stated that they had begun developing strategies to create virtual environments that would allow their customers to access non-face-to-face financial services online in the same way that they do in the real world.

Samsung Asset Management launched first-ever actively managed local **Metaverse-themed ETF (Exchange-traded fund)**. On 6 December, 2021, Samsung Asset Management, in collaboration with Nasdaq and Yewno, introduced the Nasdaq Yewno Metaverse Index ("NYMETA") ETF to meet the growing demand for Metaverse-focused investment products.



AMAXG, a tech firm based in South Korea, launched its new office location in a Metaverse space, developed with similarity to its headquarters. It recreated the same chairs and coffee mugs, but it's all virtual. This was a breakthrough moment for remote working, and the organization believes this will boost productivity and employee connections regardless of the physical barriers. According to the organization, remote employees will be able to interact once a month in a Metaverse office.

Facebook rolled out "**Horizon World**" in North America on Dec 9, 2021. In 2020 a prototype version of this platform was made available to a limited number of users, but now this virtual world app is open to the public of North America.

In 2021, more than 42.1 million users logged in to **Roblox** each day in the first quarter of 2021. Roblox is an online game platform and game creation system developed by Roblox Corporation. Users on the platform spent a combined \$652 million on currency tokens in a virtual economy, referred to as Robux.

In March 2021, **Google Trends** index on the term "Metaverse" reached 100 for the first time. In the previous fifteen years, the term "Metaverse" was only used a handful of times, and never exceeded 7.

What are market leaders are saying?



Mark Zuckerberg, outlined his “Metaverse” as a virtual world concept, which was about “connecting with people”. Mark Zuckerberg’s company took its first step in this direction after acquiring the Oculus VR headset for \$2 billion in 2014. On 28 October 2021, Facebook’s CEO made an announcement at Facebook Connect, that the company would rebrand as “Meta” to reflect its significant investment in the Metaverse space.

That same month, Facebook CEO said Facebook will spend about \$10 billion over the next year developing technologies to build the Metaverse. Recently, the CEO was busy promoting the Metaverse that integrates work and life across a variety of platforms, including VR headsets and AR deployments. Zuckerberg further envisions 3D spaces in the Metaverse which will allow us to socialize, learn, collaborate and play in ways that will go beyond what we can imagine.

Satya Nadella, CEO of the Microsoft, said while addressing the company at Ignite 2021 conference, that “he can’t overestimate how much of a revolution” the Metaverse is. He said that there had been discussions about creating digital representations of the world for years, and “we now have the opportunity to go into that world and engage in it.”

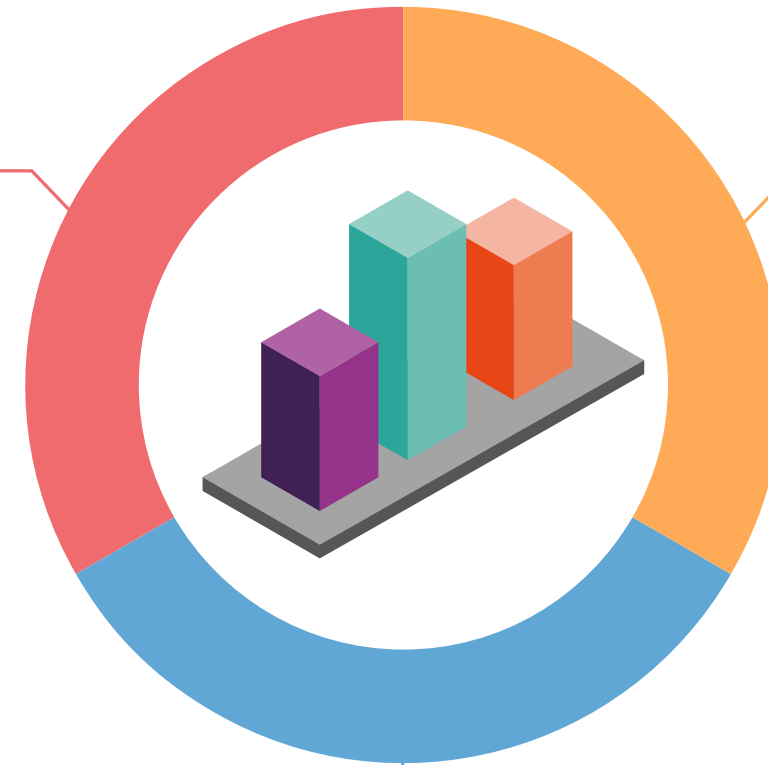
Recently, Harvard Business Review’s Editor-in-Chief Adi Ignatius sat down for a video call with CEO Satya Nadella to discuss the subject of “the Metaverse”. In the call the CEO said that Microsoft was developing a completely new platform layer, where the digital and real worlds converged. Nadella added that it was no longer only about gazing at the camera view of a situation but also including people into it to interact in the virtual universe . He used “Mesh for Microsoft Teams” as an example, demonstrating how real-world aspects were being transformed into a digital format.



Key Market Statistics

According to Brandessence Market Research, the global Metaverse market reached USD 44.69 billion in 2020 and is predicted to reach USD 596.47 Billion by 2027. The Metaverse market size is likely to grow at a robust 44.8% CAGR during the period of 2021-2027. Online activities are increasingly grabbing attention, especially among the younger population, and this will provide the Metaverse market with strong opportunities over the projected period. A few aspects are highlighted below to show the market's potential.

According to a report by Statista, people in general spend **(6 hours per day)** watching TV, playing video games, or using social media. And given that all of these activities could be done inside the Metaverse, this may present an opportunity for organizations to drag their participation to the Metaverse.



According to globenewswire, virtual gaming revenue reached **USD 7.92 billion in 2021 and is expected to hit USD 53.44 billion by 2028**. According to these figures, the gaming industry will be the Metaverse's key driver in the future.

NFT (Non fungible tokens) assets in both art and gaming were worth **\$17.7 billion** at the end of 2021. Now, NFTs are digital items like art, music, photos, and other digital assets. These assets could be traded as NFTs in the Metaverse space with the help of Metaverse currencies such as MANA, AXS, SAND and GALA. So, the rise of NFTs could help to boost the selling and buying of digital artwork. For example: Recently, Amitabh Bachchan launched NFTs which included his autographed vintage posters, a recital of his father's famous poem Madhushala, were sold for roughly Rs 7.18 crore (\$966,000).

Key Acquisitions



01 Nike acquired virtual sneaker maker “RTFKT” amid fast growing Metaverse. On December 13, 2021, Nike CEO John Donahoe revealed that this acquisition will accelerate the company's digital shift, allowing it to better serve athletes and creators in the areas of sport, creative, gaming, and culture.



02 Tencent is set to acquire gaming smartphone maker “Black Shark” to mark its arrival into the Metaverse. Black Shark is a relatively young company that was established in 2017 and was backed by another Chinese tech giant, Xiaomi. The goal of this acquisition is to expand VR (Virtual Reality) technologies and devices.



03 InfiniteWorld, a leading Metaverse infrastructure platform for brands, has announced plans to acquire Aries I Acquisition Corporation to become a publicly traded company. The objective of this acquisition is to strengthen its fully digital platform that enables brands and creators to engage with consumers in the Metaverse.



04 Microsoft acquired Activision Blizzard, one of the biggest California-based video game holding company for developing its own Metaverse. Microsoft announced that the deal would bring the joy of gaming to everyone in the gaming community across the device. The deal involved a transaction of \$68.7 billion, which is the biggest purchase ever made by Microsoft in this domain.

