

Overview: Technology Roadmap of the Future Trend of Metaverse based on AI Technique

Khadija M Abuzagia¹ Said A.A.Hadoud²

Al-Mergheb University¹
Libyan Authority for Scientific Research²
khadijabuzgia@gmail.com

Abstract

The renaming of Facebook to Meta in October 2021 ignited global enthusiasm for metaverses, and until the beginning of this year 2022, there was a lot of hype, skepticism, sarcasm, and confusion surrounding the concept of metaverses. For some, it has added to that bewilderment an elusive realm of augmented, mixed reality. However, for others, metaphysics is a historic moment in the extended realm of reality; A world is approaching the "second life" that many have long expected.

The news that some of the largest technology companies in the world are rapidly developing supercomputers powered by artificial intelligence has reinforced this expectation, but what will it mean for these computers to enter virtual reality and metaverses?

In this paper we will answer the following questions:

What is the value of the Metaverse? How will it look in the future?

What role does artificial intelligence play in building this new technology?

Is there an analytical framework that covers all its components?

What effects will this technology have on scientific research?

What technologies do organizations need to shape their Metaverse? Where are the jams?

Research paper goal:

This paper meets the need of researchers, and those interested in the field of computer, information and computing sciences, to learn more about the artificial intelligence of Metaverse, as there are still relatively few researches about it. The topic is in the field of technology and information.

research importance:

The importance of the paper stems from the fact that it discusses the link between two topics that are no less important to each other, the first is artificial intelligence and its effective role in creating virtual worlds through voice commands and allowing humans to have more realistic conversations using voice assistance and translation between languages, and the second is that metaverse is a futuristic concept for building Virtual environments where users can work, socialize and play, will be the successor to the Internet.

Research Methodology:

The descriptive and analytical approach was relied on in this paper, and illustrations and tables were used to present the conceptual framework of Metaverse and its techniques, and to try to confirm the effective role of artificial intelligence in the superior development of information and communication technology.

Keywords: Internet of Things, Blockchain, Real Education, Dieting, Dance, Reality, Augmented Reality, Reality, Extended Reality.

الملخص

أشعلت إعادة تسمية فيسبوك إلى ميتا في أكتوبر 2021 الحماس العالمي لميتافيرس، وحتى بداية هذا العام 2022، كان هناك الكثير من الضجيج والتشكيك والسخرية والحيرة المحيطة بمفهوم الميتافيرس. بالنسبة للبعض، فقد أضاف إلى تلك الحيرة عالمًا بعيد المنال من الواقع المعزز، والواقع المختلط. ولكن بالنسبة لآخرين، فإن الميتافيرس هي لحظة تاريخية في عالم الواقع الممتد؛ عالم يقترب من "الحياة الثانية" التي توقعها الكثيرون منذ فترة طويلة. الأخبار التي تفيد بأن بعض أكبر شركات التكنولوجيا في العالم تطور حاسبات فائقة تعمل بالذكاء الاصطناعي بشكل سريع قد عززت هذا التوقع، ولكن ماذا سيعني دخول هذه الحاسبات للواقع الافتراضي والميتافيرس؟ في هذه الورقة سنجيب عن التساؤلات الآتية:

ما هي قيمة Metaverse؟ كيف سيبدو في المستقبل؟

ما الدور الذي يلعبه الذكاء الاصطناعي في بناء هذه التكنولوجيا الجديدة؟

هل يوجد إطار تحليلي يغطي جميع مكوناته؟

ما الآثار التي ستحدثها هذه التكنولوجيا على البحث العلمي؟

ما هي التقنيات التي تحتاجها المنظمات لتشكيل Metaverse الخاص بها؟ أين الاختناقات؟

الكلمات الدالة: انترنت الأشياء، البلوكتشين، التعليم العميق، الذكاء الاصطناعي، الميتافيرس، الواقع المعزز، الواقع المختلط، الواقع الممتد.

Introduction

The modern age is fortified by massive images of innovative technologies. Cloud computing IoT, flickering, learning to dance, quantum computing, virtual reality, augmented reality, digital twin and blockchain are modern technologies of the 20th century[1].

Metaverse can be considered a new form of internet that is still straight, in its concept, your trust in it. Quotes from around the world meaning to define it.

It is time for an accelerated interest in metaviruses. This indicates that the uses of metavirs may expand to include all aspects of life, in addition to increasing the chances of an individual moving away from his concrete reality and escaping from failure and problems that he may face.

In fact, the place where you're looking for impact is looking into the field of computer and information sciences and computing, to more learning about retro dance in reality, where there are actually places to eat. This topic holds in the field of technology and information.

