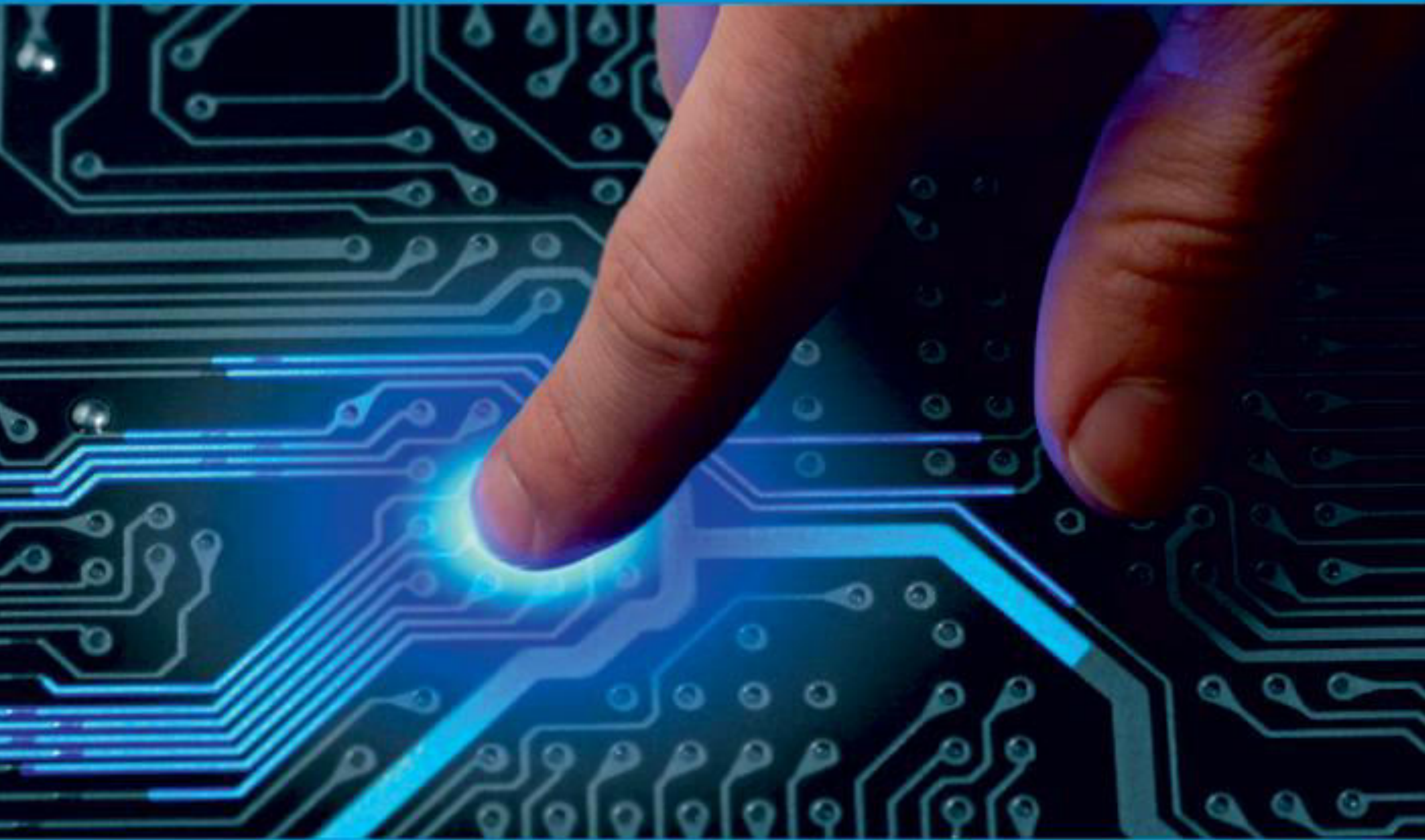
IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 10, Issue 6, June 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.165