Regional Analysis



According to Market Research Future the global Metaverse market is segmented into five regions: **North America, Europe, Asia-Pacific, Middle East & Africa, and South America**. North America is foreseen as the leader in regional market owing to faster adoption of advanced technologies in the region predominantly—including USA, Canada, and Mexico. This is mostly owing to the fact that the region is one of the most technologically advanced, with a significant number of market participants such as **Facebook, Inc., Nvidia Corporation, and Roblox Corporation**.

According to PRNewswire Asia-Pacific region is predicted to grow at the highest CAGR during the forecast period of 2021-2027. The growth is expected to be driven by increasing number of start-ups such as **Bolly Heroes, OneRare, LOKA, Cope.Studio, Interality, Zippy, and NextMeet** in India as well as **miHoYo Co., Ltd. and Shenzhen Zhongqingbaowang Interaction Network Co., Ltd.** (ZQ Game) are among others in China, with clear perspectives on developing Metaverse platforms.

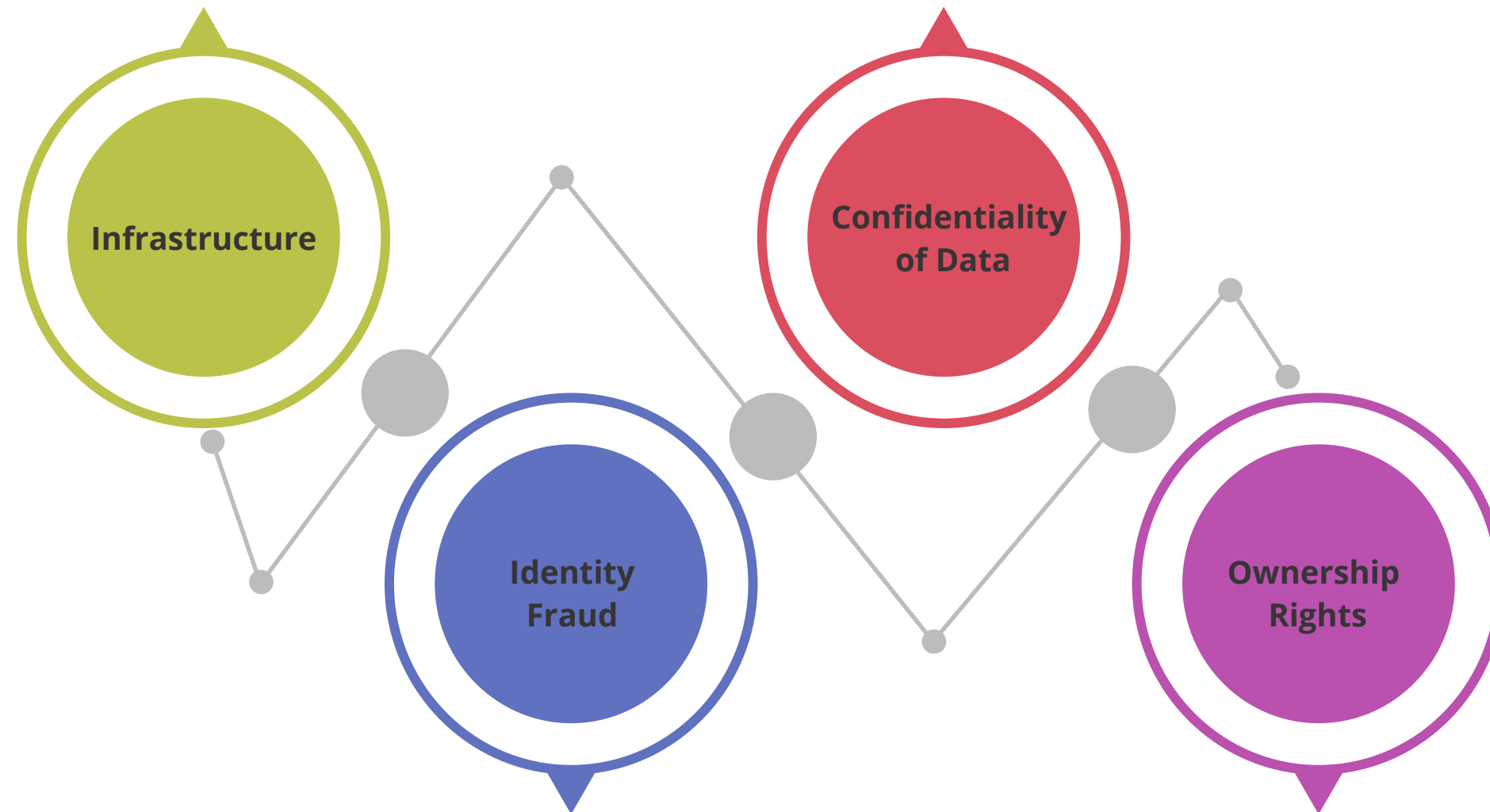
- North America
- Asia-Pacific
- Europe
- Middle East
- South America

Key Challenges

The present state of the Metaverse is in its development stage, highlighting the gray areas that need to be addressed. Here are a few challenges that need to be considered.

Building a Metaverse would demand a considerable **advancement in technology hardware, software, and content**. The infrastructure required is not that robust at this moment. The internet in its present state may not be able to function effectively. This would require a joint effort from large companies such as Google, Amazon, Facebook as well as startups to invest in the Metaverse space.

Socializing in the Metaverse will certainly require the **exchange of personal data for individual identification**. Considering there would be financial transactions such as buying a land in the Metaverse, it is the responsibility of investors to implement appropriate security methods to avoid data breach.



When you are in the Metaverse, there's a decent possibility that you will run into issues with **identity authentication or verification**. Hence, there should be a strong system in place to detect bots attempting to recreate one's virtual presence.

Metaverse will involve the **purchase and sale of various digital assets** such as music, photography, logos, illustrations, animations, digital paintings etc. which will have real-world value. So, determining how creators of digital products can be granted ownership rights and how ownership of digital assets in the Metaverse can be validated will be a stiff challenge.