The metaverse is defined as a vast virtual space where users can interact with 3D digital objects and virtual 3D avatars of each other in a complex way that mimics the real world.

The idea of the metaverse was first coined by science fiction writer Neal Stephenson in the early 1990s, but the concept of the metaverse is not a new term. The word metaverse first appeared in 1992 in a fictional piece called Snow Crash written by Neal Stephenson. In this novel, Stevenson defines the metaverse as a large virtual environment. It is a conceptual extension of that scene that can be imagined as a “real” virtual world that is a complete simulation and a complete mirror of the real world [2].

Vision and Values

This is an original creative virtual world that contains all the elements of the real world, but its elements do not contain the corresponding elements of the real world. People can use their imagination and creativity to create virtual people, things, and environments. New entities, new regulations, new wisdom will embody innovation in this original virtual world.

This new entity is a home for people, things, and environments that are completely formed in the virtual world, with no real-world counterparts. In this Metaverse, there will be new "people" who are not avatars, but created people who only exist in the virtual world. Other examples include non-replaceable symbol objects (NFTs) such as images, audio, videos, artwork, and buildings. In this original virtual world, editing some of the physical and spatial conditions of the real world creates a virtual natural environment.

Organization has three aspects in this new, original virtual world:

Governance by decentralized autonomous organizations (DAOs), which is quite different from the centralized model in the real world;

User Generated Content (UGC) instead of Platform Generated Content (PGC), which will totally free people to be creative and allow anything to be created; the movement of people in the virtual world is not restricted by actual physical or spatial rules.

New wisdom refers to artificial intelligence (AI). In addition, virtual people, although only found in the Metaverse, would have the same or greater wisdom as humans in the real world.

Most AI systems today seek to mimic humans by listening, speaking, and reading, writing, smelling, touching, moving, and thinking. One day the wisdom of artificial intelligence will surpass humans, and that day is not far off as technology accelerates, with the computing power of Nvidia's CPUs now said to be a million times faster than it was 10 years ago.

Convergence and interaction between the real and the virtual The virtual world and the real world will form a closely related and interacting world – from real to real, from real to virtual, virtual in reality, real in virtual – like a “live action” version of the coexistence of robots in the real and virtual worlds.

This closeness and interaction means that the Metaverse will transcend both the real and virtual world, returning to the original meaning of the word "Meta". The degree to which the virtual world converges and the real world interacts with it is a critical criterion in assessing the value of the Metaverse [3].

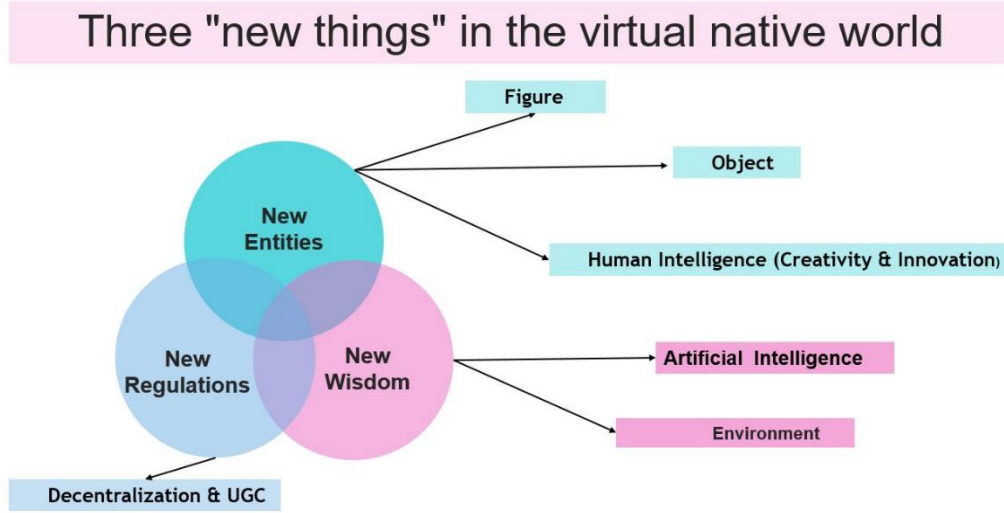


Figure 1. Three "new things" in the virtual native world

The metaverse can have several layers, which are expressed as:

1. Infrastructure: 5G, 6G, WiFi, cloud, data center, CPUs and GPUs.
2. Human interface: mobile phone, smart watch, smart glasses, wearable devices, head-mounted display, gestures, voice, and electrode pack.
3. Decentralization: edge computing, artificial intelligence agents, blockchain, and microservices.
4. Spatial Computing: 3D Engines, VR, Augmented Reality (AR), XR, Geo-mapping and multitasking.
5. The creator economy: design tools, asset markets, e-commerce, and workflows.
6. Discovery: advertising networks, virtual stores, social organization, ratings, avatars and chatbots.
7. Experience: gaming, social, e-sports, shopping, festivals, events, learning and work.