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006001 |

The Metaverse and Web3: A New Era of Decentralized Digital Ecosystems

Mohit Mittal

Dr. A.P.J. Abdul Kalam Technical University, Lucknow, Uttar Pradesh, India

ABSTRACT: This intersection of Web3 technology and the metaverse constitutes a major leap into decentralized digital environments. Web3, which is based on blockchain technology, offers a user-centric architecture that allows users to own and control their digital assets, identities, and interactions. Blockchain ensures transparent, immutable records in the metaverse; smart contracts enable secure, trustless transactions to happen automatically. Non-fungible therapy tokens (NFTs) advance ownership online by showing original virtual items. Metaverse is a notion that envisions a communal, virtual shared environment that exists beyond the physical world. This space is shared by all individuals. It is a digital world in which users can interact with computer-generated surroundings, connect with other users, and participate in a variety of activities by utilizing AR, VR, and other immersive technologies. This article investigates how the integration of Web3 technology supports distributed governance, virtual commerce, and interoperable experiences, thereby ushering a new era of immersive, fair digital places. We also look at potential adoption chances as well as challenges.

KEYWORDS: Virtual Reality (VR), Smart Contracts, NFT Marketplaces, Deep Learning, Image Processing, Blockchain, Smart contracts

I. INTRODUCTION

The notion of a metaverse is predicated on the concept of a non-physical, collective, virtual shared world. All individuals in this vicinity use it. This virtual environment enables users to participate in many activities, interact with others, and experience computer-generated settings using augmented reality, virtual reality, and other immersive technologies. "Metaverse" is a fusion of "meta-" (denoting "beyond") and "universe," emphasizing the concept's vast and inclusive essence [1].

In the Metaverse, the absence of tangible borders allows users to seamlessly integrate their real-life and virtual experiences at their discretion. It surpasses the limitations of traditional online environments by providing continuous, integrated, and immersive experience accessible across many digital devices and platforms. Users may engage in many activities and have the capability to build their own avatar and virtual assets. This category includes several activities, such as gaming, socializing, attending virtual events, and holding virtual meetings. Virtual worlds, augmented reality, a virtual economy, and interoperability are essential components of the Metaverse. Technologies such as blockchain, which guarantees safe asset ownership, NFTs, which provide unique digital assets, and advanced AI systems, which allow realistic interactions in virtual environments, are attracting substantial investments. Numerous enterprises and IT aficionados are now examining the Metaverse.

The dramatic growth in the popularity of the metaverse in recent years may be attributed to technological improvements, increased processing capacity, and an escalating need for immersive and linked online experiences. The notion has the capacity to obscure the distinctions between the actual and virtual realms as it progresses, transforming the manner in which individuals socialize, work, and interact with digital material and other types of entertainment. The emergence and widespread adoption of the Metaverse signify a fascinating new phase in the evolution of the digital realm. The exploration of this undiscovered region offers new opportunities for creativity, collaboration, and personal expression.

Participants in the metaverse may engage with digital items and other users in real time using avatars, which serve as their representations in the virtual environment. Ensure you own a computer, a virtual reality headset, and access to an online role-playing game [2].

The phrase "software development" includes all activities related to the creation, design, release, and maintenance of

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006001 |

software. All of these elements pertain to computers. Individuals mostly accountable for software creation are referred to as programmers, software engineers, or developers. Although these positions are significantly interrelated, the connections among them differ substantially among communities and departments. Custom software development significantly differs from commercial software manufacturing in many major aspects. Bespoke development entails creating software tailored to a specific set of individuals, a defined objective, or both.

Individuals may conduct their daily activities inside the "mega smart space," which represents the convergence of the physical and virtual realms. A new global and economic system may plausibly arise. Metaverses, sometimes referred to as virtual worlds, enable people to engage in an alternate reality for their regular activities.