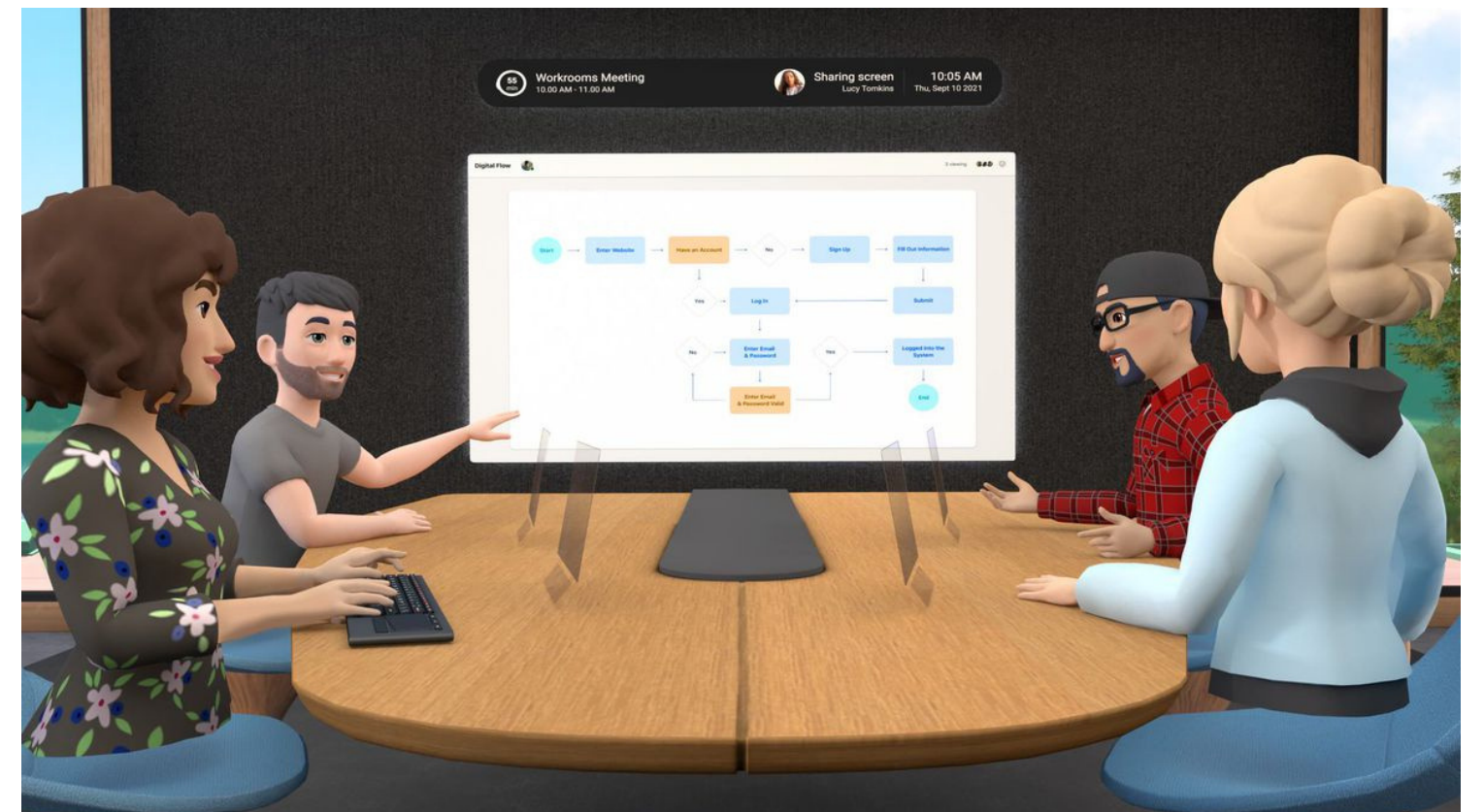
Applications of Metaverse

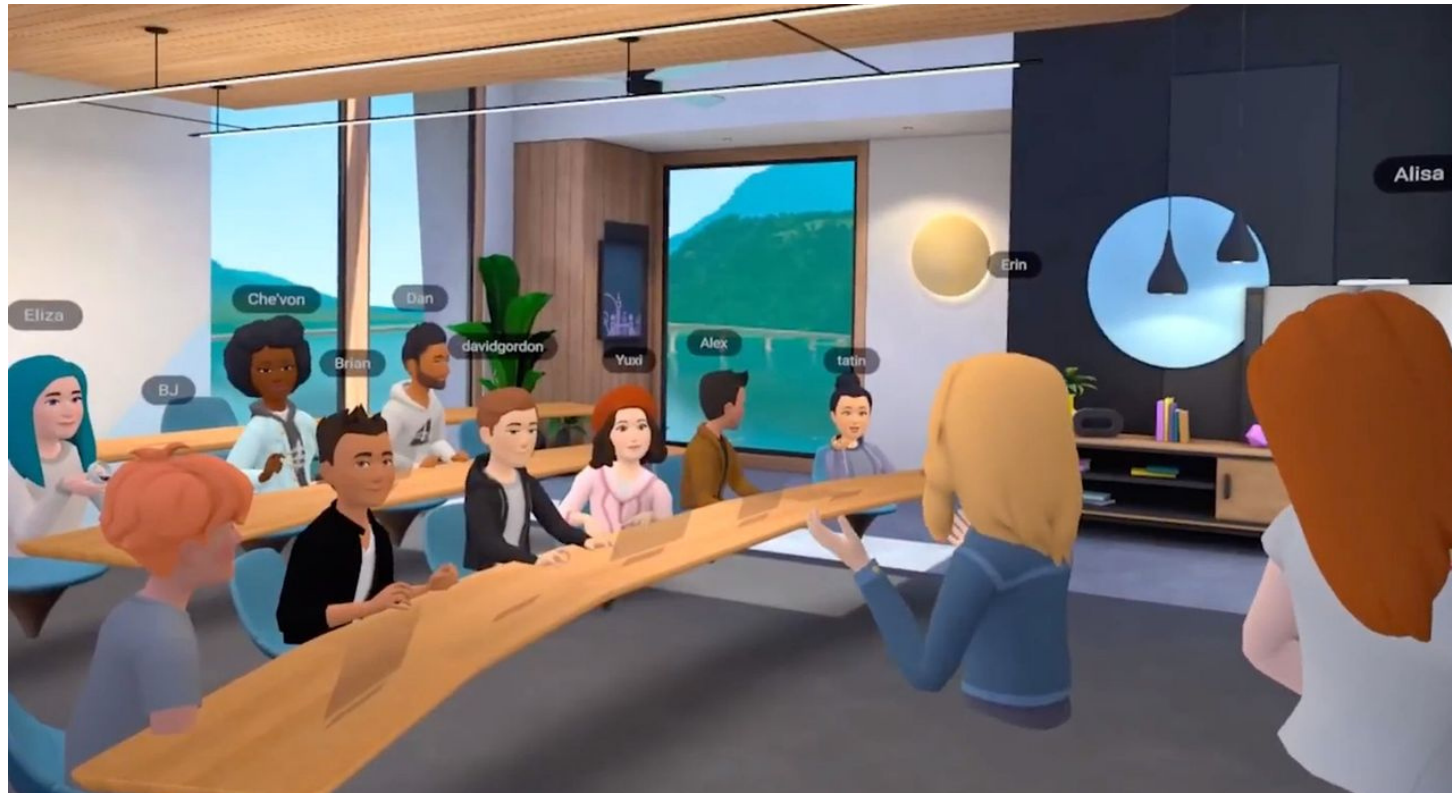
Metaverse allows users to socialize, learn, collaborate and play in ways that go beyond what we can imagine. Few most popular applications are discussed below.



Social Networking: Currently, Social media platforms such as Facebook and Twitter are confined within the two-dimensional plane but Metaverse promises to elevate the social networking experiences of internet users to create digitized communities. Metaverse platforms will provide these social media participants a sense of an actual presence in a 3D environment.

Business Conversations: Workplace productivity and communication are also key aspects in the Metaverse. Metaverse platforms will allow employees to hold meetings face-to-face using their avatars in an actual virtual office. The work collaboration becomes more impactful because of the highly realistic nature of the shared Metaverse spaces.





Learning: The COVID-19 pandemic has forced educational institutions to build technological capabilities to ensure uninterrupted learning. However, the overall communication quality has been criticized as one-sided and passive. Now in the Metaverse world, students can use their avatars and virtual reality gears to create an online presence and participate in a shared virtual environment wherein they can actively interact, collaborate, and engage with their classmates and instructors.

Gaming: The gaming experience in the Metaverse will become much more flexible as users will be able to join the virtual world, create their own content, build sub-games within a game, and essentially treat the gaming environment as a platform-like space for other activities. We know that Metaverse is interpersonal and interactive by nature, which distinguishes it from conventional lonely VR experiences. Hence, multi-player gaming will take on an additional dimension as players are able to invite friends from the real world to play with them.