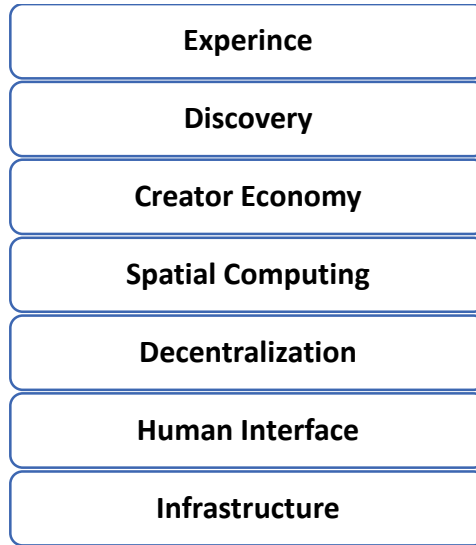


Figure 2. Seven layers of the Metaverse platform.

It is not difficult to see the presence of artificial intelligence within the layers, with machine learning (ML) and deep learning (DL) algorithms, besides its importance in many diverse aspects. Many ML algorithms with supervised and unsupervised learning in classification and regression models for voice recognition and other language processing tasks that enable system agents to understand user commands. With input data for sensory signals collected by multiple devices, such as a mobile phone, smartwatch, and other wearable devices, complex patterns of human actions can be analyzed and learned for some applications such as physical activity recognition that allows the system to perceive user activities and interactions in a situation Global default.

Recently, DL has emerged as a powerful tool for artificial intelligence dealing with the practical issue of understanding complex patterns from confusingly chaotic big data. With great success in the field of computer vision, DL is now being utilized in various fields, such as wireless communications, human-computer interaction, gaming and finance.

A few years ago, NVIDIA introduced DL Super Sampling (DLSS), a pioneering technology that harnesses the power of DL and other AI algorithms to boost frame rate while maintaining beautiful, sharp in-game visuals, thus the ability to improve the visual experience in the metaverse.

Metaverse properties

As a new Internet application, Metaverse integrates a variety of new technologies and has multiple technology characteristics; as a new social form, the Metaverse has social characteristics As parallel and closely related to the real world In the virtual world, the Metaverse has hyper-spatiotemporal characteristics [4].

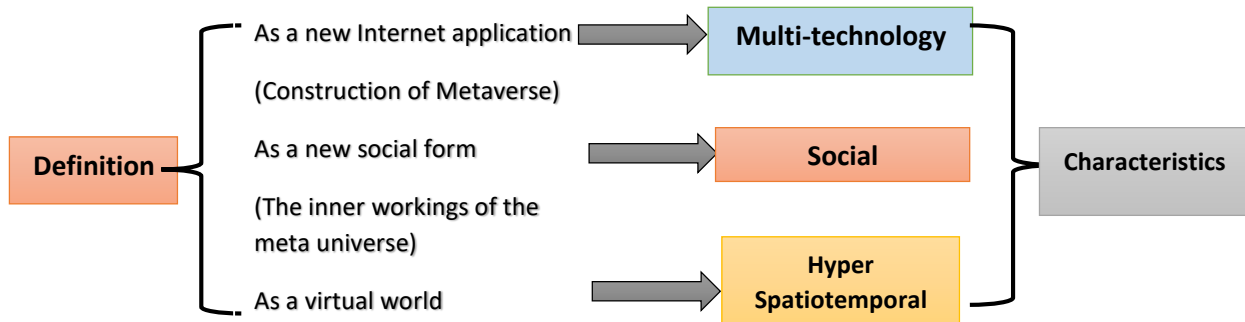


Figure 3. Characteristics of the Metaverse

Plurality of technologies: Metaverse incorporates a variety of new technologies. It provides an immersive experience based on augmented reality technology, generates a mirror image of the real world based on dual digital technology, and builds an economic system based on blockchain technology.

Social: As the definition says, the Metaverse is a new type of social form. Metaverse includes economic systems, cultural systems and legal systems, which are close to each other related to reality, but have their own characteristics.