A significant advancement has been made in the development of an online virtual environment that amalgamates many communication modalities, including augmented reality, virtual reality, video, and both real and virtual holograms. The proliferation of the metaverse will render the creation of a hyper-realistic parallel universe feasible. The game makers want to influence the growth of the metaverse. The integration of video, virtual reality, and augmented reality may enable users to "inhabit" a digital environment.

The metaverse may potentially catalyze the spread of internet-based technology. Furthermore, devices like as mobile phones and general-purpose personal computers may facilitate access to metaverses. To improve the user experience with AR and VR, it is possible to enrich real-world environments with visual components, auditory features, and other sensory stimuli. This is executed to enhance user immersion. Augmented reality (AR) users may alter their physical presence in the real world using their cellphones. Virtual reality (VR) is a speculative technology that enhances previously conceived environments. The system bears the responsibility for user authentication, and operation is contingent upon the usage of a headset.

II. RELATED WORK

According to Lik-Hang Lee et al. [3], a digital "big bang" may occur, since they developed a comprehensive framework for assessing prospective metaverse advancements in relation to existing technologies and surroundings. Primarily, significant technology improvements facilitated the transition from the traditional Internet to a metaverse-based system with relative ease. The researchers engaged in this endeavor thoroughly examined each of these domains. User engagement with a self-sustaining virtual environment was enabled via applications developed inside the metaverse ecosystem. Six user-centric concerns were taken into account: trust and responsibility, social acceptability, virtual economy, security and privacy, and usability. Their suggestion was to develop a targeted research agenda to facilitate the advancement of the metaverse. Virtual worlds, or digital twins, will evolve in the next years owing to advancements in technology and improved ecosystems.

The rapid adoption of digital technologies across several sectors indicates that the pandemic experience will stimulate investment in digital enterprises. This explains why James Ferraioli became an essential resource during the COVID-19 epidemic, a period when the world was increasingly experiencing a sense of "remoteness." They anticipate a significant rise in financing for virtual reality and augmented reality in the next years. The technology behind virtual reality and augmented reality has reached a level of maturity that may lead to a more substantial confluence of the two domains. Research indicates that certain publicly traded companies have utilized VR/AR technology [4].

Marc Bridger and colleagues [5] used the word "metaverse sight" to denote an anthropomorphic metonym that expands the concept of metaverse simultaneity to include perceived quiddity. The interconnectedness of the metaverse's environment and the digital cultures that disseminate its concepts creates situations analogous to those of earlier social phenomena. Gaslighting, propaganda, stigma, and stereotypes are forms of interpersonal communication closely linked to doxing, swatting, cancel culture, and defamation. The media were overwhelmed with misinformation, including Twitter outbursts and deception, due to the storms that arose from these circumstances. While celebrities initiated the phenomenon of "cancelling culture," the tendency has since proliferated and been extensively advocated on social media. They used an artistic media that prompts meditation on the pixelated mirror as a co-creator of our reality via its reflections. The objective was to examine the new metaverse and its implications; hence, we undertook this investigation.

Ghislaine Boddington described the 'Internet of Bodies' that they had developed. As these two domains began to converge, we saw changes in three key aspects of human existence. The last point is that these components have been

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006001 |

regarded as the bridge [6]. Through a profound discourse among our collective consciousness and interconnected community, we may rekindle our intrinsic obligation to our data, to each other, and to our interrelated identities. This reinstated the right to privacy as an essential aspect of humanity, integral to our identity and, hence, defining our value as individuals.

Ben Falchuk has conducted research on the logical development of privacy solutions.
This section provided an overview of a deployment strategy that meets the criteria for social metaverse privacy initiatives. The objective of this section was to apply the analyzed concepts to a practical context. Players will access the requisite metaverses using cloud-based servers. User access to the cosmos is facilitated by the metaverse instance and engine. The in-game item, Privacy Manager, is intended to initiate, oversee, monitor, sustain, and assess the effectiveness of privacy strategies. The metaverse logic may be included into both server and client engines, enabling them to function as a metaverse. This solution enables VR users to protect themselves from intrusive observation while using the service [7].