Metaverse presence at CES 2022

Metaverse has generated a lot of curiosity in the past one year and was expected to garner a lot of attention at the Consumer Electronics Show (CES) 2022. Several companies such as Samsung, Panasonic, and Hyundai revealed their visions about the future of Metaverse. Here are some notable observations of CES's Metaverse efforts.



Samsung's My House platform: On the very first day of CES 2022, Samsung revealed its "My House" Metaverse experience. Samsung has collaborated with Asia's biggest Metaverse platform Naver Z's ZEPETO for its Metaverse venture. The platform "My House" will allow users to directly experience a total of 18 Samsung products such as large-screen TVs, home appliances and, smart phones among others, including new products for 2022. Samsung has launched the first-of-its-kind My House world map that invites users to decorate their very own home in the Metaverse.

Samsung's Metaverse destination - Samsung 837X: Samsung 837X debuted in Decentraland at CES 2022. Samsung 837X is a fully immersive experience, featuring quests and live music events. It's a blockchain-powered Metaverse space, where you can buy and sell exclusive digital assets, like land and wearables. Samsung 837X is Modeled on the physical Samsung 837 flagship location in New York City.





LG's Omnipod: This is a future mobility concept cabin that can reconstruct the customer's space for a purpose. Omnipod is a self-driving van that can serve as your office, your living space, or just a hangout cave. It even comes with an AI avatar (named Rhea) to serve as your friendly on-screen companion as you autonomously navigate the Metaverse.

Hyundai's Metamobility: Hyundai Motor shared its vision for robotics in the real world and Metaverse under the theme 'Expanding Human Reach' to fulfill unlimited freedom of mobility. The company revealed a new 'Metamobility' concept, going beyond physical movements through robotics and the Metaverse to affect change in the real world.



Top Startups Building the Metaverse

Apart from tech heavyweights, a slew of startups are springing up in this nascent technology, each with a unique approach to create interactive, immersive, collaborative experiences for their users and clients. Let's have a look at the notable startups that are investing in this virtual world.

The logo for Crucible, featuring the word "Crucible" in a bold, black, sans-serif font.

Founding Year: 2018
Location: London, UK
Startup Domain: WebVR, Digital Identities

Crucible is a British startup that develops tools for an open Metaverse. The startup enables gamers and artists with portable infrastructure allowing them to securely keep all of their digital assets at one place. Creators may build interactive galleries showcasing digital art using WebVR, a platform that connects Virtual Reality to the web. Crucible's solutions provide future-proof security while allowing users to stay anonymous while maintaining transparency for the digital assets.



Founding Year: 2016
Location: Helsinki, Finland
Startup Domain: Mixed Reality, Virtual Reality

Varjo is a Finnish startup that creates virtual reality headsets for Metaverse collaboration. The startup's premier headset, the Varjo XR-3, provides realistic visual quality across a wide field of vision. It perceives depth and constructs a 3D scene around the viewer using light detection and ranging (LiDAR) technology. This makes remote participants feel as if they are in the same room while interacting with each other. The headsets developed by the startup are used in training, simulation, engineering, and healthcare.



Founding Year: 2020
Location: Sweden
Startup Domain: Game Development, Virtual Spaces

Hiber is a Swedish startup that lets anyone build immersive worlds, experiences, and games on their mobile phones without the need to have prior coding skills. It competes with platforms such as Minecraft and Roblox, both of which allow users to create their own Metaverse worlds. Hiber's unique selling point is its no-code accessibility (i.e. no coding skills are required to create the Metaverse space). Hiber also realized that users didn't simply want to play games but also wanted to create and share everything from a virtual library.

The logo for ALDIN, featuring the word "ALDIN" in a bold, teal, sans-serif font.

Founding Year: 2013
Location: Iceland
Startup Domain: Game Development, Virtual Spaces

Aldin is a virtual reality software startup based in Iceland and was established in early 2013. The startup focuses on providing authentic virtual reality experiences, with a primary emphasis on offering an entertaining experience that allows fantasy feel real. "Waltz of the Wizards," their game, is noted for its unique elements that highlight the potential of Metaverse experiences. Waltz of the Wizards has already grabbed popularity on Oculus Quest and other VR headsets, and Aldin is working on a slew of new releases with next-gen capabilities.



Founding Year: 2014
Location: Poland
Startup Domain: Virtual and Augmented Reality Studio

4Experience is a Polish startup that creates immersive, interactive content for virtual reality experiences in the fields of education, medicine, advertising, and entertainment. From VR-assisted stroke rehabilitation to VR safety awareness and AR medical inspections, the Polish VR and AR studio has generated 150 projects to date. The organization uses Unity 3D engine (a cross-platform game engine developed by Unity Technologies) to create solutions that run on both desktop and mobile devices such as Oculus Rift, HTC Vive, Samsung Gear VR, Google DayDream, etc.

Indian Startups Contributions to Metaverse Technology

According to WaterBridge Ventures Indian startups have a significant role to play in the Metaverse revolution. With 440 million gamers, India ranks among the top five global markets in terms of user base, accounting for 16.7% of the total 2.7 billion players worldwide. Speaking at Meta's Fuel for India Programme 2021, Facebook CEO Mark Zuckerberg stated that the organization was really excited about the role of India in building this virtual world (Metaverse) owing to India's talent pool, engineers, developers, creators and the startup ecosystem. Also, for the first nine months of 2020, India ranked number one in global mobile game downloads. This highlights that India is well on course to develop Metaverse spaces and no doubt that startups will also contribute in building this new world. Five Indian startups making strident developments in Metaverse include:



Founding Year: 2021
Location: New Delhi, India
Startup Domain: Food Metaverse development

OneRare is an Indian startup that has created the world's first Metaverse for the global food & beverage industry. OneRare is the first play-to-earn food Metaverse game in the world, with the simple goal of claiming your favorite dishes. To successfully unlock the dish NFTs (Non-fungible token), the player must follow instructions and harvest appropriate ingredients. The most intriguing aspect of this is that each recipe has only One Dish NFT. In other words, just one individual in the entire world will own the 'One Rare Dish.' The organization has built the first tokenization layer that celebrates Food in the virtual world - creating an immersive & gamified experience for users worldwide.



Founding Year: 2021
Location: New Delhi, India
Startup Domain: Virtual Spaces

LOKA, headquartered in New Delhi is India's first multiplayer gamified virtual Metaverse based on 3D maps of real-world cities and locations, where players can engage in a live and concurrent experiences driven by their favorite third-party apps. The platform offers 3D versions of cities and locations like Connaught Place in Delhi, Marine Drive in Mumbai, and MG Road in Bengaluru. The platform has an additional layer known as 'Feel, vibe and culture,' which has small elements like ambient sounds, background noises, NPCs, culture-specific virtual goods, etc., thereby retaining the feel and relevance of the location.



Founding Year: 2021
Location: New Delhi, India
Startup Domain: Virtual Spaces

Zippy, an Indian startup based out of Gurugram that develops Metaverse platform for runners and athletes. Zippy is a Metaverse space where people can run through major marathon cities (Boston, London, Mumbai, Tokyo), as well as enjoy scenic environments such as jungle routes, beach runs, and so on, alone or with friends, by creating avatars, that are aligned with the real mechanics of runners in the real world using fitness wearables or treadmill sensors. The platform connects users with fellow runners from all over the world and provides them with an on-demand, immersive, safe, and fun environment. The startup also wants to ensure that running is not dependent on external factors such as weather, pollution, or traffic, and that it is not boring or monotonous.