Excessive spatiotemporal: Hyper Spatiotemporally refers to the Metaverse, a virtual world parallel to the real world. It breaks the boundaries of time and space and offers users an open, free, and immersive experience [5].

Since the Metaverse operates in a middle layer between the real world and the virtual world, it needs the following characteristics:

- The tool used to implement the Metaverse universe must be lightweight, accessible and portable.
- Metaverse intermediary execution system should be transparent, as the user should not need technological knowledge currently; the standard interactive technologies of Metaverse are the following: Somatosensory technology is commonly used in home entertainment and medical healthcare. It helps users interact with digital devices using hand gestures [6].

XR Technology: XR is a combination of VR (Virtual Reality), AR (Augmented Reality) and MR (Mixed Reality) called extended reality. In general, XR is a form of wearable computer-based technology for human-computer interaction [7].

Arithmetic issues: Computational power is the ability of a computer to process data. It contains the following parameters to judge its performance data processing, transmission and storage.

Having a very stable network is mandatory to support multiple simultaneous users.

Moreover, as a new technology host for the Metaverse, cloud computing needs increasing computing power. Besides the server side, user devices have to be more intelligent and computationally efficient to get a high quality Metaverse experience.

Privacy issues: In the Metaverse, every identity is close to an actual global existence, so there must be a strict privacy check for Metaverse identities. Data privacy must be ensured in the Metaverse universe.

Cyber Syndrome: Cyber Syndrome is a phenomenon that refers to massive social, physical and mental disorders Internet use [8].

Metaverse can bring tangible value to people and the real world. This is the primary driver of the Metaverse wave. In the end, the value that the Metaverse will bring to people is multifaceted, both moral and material, including five main elements, as in the following table:

TABLE 1. Metaverse user value

Entertainment:	Games and social activities, where players enter the Metaverse to enjoy immersive and realistic interactions, resulting in an enjoyable gaming and socializing experience.
Second Lives:	Collaboration platforms where creators build their personal worlds in a virtual space, giving individuals a chance to experience a life different from the real world.
Real-world efficiency:	Technologies such as digital twins, XR, and artificial intelligence can improve the efficiency of many industries, including education, manufacturing and retail. Activity in these industries will be unrestricted by time and space, experiences will be upgraded, and quality will improve
New Wealth:	Virtual currencies and trading in virtual items provide an opportunity to redistribute wealth
New Impact and Social Status:	In virtual societies, creating a different avatar for the individual and participating in social activities provides opportunities to achieve a new social status These five values mean that although the emergence of the Metaverse has temporarily slowed, it retains huge potential for growth and value increase.

Current bottlenecks in the development of Metaverse

Metaverse development is still in its infancy, although the market has high expectations. Ultimately, the perfect figure of the Metaverse will arrive, and he will inevitably face bottlenecks that must be breached. The main bottlenecks at this stage are:

- Accessibility to the virtual world. Currently, wearables including AR/VR combos continue to dominate people's entry into the Metaverse. In the future, entering and interacting in the Metaverse will be more flexible and convenient. Just like the League of Legends meeting in The Avengers, there will be no need to wear cumbersome equipment. After connecting to a line, the other party's avatar will appear in front of you and your avatar will appear in the other party's space, enabling simulated interaction. The VR/AR combo just got more lightweight and convenient, and within 10 years, AR contact lenses must mature. Overall, there are still significant technical limitations and more creative thinking is needed.
- Rules of governance in the virtual world. This requires research, exploration, and long-term testing of the design of social, economic, cultural, tax, legal, and governance rules in the virtual world. If this is too conservative, then the construction of the Metaverse will not meet expectations. If it is too radical, it will intensify the contradictions and even threaten the real world.
- Industrial Metaverse applications. Nowadays, Metaverse is mainly used on the consumer side, including entertainment, social networking, gaming, and NFT arts. It is not closely integrated with industry and manufacturing. Real-time sustainability, digital twins, and integrated reality

in the Metaverse have deep application prospects for manufacturing, but technological limitations mean that this potential is still far from realised.

- Information security and privacy. Network security and data privacy have become increasingly serious issues in recent years. The characteristics of the Metaverse, such as sustainability, real-time, connectivity, and creativity, indicate that the amount of data you host will increase exponentially, and data retrieval and use will become more frequent. How to balance information security and the development of the Metaverse needs a forward-looking study.
- Power supply. The complex mechanisms of the Metaverse consume significant power resources for network, storage and computing. Its stable operation will inevitably require building a new infrastructure. Existing 5G networks, IDCs, HPC, and AI are far from meeting the conditions required for a smooth Metaverse experience. In addition, amid a trend towards global carbon neutrality, the question of how to build and operate infrastructure in a green way also needs to be considered.