The study revealed that thirteen American undergraduates, one graduate student, and an assistant professor from a Greek-speaking university had culturally specific challenges when conversing across the Atlantic in Second Life [8]. The conclusion of these global transactions occurred in IBM's virtual Green Data Centre. Class talks included the environmental initiatives of IBM, the European Union, and the United States. Internet-based technology, cultural and linguistic differences, and institutional and social structures are potential sources of ambiguity in human interactions.

III. THE ROLE OF BLOCKCHAIN, NFT AND SMART CONTRACTS IN THE METAVERSE

The emergence of the metaverse, characterized by interactive virtual environments and immersive experiences, has transformed the manner in which individuals interact with digital material. Technologies such as blockchain and smart contracts provide the foundation for these domains, ensuring decentralization, transparency, and security. This paper examines the possible applications of blockchain technology and smart contracts in the metaverse, emphasizing user identity management, decentralized governance, and asset ownership within virtual commerce. Moreover, it explores the challenges and possible pathways for progress in integrating these technologies. The phrase "metaverse" refers to a collective online space that integrates aspects of augmented reality, virtual reality, and the internet. The significance of reliable and transparent systems is increasing in these contexts. One potential solution is blockchain technology, which automates transactions via its decentralized ledger and smart contracts [9].

3.1 Blockchain in the Metaverse

Blockchain provides the underlying infrastructure to ensure trustless and transparent interactions within the metaverse [10] [11]. Key features include:

- **Decentralization:** Eliminates reliance on centralized authorities.
- **Security and Transparency:** Ensures tamper-proof recordkeeping.
- **Interoperability:** Facilitates seamless asset transfers between platforms.
- **Digital Ownership:** Enables verifiable proof of ownership through non-fungible tokens (NFTs).

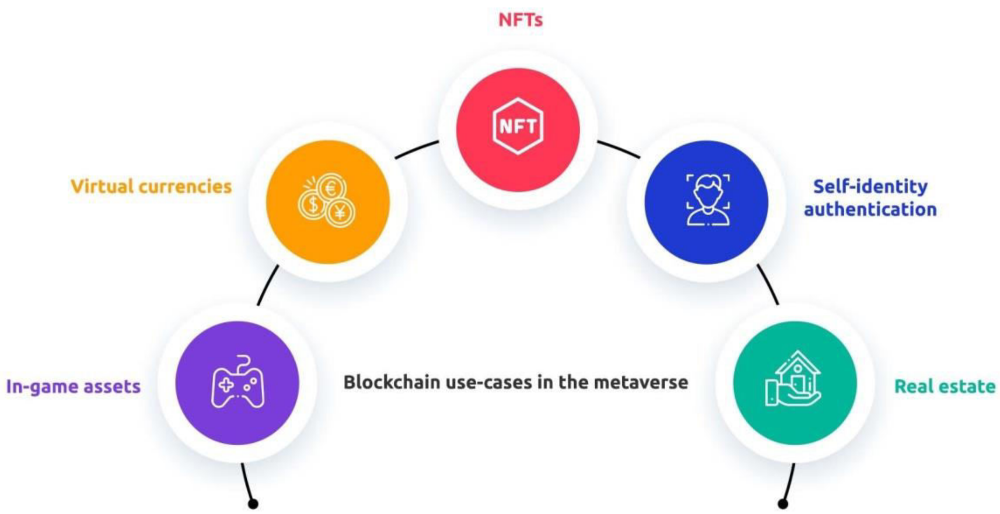


Figure 1: Block Chain use-cases in metaverse

3.2 Smart Contracts in the Metaverse

Smart contracts are self-executing programs stored on the blockchain, which execute predefined conditions automatically [12]. They enhance the functionality of the metaverse by:

- **Automating Transactions:** Reducing the need for intermediaries.
- **Enforcing Agreements:** Ensuring compliance through code-based governance.
- **Managing Digital Assets:** Facilitating real estate purchases, virtual goods sales, and in-game transactions.
- **Enabling Decentralized Autonomous Organizations (DAOs):** Supporting community-driven governance.