Founding Year: 2020
Location: Hyderabad, India
Startup Domain: Augmented Reality & Virtual Reality

NextMeet, based out of Hyderabad, is one of India's first avatar-based immersive platforms that enables virtual conferencing and networking in a 3D environment. The objective of NextMeet is to reduce the isolation and UI fatigue that are part of remote working models. To address this, it has introduced interactive surroundings, spatial audio and 3D avatars into its diverse environment to improve UI/UX. The company currently serves the mass market, particularly in categories such as corporations, educational institutions, virtual events and performances, and so on.



Founding Year: 2021
Location: Bangalore, India
Startup for: Augmented Reality & Virtual Reality

Interality, based out of Bangalore is a unique platform for creator and fan engagement in the Metaverse. The platform allows creators to capture and share their life experiences in augmented reality using NFT (Non-Fungible token)-based holograms. The startup is currently in its nascent stage and will unfold more about the platform in the near future.

Eminent industry players

facebook

Tencent

ByteDance

NetEase Games

NVIDIA®

 Microsoft

ROBLOX

unity

lilith

Intellectual Property Overview

While there has been a research earlier too, a focused development of Metaverse technologies commenced in 2006 with a patent filed by IBM titled “Activity triggered photography in Metaverse applications” to develop a system for collecting image data from within a Metaverse. However, actual patent filling activities grew robustly in 2008-09, with the introduction of the system for private conversation in a public space of a 3D virtual world. The graph below depicts the technological evolution of the Metaverse.

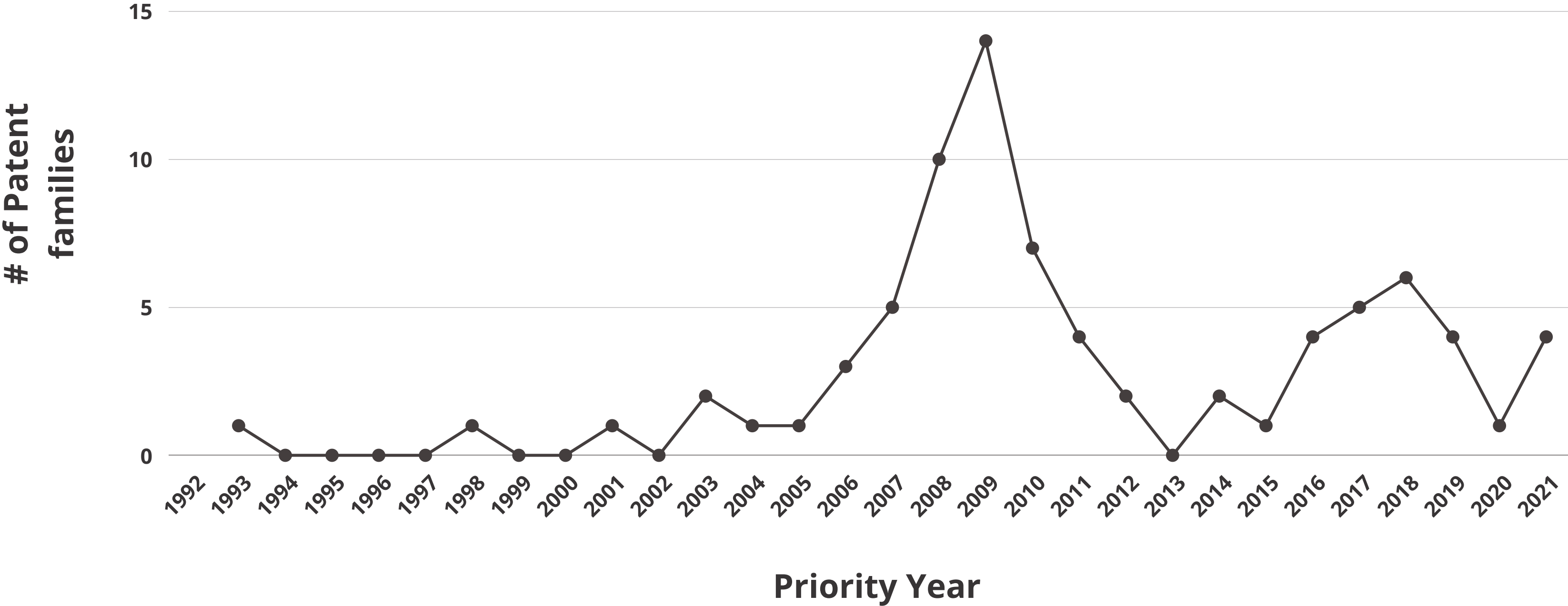


Fig - Patents filing trend

Geographical Jurisdiction

The Metaverse first flourished in the US mainly due to the region being one of the most technologically advanced and with the presence of a large number of market players such as Facebook Inc, Nvidia Corporation, and Roblox Corporation. While the Asia Pacific region promises to remain the fastest-growing region in the global Metaverse market due to a large population that has increasingly become the hub for tech-device manufacturing, and online communities, mostly taken a stronghold in China, followed by Korea & Taiwan. The next pie chart depicts the geographic coverage of the Metaverse patent families.