TABLE 2. The major bottlenecks in the Metaverse

Metaverse Rules Creation	Normal operation of the economic and social systems of the Metaverse requires a series of rules and institutions to support it.
Industrial Application	At present, the Metaverse is mainly used in entertainment, games, and other fields, which lack entry points and a focus on deep integration with production. There has yet to be demonstration and benchmarking application on the production side.
Data Security & Privacy Protection	The scale of data in the Metaverse will increase exponentially, involving a large amount of personal privacy information, and data collection and use must be controlled.
Metaverse Energy Supply	Stable operation of the Metaverse is inseparable from the support of data centers, computing power centers, network equipment, and communication base stations. Operation of this infrastructure requires a large supply of energy, which needs to be green and low-carbon.

Artificial Intelligence in the Metaverse

In light of globalization, the world is witnessing a deep and rapid development at the economic, political, social and technical levels. Because of the depth and speed of this development in the field of information technology, the world has entered the era of the information society, and at the present time, in light of the intense international competition, information and informatics have become the raw material for any human activity. The developed world is racing among themselves to develop strategies and plans for the development of information technology, and this is accompanied by the emergence and spread of computers, which have become an imperative need for all institutions, due to their strong advantage in processing and storing a huge amount of information in an organized, fast and accurate manner, in addition to the development of communication devices and satellites. The researcher is far from the source of the information from accessing it and reshaping it to invest in his research, and the importance of information and its technologies had the greatest impact on the emergence of the term “informatics” and other terms such as “information science”, artificial intelligence, and systems and sciences based on it [9].

Why does virtual reality need artificial intelligence?

There are a number of things that the Metaverse application needs that can only be accomplished with the help of artificial intelligence, including:

- **Accurate avatar creation:** The AI engine can analyze 2D user images or 3D scans to come up with a highly realistic simulation display. A variety of facial expressions, emotions, hairstyles, signs of aging, etc. is then drawn to make the avatar more realistic. Companies like Ready Player Me are already using AI to help create metaverse avatars, and Meta is currently working on its own version of the technology.
- **The VR world expands on a large scale:** when the AI engine is fed with historical data, it learns from previous outputs and tries to invent its own data, so the output of the AI will improve every time, with new inputs, human feedback, as well as enhanced machine learning. Eventually, artificial intelligence will reach a point where it will be able to perform the task and provide outputs almost like humans [10]. Companies like NVIDIA are training AI to create entire virtual worlds. This hack will be instrumental in driving the scalability of Metaverse, where new worlds can be added without human intervention.
- **Digital humans:** Built entirely using artificial intelligence technology, digital humans are essential to the metaverse landscape. Digital humans are 3D versions of the chatbots found in Metaverse. They are more like AI-enabled NPCs in a video game that can react and respond to your actions in a virtual reality world. Previously, companies like Unreal Engine and Soul Machines have already invested in this direction.
- **Intuitive Communication:** AI can assist with Human-Computer Interactions (HCI). When you wear a high-end VR headset that supports AI, its sensors will be able to read and predict your electrical and muscle patterns to know exactly how you want to move within the Metaverse. AI also helps recreate a true sense of touch in virtual reality. In addition, voice-enabled navigation, so you can interact with virtual objects without having to use manual controls.
- **Multilingual accessibility**

AI can help deconstruct natural languages such as English, convert them into a machine-readable format, perform analysis, access a response, convert the results back into English and send them to the user. This whole process takes a split second - just like a real conversation. The best part is that the results can be converted into any language, depending on the training of the AI so that users from all over the world can access the metaverse.

Eventually, AI will be able to perform the task and deliver an output almost like humans. Companies like NVIDIA are training AI to create entire virtual worlds.

Potential dangers of Metaverse

The progress of the Metaverse will pose significant potential risks related to addiction, privacy, intellectual property, economics, oligopoly and governance.