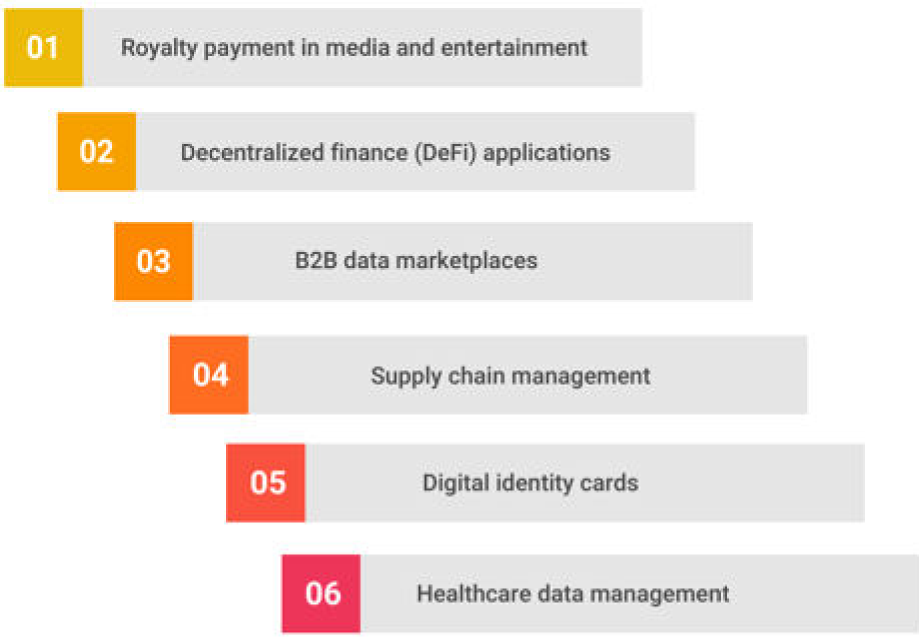


Figure 2: Uses of Smart Contracts

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006001 |

3.3 NFTs in the Metaverse
Non-fungible tokens (NFTs) are blockchain-based digital assets that represent ownership of unique virtual items. Their applications in the metaverse include:

- **Digital Asset Ownership:** Users can buy, sell, and trade digital items like avatars, virtual real estate, art, and fashion.
- **Provenance and Scarcity:** NFTs ensure the authenticity and uniqueness of digital creations, enhancing value.
- **Creator Empowerment:** Artists and developers can monetize their work through NFT marketplaces, earning royalties on secondary sales.
- **Interoperability:** NFTs can function across multiple platforms, allowing cross-world asset usage.

3.4 **Use Cases**
3.4.1 Digital Asset Ownership
Users can buy, sell, and trade digital assets like virtual real estate, collectibles, and in-game items using NFTs. Blockchain ensures ownership verification and asset transfer.

3.4.2. Virtual Commerce
Smart contracts enable secure and automated payment processing in the metaverse. Cryptocurrency transactions eliminate the need for traditional financial intermediaries.

3.4.3. Identity Management
Decentralized identities (DIDs) allow users to maintain control over their digital identities, enhancing privacy and security. Blockchain-based verifiable credentials ensure authenticity.

3.4.4. Decentralized Governance
DAOs leverage smart contracts to implement transparent decision-making processes. Participants can vote on proposals and govern virtual environments collaboratively.