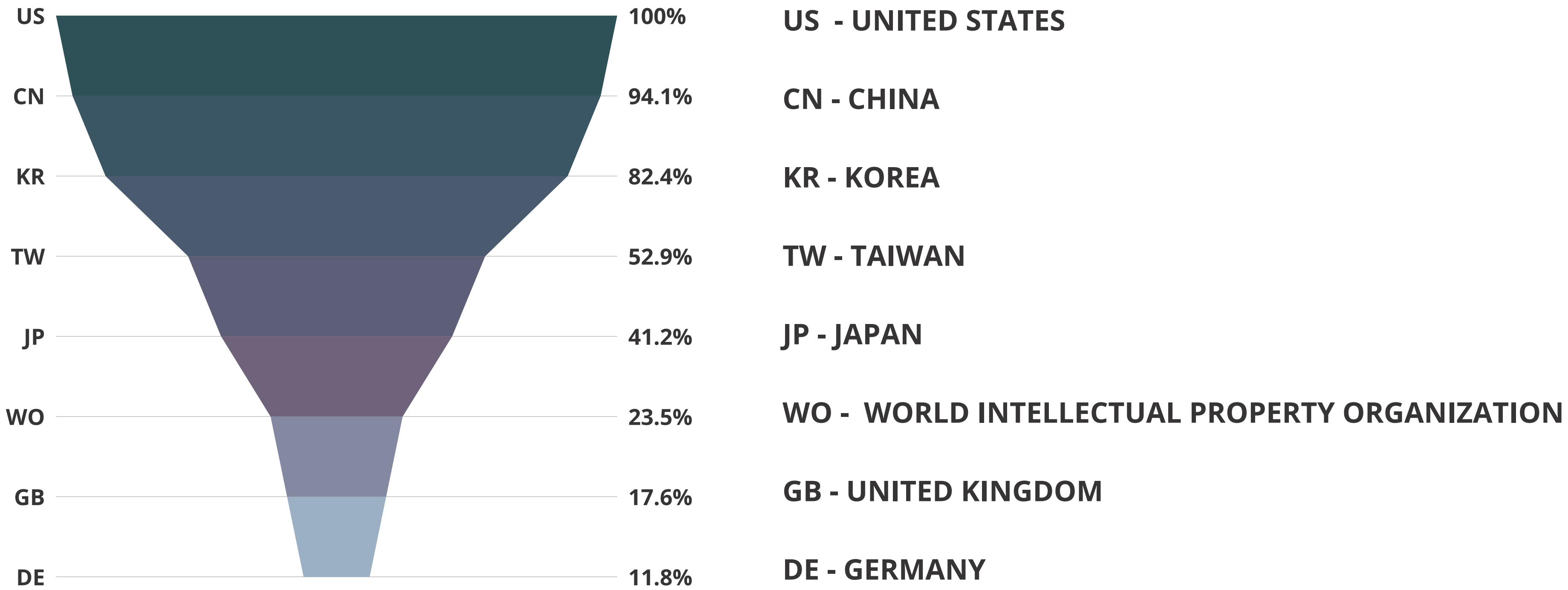
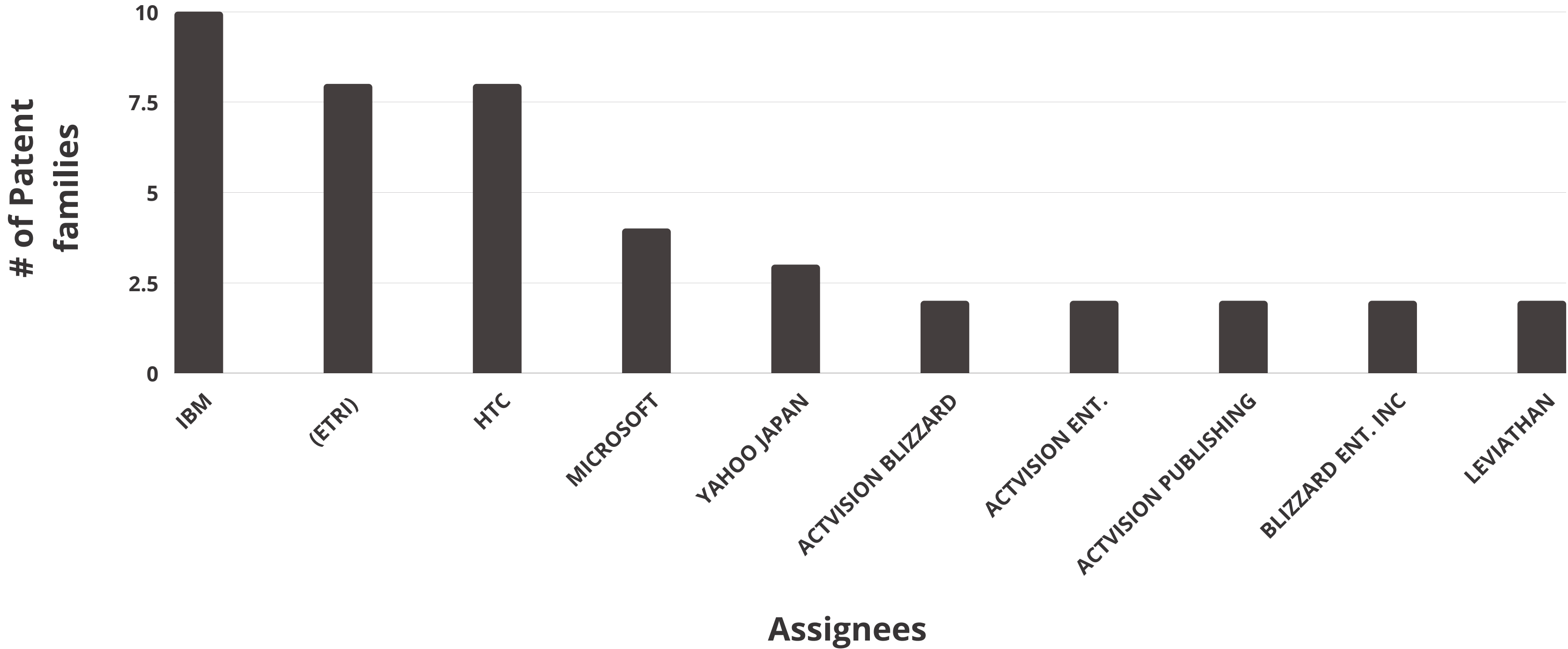


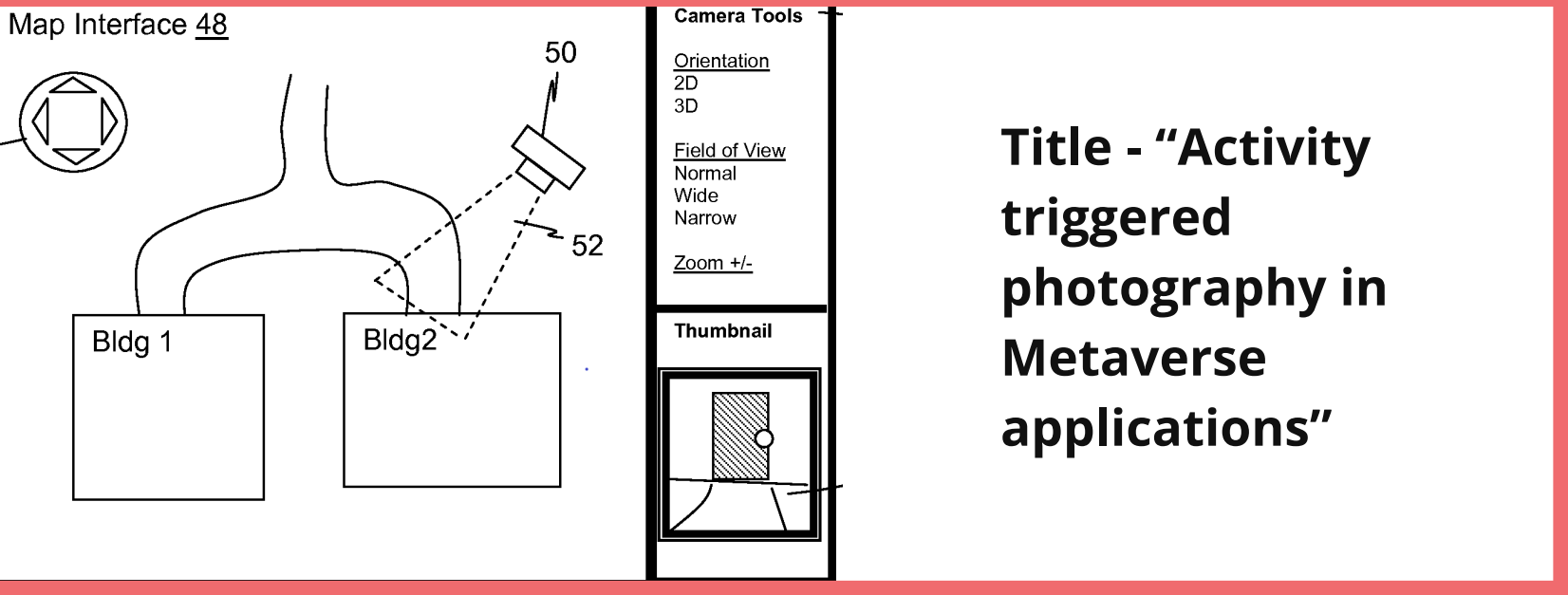
Fig - % Patents By Country Codes

Top Patent Assignees

IBM, HTC, Microsoft are the leading assignees in the Metaverse space. IBM has predominantly filed patents in systems and methods for users to interact within the Metaverse. HTC has played a vital role in developing virtual reality devices and their related accessories, while Microsoft was more concerned about building secure environments with regards to users data in Metaverse. The graph below showcases the top patent assignees in the Metaverse technology.