- **Addiction:** With the continuous development of the Metaverse, the risk of addiction is becoming more and more important. Metaverse breaks the physical rules of the real world, redefines production and lifestyles in the digital world, and transforms social productivity. However, new visual stimulation and interactive experiences can make people addicted to the virtual world and unable to extricate themselves from it. It is therefore crucial to find a way to balance the relationship between the real world and the Metaverse, and to allow the latter to play a more positive role.
 - **Privacy:** The Metaverse will become a massive, highly complex, open and dynamically optimized system that is more integrated than the "old" Internet that existed in people's work and daily lives. Any malicious use of the data recorded through every interaction of people with Metaverse will bring significant risks to people's privacy.
 - **Intellectual Property:** With the integration of the digital and real worlds, the ownership and distribution of intellectual property in the virtual world and the problem of misappropriation of virtual items will pose a challenge to the management of intellectual property.
- Economics:** Economic risks include the possibility that the discrepancy between the huge economic value in the virtual world and the virtual nature of this value will lead to speculative behaviour, or that the Metaverse is attacked, invaded, disrupted and destroyed, resulting in damage to the real-world economy and social development [11].
- **Oligopoly:** Building the Metaverse requires a huge amount of investment to achieve mass user interaction and the formation of standardized standards, and needs stable service providers, which creates potential oligopolistic risks. Avoiding this danger is critical to the development of the Metaverse.
 - **Governance:** the most desirable relationship between the virtual and human beings. Whether decentralization in the digital world is realized or becomes just the embodiment of the personal will of a group of developers; the impact of the digital world on the real world; The division of governance across the virtual and real worlds is a major problem that is difficult to solve [12].

Metaverse Tactics

The Metaverse presents a huge opportunity but also a huge risk. Companies aiming to adopt the Metaverse should take the following approaches:

Effective teaching. Metaverse is basically a new technology-driven revolution in society with a profound impact. To embrace this change, organizations must understand its full scope before looking for opportunities in the Metaverse.

- **Gaining the first mover advantage.** Companies hoping to enter the Metaverse and provide services to businesses or individuals must move quickly, provide targeted solutions, and introduce customer awareness to amplify results. The capital market, companies and individuals are quickly accepting the concept of the Metaverse. Despite recent declines in market valuations for Metaverse-related companies, they gained acceptance much faster than the internet when they came out. This means that every window of opportunity will not do that Long-term openness and first advantage is the key.

• Treating the Metaverse as an advanced digital transformation. Companies wishing to empower themselves with Metaverse technologies and models can consider this part of a comprehensive digital transformation and upgrade intelligence.

When the Metaverse concept was proposed, all related technologies were already in place and had varying scopes of application. All the same technologies are also required in digital transformation. The Immersive Experience of Metaverse.

Suitable for marketing and consumer interactions, research, development and manufacturing use digital twins and 3D simulations, and artificial intelligence algorithms are already widely used.

• Focus on business model innovation based on core competitiveness. Companies that want to enter the Metaverse market to develop innovative businesses must explore the Metaverse value chain to find a link in that chain that fits their current capabilities. For example, the four layers of the NFT market have corresponding core capabilities, and the infrastructure of the NFT blockchain requires.

Advance the digital industry and advance the integration of Metaverse, big data, cloud computing, blockchain, geospatial information, and quantum technology with the real economy.

The effects that this technology will have on scientific research

Some aspects of the metaverse have already made their way into universities. The real revolutionary potential of the metaverse lies in how to allow more profits to be made in higher education. As recent research into digital technologies and higher education offerings, these developments may increase income from students' experience and exploit the work of academics.

The metaverse will allow students to have an increasingly "electronic" college experience, as the virtual world fuses with the real world. Many students have already experienced something similar. During the pandemic, learning has shifted between online and in person.

The metaverse has the potential to change how college education is monetized and academics' work. It was a university lecture delivered in real time, by a real lecturer to a real limited audience of students - one commodity. The advent of virtual environments such as Zoom has changed this.

Now the lecturer often teaches both an audience of real students and a virtual audience simultaneously. Personal lecture and presentation are two commodities that can be bought and sold, which increases productivity and profits. In the metaverse, what was originally a single lecture can become available in multiple formats.

If academic lectures are recorded as the intellectual property of universities rather than individual lecturers, the metaverse academic may find their words and ideas reassembled and presented through artificial intelligence in the metaverse. These technologies could allow the production of an infinite number of lectures by a range of animated academics and avatars.

The hypotheses of experts imagine a completely different future for the education sector due to the penetration of metaverse technology in it. It is expected that the era of traditional

education, two-dimensional books and non-interactive environments will end, and be replaced by interactive three-dimensional education in virtual universities supported by metaverse technology. This will allow non-national students to attend lectures in a 3D virtual environment and interact with the rest of the students, and their love of learning will not be hindered by physical, political or health constraints.

But there is another hypothesis that predicts the failure of e-learning. The environment, teachers and virtual colleagues, in addition to the possibility of technical problems remaining, may be the most important reasons for not accepting and spreading three-dimensional education. Thus, traditional education will continue in real environments, and its limitations will continue to create problems for the acquisition of knowledge.