IV. ROLE OF IMAGE PROCESSING AND DEEP LEARNING IN OBJECT DETECTION IN METAVERSE

Image classification tasks are ideally addressed by Convolutional Neural Networks (CNNs), sometimes referred to as ConvNets, a category of deep learning models designed for the processing and interpretation of visual data. Initially created to address deficiencies in the image processing skills of traditional neural networks, convolutional neural networks (CNNs) have subsequently revolutionized computer vision applications [13].

The primary aim of computer vision is to develop models that can precisely and autonomously extract valuable information from pictures and categorize it into established classifications. CNNs succeed in this context owing to their hierarchical and localized pattern learning approach. In convolutional neural networks (CNNs), the fundamental components are referred to as convolutional layers. These layers use kernels or filters to execute convolutional processes on the input pictures. The filters systematically analyze the incoming picture, detecting characteristics such as edges, textures, and forms. A significant advantage of this method is that it enables CNNs to identify hierarchical patterns in a spatially structured fashion. Subsequent to the convolutional layers, the spatial dimensions of the data are reduced by the pooling layers. A common pooling technique, the max pooling approach, restricts the maximum value to a specified range. This maintains the fundamental characteristics while reducing the spatial resolution. Pooling enhances the network's translation invariance and decreases computational complexity. Non-linearities in the network are added by activation functions such as the Rectified Linear Unit (ReLU). The network may now explore intricate data relationships. ReLU's simplicity and efficiency make it a favored option for CNNs [14]. Finally, the network's fully connected layers amalgamate the features acquired by the convolutional and pooling layers for event prediction purposes. Such layers enable the network to comprehend global patterns and correlations by linking each neuron to every neuron in the next levels above and below. The network's output is often converted into probability scores for each class by including a SoftMax activation function in the last layer. The results may be readily interpreted as class probabilities, since this guarantees that the product of the model's predictions equals one. The training of convolutional neural networks (CNNs) employs gradient descent and backpropagation [15]. To reduce the discrepancy between anticipated and actual class labels, the model adjusts its parameters during training. Forward propagation facilitates prediction in this methodology, whilst backward propagation is used to adjust the model's parameters based on the calculated gradients. A prevalent technique used by CNNs is transfer learning, which involves using models already trained on large datasets such as ImageNet. Practitioners may optimize the data gathered during pre-training for

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006001 |

particular picture categorization tasks. This is most accurate when dealing with weakly annotated data sets [16]. Conventional neural networks (CNNs) have shown exceptional effectiveness in image classification tasks, ranging from the recognition of basic objects to more complex ones. They excel in deriving significant representations from pictures owing to their capacity to autonomously learn hierarchical features. This is the reason they have become essential to contemporary computer vision applications. Over one million images from the ImageNet dataset were used to train the ResNet convolutional neural network. Residual Networks, also referred to as ResNets, have proven crucial in the progression of image categorization research [17].

Mitigating the Vanishing Gradient Phenomenon During the training of a conventional deep neural network with several layers, the vanishing gradient problem may occur, resulting in diminishing gradients as they propagate backward. ResNets use shortcut connections, sometimes referred to as skip connections, to address this issue. The connections facilitate the training of extremely deep networks by enabling the gradient to traverse the network more directly, hence mitigating the problem of disappearing gradients.

Facilitating the Training of Extremely Deep Networks ResNets allow the training of networks including hundreds, if not thousands, of layers, a feat that was previously unattainable with earlier architectures. The use of residual blocks with skip connections simplifies the learning of complicated hierarchical features by facilitating the preservation and propagation of gradients. The Utilization of Remaining Components The residual block is the most fundamental component of a ResNet. A residual block has many components, including batch normalization, ReLU activation, two convolutional layers, among others. Additionally, you get a direct link. The residual block enables the network to learn residual mappings by discerning the difference between the input and output of the block. The network's design facilitates the easier learning of identity mappings, which is essential for training deep neural networks. The enhanced training dynamics in ResNets are facilitated by the existing residual connections. The gradient is expedited by shortcut connections in the backpropagation process, facilitating more rapid and straightforward training. The enhanced dissemination of information is a factor that accelerates convergence during training [18].