Notable Patents in the Metaverse landscape

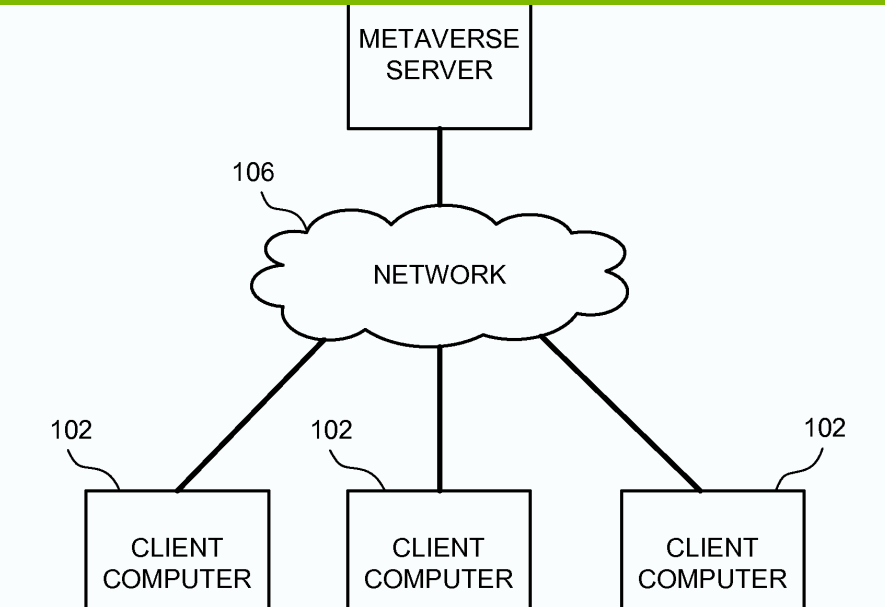


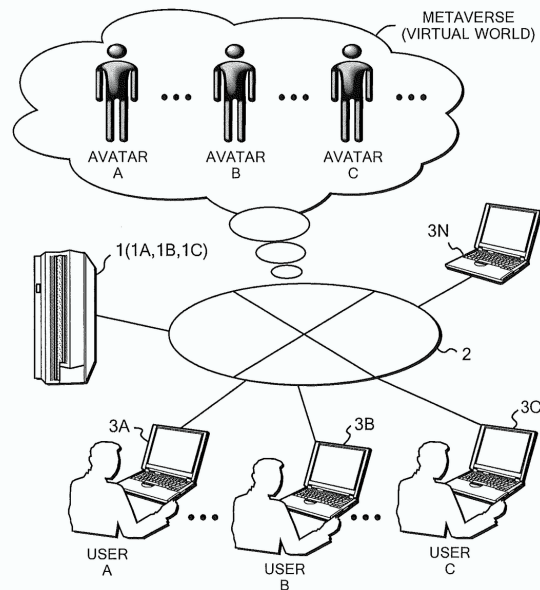
Title - "Activity triggered photography in Metaverse applications"

Patent (US9875580B2) filed by IBM Corporation in the U.S., relates to a Metaverse application that allows a user to collect image data from the Metaverse without being active in the Metaverse at the time when the image data is taken. The application allows users to deploy cameras in the Metaverse manually and define triggering events that, when detected, cause image data to be captured. Once the camera is installed, image data is collected for the user automatically independent of any actions of the user or the user's avatar.

Patent (US9165426B2) filed by IBM Corporation in the U.S. relates to a Metaverse system that allows users to attend a recorded past event in a Metaverse application. A computer user, a Metaverse server, and a time travel engine are all part of the Metaverse system. The Metaverse application communicates with the user's PC, and then the Metaverse server records the event environment of a previous event. The time travel engine provides a playback of the recorded event environment to the user's PC in response to a user request, allowing the user to attend and view the recorded event.

Title - "System and method for attending a recorded event in a Metaverse application"



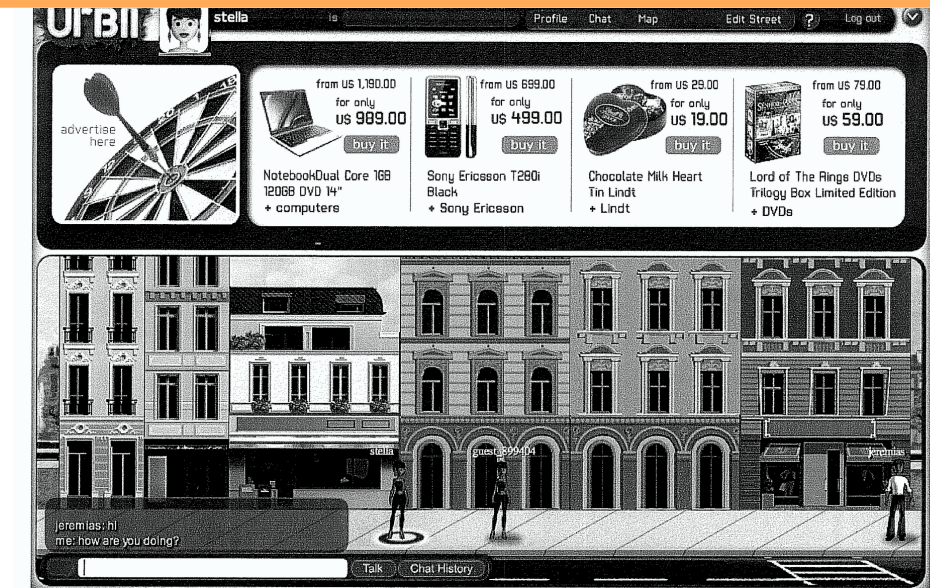


Title - "Determining whether object is genuine or fake in Metaverse"

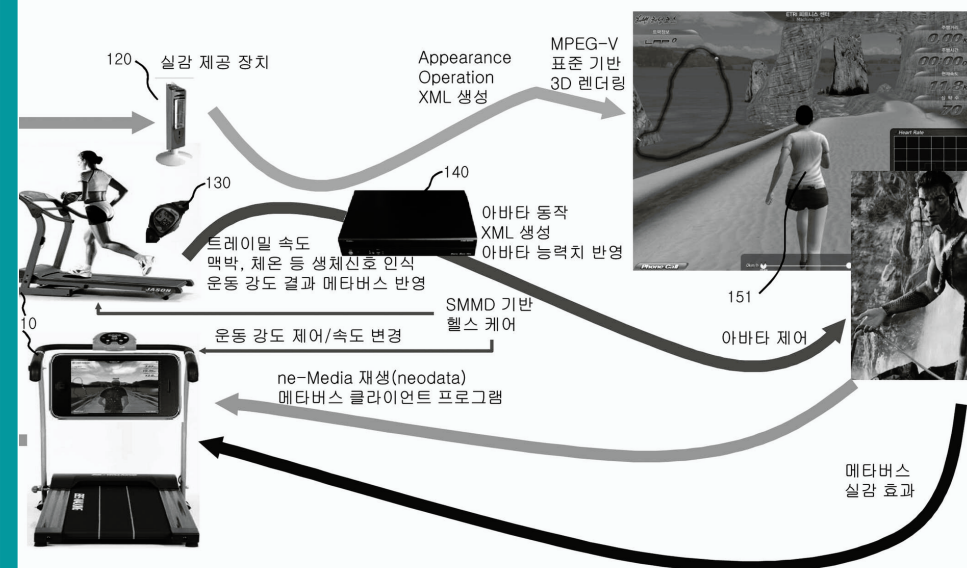
Patent (US9808722B2) filed by Activision Blizzard Inc. in the U.S relates to a system which includes a Metaverse server computer, user's PC and communication unit. The Metaverse server is connected to the user's PC through a network and controls the objects in the Metaverse accessed by the user. The server computer has a storage unit that stores an object ID that identifies an object that the user can access in the Metaverse, as well as authentication information connected with the object ID. The authenticity information indicates that the object is genuine.