The largest companies operating in the field of Metaverse

The idea of a massive online virtual world is certainly exciting, and hundreds of companies have seen the clear potential in the future of the metaverse. But what companies are in the Metaverse space and why are they doing it?

The reason why major companies are interested in and investing in the metaverse is that metaverse platforms have the potential to change how, when and where businesses interact with their customers, because augmented reality platforms enable businesses to offer new experiences and information in new ways.

The Metaverse may initially be seen as a place for sightseeing, creativity, and entertainment. But sooner or later the underlying technology will evolve and eventually provide opportunities to propagate stable states in key industry sectors such as banking and healthcare, Table (3) shows the most important companies operating in Metaverse.

TABLE 3. The most important companies operating in Metaverse

1	Meta (Facebook)	Facebook has been a staunch advocate of the development of metaviruses on a large scale. they changed their name to Meta, which included Facebook, Instagram, and Oculus VR, which shows us how serious she is in the field. It is clear that Meta Corporation already has many key elements in the world of metaverse; The most important of these elements: — VR messaging which is important to help connect users in an immersive way. — Project Cambria A virtual headset compatible with the world of Oculus Quest VR headsets and glasses. — Horizon Marketplace A place where buyers, sellers and creators can exchange digital goods.
2	Amazon	Amazon has introduced Metaverse technology into its digital marketplace by integrating AR View for the platform. AR View allows buyers to design and decorate their homes using augmented reality. The Amazon Showcase is a visual design tool that allows shoppers to select, place, and preview furniture in custom rooms. In this virtual environment, you can change the wall and floor color according to your home and change the products inside and outside the

		room. All these features are just the beginning. Amazon has more plans in mind. The company recently began hiring top optical computer scientists, program managers, designers, researchers, and technologists to build an AR/VR product.
3	Apple	Apple, as one of the best companies in the Metaverse space, intends to expand the real world and create life-changing solutions instead of creating a series of fascinating facts that almost confuse people's senses without any real purpose. We've already seen Apple with the iPhone, iPad, and Apple Watch, and tested them with the iPod. The re-emergence of the Mac in the past 20 years, and product design requires that the product provide purposeful and meaningful experiences.
4	Microsoft	In January 2022, the company announced that it would acquire Activision Blizzard, a massive video game developer and publisher, as part of securing a major site in the Metaverse. Microsoft's main contribution to the world of metavirus is the launch of the Mesh service on Teams, and this comes in light of the trend of working from home, which has grown significantly during the global pandemic, as well as the obsession with the world of metavirus. The software will be available on standard hardware and VR headsets to provide a permanent virtual office experience.
5	Google	Google is getting a lot of experience in the field of augmented reality by launching its "Google Glass" product. In November 2021, Google reorganized the Virtual Reality (VR) and Augmented Reality (AR) departments into the new Google Labs team developing Project Starline, its holographic video chatting tool. Google is now placing more emphasis on connecting users with avatars that combine the digital and the real world. Although we haven't seen a clear proposal from Google for metaviruses, it does have the basics to make it into this world.
6	Tencent	Tencent is a Chinese multinational company that provides digital products and services to improve people's lifestyles. This company was founded in 1998. Currently, Tencent is in the field of e-commerce, internet and payment services. This multi-service provider focuses on the Metaverse through game developer TiMi Studio Group. With some of the best companies under its umbrella, Tencent will focus on the Metaverse strategy specifically through its Game Development division.
7	Binance	Binance plays an integral role in the metaverse due to the importance of crypto and blockchain. Metaverse allows the creation of new financial systems and processes, and helps Binance provide the necessary infrastructure for these operations. For example, Binance's NFT Marketplace provides a place for buyers and sellers to trade NFT virtual assets from multiple blockchains. This helps improve interoperability between the different Metaverse ecosystems .
8	Epic Games	Epic has two main goals for Metaverse: First, it wants to develop Fortnite into a platform that can attract and support 60 million monthly users. Another goal is to make 3D content, augmented reality, and virtual reality (which is critical to an open and interconnected metaverse) more accessible and to grow the factory ecosystem. This feature allows anyone to create professional 3D content and helps improve the quality of the Metaverse experience.
9	Nike	Nike, in collaboration with Roblox, has distinguished itself from the rest of its competitors to enter the metaverse and has created the best sneaker brand in the virtual world called "Nikeland" on the Roblox gaming platform. The virtual world offers a free game space to explore where players can try on new sneakers. Players can also run Nike's