4.1 Image Processing in NFT

The progression of computational capability, advancements in mathematics—particularly in discrete mathematics—and the increasing need for digital image processing across many industries such as agriculture, health, the military, and environmental science are all contributing factors. Examples of image processing procedures including rotation, scaling, cropping, edge detection, and file size reduction. Effectively handling large and high-resolution images is a critical consideration in the domains of imaging and NFT detection and classification. Processing the original, intricately detailed images prevalent in NFT imaging datasets may be computationally intensive and resource-demanding. Before using deep learning techniques for NFT detection, picture compression is a crucial preprocessing step. The dimensions of NFT images are reduced by the use of image compression techniques such as JPEG or PNG compression. Data reduction facilitates more efficient processing and analysis by reducing the computational requirements during training and inference. This is particularly significant in hospital environments where precise and fast diagnosis are essential, but computational resources are limited. Image enhancement is crucial in medical imaging for NFT classification, since it improves image quality before the processing of classification algorithms. To enhance the precision and dependability of NFT classification, a conventional method in image processing known as noise filtering is used to remove unwanted artefacts and clarify diagnostic features. Numerous types of artefacts, such as speckle noise and random noise, are often integrated into images throughout the imaging process. These disturbances may diminish the visibility of essential information, hence affecting the efficacy of subsequent classification algorithms. To enhance the quality of images for optimal NFT classification, noise reduction techniques such as median filtering or Gaussian filtering are used to diminish noise. Noise reduction has significantly enhanced image contrast, facilitating the differentiation of structures in medical imaging. The enhancement of contrast is very beneficial for NFT classification, where accurate boundary and feature identification is essential for diagnosis and treatment planning.

4.2 Image Enhancement for Improved NFT Classification

It is common practice to use deep learning models for NFT classification in tandem with image augmentation using noise filtering. The improved pictures might be used by convolutional neural networks (CNNs) and other deep learning architectures to learn complex patterns and characteristics of various NFTs. More accurate and resilient model training may be possible with the cleaner input data produced by noise reduction. When getting medical pictures ready for NFT classification, noise filtering is an important step in improving the images. Supporting healthcare professionals in their diagnostic and therapeutic decision-making processes, this preprocessing stage helps to more accurate and clinically meaningful outcomes by decreasing noise and highlighting key information.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006001 |

The goal of researchers is to reduce the size of pictures so that object detection in the meta-verse may be accomplished more quickly. Through the use of deep learning and picture compression technologies, we have accomplished the feat of detecting entities in the meta-verse.

Image processing: Several ways could be employed in picture processing to improve or extract important information. This kind of signal processing accepts an image as input and, based on the objective, either outputs the original picture or certain related attributes or features.

Image compression: Reducing a picture's file size while maintaining its visual quality. File compression allows for the storing of a greater number of photographs within the same memory or storage capacity.

Edge Detection: Edge detection is an image processing technique that identifies the boundaries of objects inside pictures. The sensor is operating as designed, targeting the specified object. Machine vision, computer vision, and image processing use edge detection for image segmentation.

Deep learning encompasses several methodologies within machine learning aimed at constructing artificial neural networks and acquiring representations. Both supervised and unsupervised learning are feasible options. An AI technology called deep learning seeks to imitate the way individuals acquire certain types of knowledge. Data science mostly depends on deep learning for activities such as statistical analysis and predictive modelling.

V. CONCLUSION

The integration of metaverse and Web3 technologies is transforming digital interactions by fostering decentralization, transparency, and user empowerment. Blockchain provides the basis for trustless ecosystems, guaranteeing verifiable digital ownership and unalterable data. Smart contracts optimize transactions and enable decentralized governance, while NFTs confer value and validity to virtual assets. Notwithstanding obstacles in scale, interoperability, and regulation, the ongoing advancement of these technologies ensures a more fair digital future. Through the adoption of innovation and the promotion of cooperation, the metaverse and Web3 will unveil unparalleled potential for artists, consumers, and communities, propelling the advancement of immersive and interconnected virtual experiences.