Patent (US20100228633A1) filed by Axis Producoes E Comunicacao Ltd in Brazil relates to a system for hosting a Metaverse environment within a webpage and navigating within that environment. The Metaverse is created by integrating an interface in a web page and then constructing an avatar when a mouse moves over the interface under the control of a Metaverse environment user. A virtual reality street serves as the central point of the virtual environment associated with a particular URL, and is placed on the bottom of a webpage. The street is customized with a variety of facades, and the avatar is moved up and down the street by the user. The movement of the avatar allows it to interact with the facades that are built into the street.

Title - "Method and system for hosting a Metaverse environment within a webpage"

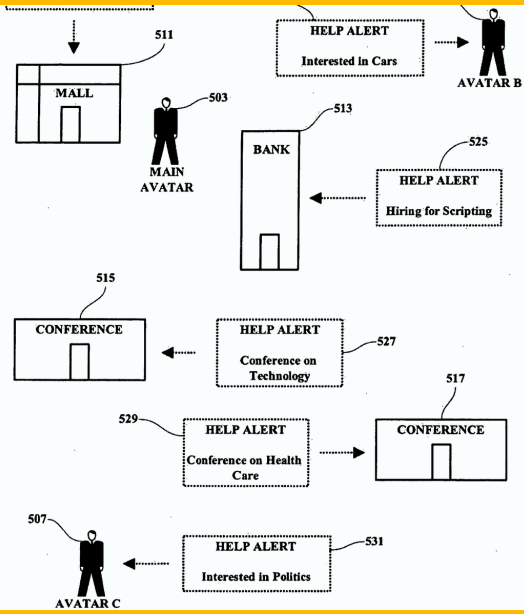


Patent (KR20120003588A) filed by Korea Electronics Telecomm in South Korea relates to a health-care system incorporating a Metaverse interaction function for providing an exercise environment and displaying a workout situation in virtual space. When a person exercises on a treadmill at home, it is incredibly monotonous, making it tough to exercise consistently. To deal with this, the system can display the user's current exercise condition in virtual space, and create a realistic exercise environment based on the user's movement in virtual space, and give the user optimized exercise assistance.



Title - "Health care system having function of interworking with Metaverse"

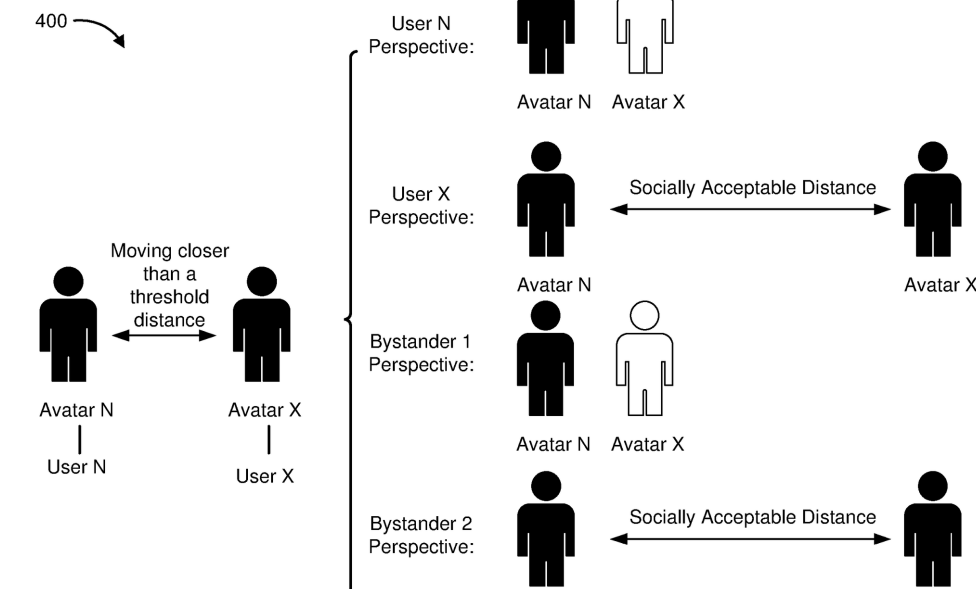
Title - "Profile-based help for Metaverse applications"



Patent (US20090276703A1) filed by IBM Corporation in the U.S. relates to a system that allows a user to construct a user profile by uploading information about his or her own interests, such as what they want to do in a virtual world application and how the application may best satisfy the individual's demands. Users can describe their interests by filling a form, and information about places, and events will be presented based on the user input parameters that may be relevant to the user in accomplishing the individual user's objectives.

Patent (US20210339143A1) filed by Apple Inc. in the U.S. relates to a zone where users will find themselves in scenarios where they'll want to protect their social identity in the Metaverse from intruders or at least suppress them. For instance initially, the avatars are fully visible but when one or more avatar social interaction criteria are breached, the avatars and content in connection with behaviors of the avatars can become partially invisible or fully invisible.

Title - "Method and device for attenuation of co-user interactions in simulated reality (SR) space"



Conclusion & Future Prospects



The Metaverse is expanding thick and fast. From the beginning of its technological journey in 1932 to the present, there has been constant development in this 3D virtual landscape, with its mystery of user experiences only thickening and becoming more intriguing. The tech heavyweights are pumping billions into making this platform available to the general public across the globe. The market has always been on the rise, and market opportunities are expected to grow at a rapid rate throughout the next forecast period. The gaming industry currently provides the most immersive experiences and is a primary driver for the Metaverse ecosystem.

From tech powerhouses to fledgling startups, everyone has already begun to explore the Metaverse's limitless potential. We've also noticed that the APAC region, particularly India, has a great opportunity of becoming a leader in the Metaverse startup ecosystem. Although we observed that there are a few legal and security challenges that are hindering this technology from serving a larger number of people, but thanks to ongoing innovation and patent filing, these issues should no longer prevent individuals from accessing this 3D virtual environment.

In the near future Metaverse will be largely dictated by how easy it is for people to transact in this 3D virtual space. This is where crypto tokens would come into effect wherein each virtual world will have its unique token allowing users to make digital purchases. Many have already started to get underway with a number of projects such as Axie Infinity, Decentraland, and The Sandbox that use them to support both real-world and digital transactions. Moreover, in the future, people would be able to seamlessly convert paper currencies to crypto tokens which will allow them to travel between the physical world and the Metaverse with ease. Also, Consumers would be able to purchase digital avatars and virtual land and even host gatherings for family members by using crypto tokens that are issued by organizations facilitating these virtual interactions.



While, the Metaverse opens up a vast array of possibilities, the question remains, however, as to whether the world is prepared for the Metaverse. In our opinion, there is a substantial lack of knowledge, devices, commercial feasibility, and ease of use among the general public, with the exception of technology enthusiasts. This lack must be acknowledged and organizations focused in this space need to take steps towards making it more easily acceptable by the larger world in order to make this the next internet sensation. Let's hope that more independent applications emerge that are easier to use, have a better user interface, and are commercially viable, marking the emergence of the full-fledged Metaverse.

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