		Metaverse marathon on Roblox. Nike's identity as one of the top participating companies in the Metaverse is sure to inspire more companies to join. With immersive experiences at Nikeland, Nike can reach customers on a friendlier level and increase target audience engagement.
10	Dyson	Dyson, as a manufacturer of luxury home appliances, has entered its metaverse. This company created the Dyson Demo VR, whose visualization and simulation technology is also used by the company's engineers. This technology helps test and develop new products and software for the UK-based company. Customers can now test hair dryers, straighteners and conditioners at home on the virtual platform.
11	Adidas	Adidas launched the Non-Fully Token Series (NFT) called "Into the Metaverse" in collaboration with Bored Ape Yacht Club (BAYC), PUNKS Comics and the famous influencer; GMoney launch. NFT holders will have access to limited-edition sneakers and apparel, as well as the brand's upcoming three-line metaverse.
12	Boeing	Boeing is looking to incorporate Metaverse features into the aerospace industry, something that could revolutionize the design and production process and make it one of the best companies in the Metaverse space. Boeing will be able to create 3D virtual versions of its designs, called "digital twins," to make simulations more realistic. Each plan is accompanied by a "digital string" containing all the information from the beginning of the project, including the parts, certifications and requirements for the airlines.

Conclusion

Tech joints pay full attention to the Metaverse to make it come true. With the help of advances in computing technology, the Metaverse will change the virtual world and make it more interactive and embodied before the Metaverse takes over the entire economy and technology. There should be attention to some open issues such as ethical standards, privacy and other issues. This paper reveals the Metaverse's basic concepts of metaverse . several key technical aspects, that artificial intelligence has great potential to strengthen the infrastructure of systems and raise an immersive three-dimensional experience, and the prosperity of services embedded in virtual worlds significantly. AI tools should be cheap for everyone and have easy-to-use interfaces. Issues related to user-generated metaverses should be seriously examined with restrictions and policies between users and third party organizations to mitigate harmful risks and threats to individuals and communities when users synthesize hyper-reality media contents.

References

- [1]. S. A. Shah and N. Mazher, "A review on security on the internet of things," in November 2018 Conference: 1st International Multi-Disciplinary Research Conference (IMDRC 2017).
- [2]. J. Muhammet Damar ,2021, Metaverse Shape of Your Life for Future: A bibliometric snapshot, Journal of Metaverse, Volume: 1, Issue:1.
- [3]. Thien Huynh-The, Member, IEEE, Quoc-Viet Pham, Member, IEEE, Xuan-Quy Pham, Thanh Thi Nguyen, Zhu Han, Fellow, IEEE, and Dong-Seong Kim, Senior, IEEE : Artificial Intelligence for the Metaverse: A Survey(2022)p2.

-
- [4]. Huansheng Ning, Hang Wang, Yujia Lin, Wenxi Wang, Sahraoui Dhelim, Fadi Farha, Jianguo Ding, Mahmoud Daneshmand: A Survey on Metaverse: the State-of-the-art, Technologies, Applications, and Challenges(2021)pp12-13.
- [5]. Gopala Krishna Sriram: A COMPREHENSIVE SURVEY ON METAVERSE , International Research Journal of Modernization in Engineering, Technology and Science , Volume:04/Issue:02/February(2022), www.irjmets.com
- [6].] P.-L. Teh, P. K. Ahmed, R. S. Goonetilleke, E. Y. L. Au, S.-N. Cheong, and W.-J. Yap, "Technology Acceptance and Hand Anthropometry (TAHA) Model: Insights from somatosensory technology," Procedia Manufacturing, vol. 3, pp. 4197-4204, 2015.
- [7]. S. H.-W. Chuah, "Why and who will adopt extended reality technology? Literature review, synthesis, and future research agenda," Synthesis, and Future Research Agenda (2018),
- [8]. H. Ning, S. Dhelim, M. A. Bouras, A. Khelloufi, and A. Ullah, "Cyber-syndrome and its formation, classification, recovery and prevention," IEEE Access, vol. 6, pp. 35501-35511, 2018.
- [9]. Khadija Abuzagia : International intentions in the field of information technology(Artificial intelligence systems and their importance in the fields of education),IEEE Xplore 2017
- [10]. Muhammad Abu al-Qasim al-Ritimi , Artificial intelligence and expert systems,2012.
- [11]. Metaverse Jobs That Will Exist by 2030 <https://cult.honeypot.io/reads/10-metaverse-jobs-that-will-exist-by-2030/> Metaverse
- [12]. <https://www.researchgate.net/publication/358497370>.