REFERENCES

[1] A. Cichocki and A. P. Kuleshov, “Future Trends for Human-AI Collaboration: A Comprehensive Taxonomy of AI/AGI Using Multiple Intelligences and Learning Styles,” Comput. Intell. Neurosci., vol. 2021, 2021, doi: 10.1155/2021/8893795.

[2] D. Gursoy, S. Malodia, and A. Dhir, “The metaverse in the hospitality and tourism industry: An overview of current trends and future research directions,” J. Hosp. Mark. Manag., vol. 31, no. 5, pp. 527–534, 2022, doi: 10.1080/19368623.2022.2072504.

[3] L.-H. Lee et al., "All One Need to Know about Metaverse: A Complete Survey on Technological Singularity, Virtual Ecosystem, and Research Agenda,” vol. 14, no. 8, pp. 1–66, 2021, [Online]. Available: http://arxiv.org/abs/2110.05352.

[4] J. Ferraioli, “AlphaCurrents,” pp. 1–12, 2021, JOURNAL OF LATEX CLASS FILES, VOL. 14, NO. 8, SEPTEMBER 2021.

[5] M. Bridger, “Externalities of the Metaverse Gaze A Thesis Submitted to the Faculty of the Painting Department in Partial Fulfillment of the Requirements for the degree of Master of Fine Arts in Painting at Savannah College of Art and Design Marc Bridger Savannah, Georgia Copyright © Marc Bridger, July 2020 Christopher Williams, Committee Chair Stephen Knudsen, Committee Member Todd Schroeder, Committee Member," no. July 2020.

[6] G. Boddington, “The Internet of Bodies—alive, connected and collective: the virtual physical future of our bodies and our senses,” AI Soc., no. 0123456789, 2021, doi: 10.1007/s00146-020- 01137-1.

[7] J. Udell, “The Social Metaverse.,” InfoWorld, vol. 28, no. 42, p. 48, 2006, [Online]. Available: https://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=22943027&site=ehost-live.

[8] S. K. Hadjistassou, “Culturally afforded tensions in the second life metaverse: From sustainability initiatives in Europe to sustainability practices in the United States,” Int. J. WebBased Learn. Teach. Technol., vol. 11, no. 2, pp. 14–38, 2016, doi: 10.4018/IJWLTT.2016040102.

[9] L.-H. Lee, T. Braud, P. Zhou, L. Wang, D. Xu, Z. Lin, A. Kumar, C. Bermejo, and P. Hui, “All one needs to know about metaverse: A complete survey on technological singularity, virtual ecosystem, and research agenda,” arXiv preprint arXiv:2110.05352, 2021

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006001 |

[10] H. Ning, H. Wang, Y. Lin, W. Wang, S. Dhelim, F. Farha, J. Ding, and M. Daneshmand, "A survey on metaverse: the state-of-the-art, technologies, applications, and challenges," arXiv preprint arXiv:2111.09673, 2021.
[11] M. Dotan, Y.-A. Pignolet, S. Schmid, S. Tochner, and A. Zohar, "Survey on blockchain networking: Context, state-of-the-art, challenges," ACM Computing Surveys (CSUR), vol. 54, no. 5, pp. 1–34, 2021.
[12] X. Jian, P. Leng, Y. Wang, M. Alrashoud, and M. S. Hossain, "Blockchain-empowered trusted networking for unmanned aerial vehicles in the B5G era," IEEE Network, vol. 35, no. 1, pp. 72–77, 2021
[13] Di Pietro, R., & Cresci, S. (2021). Metaverse: Security and privacy issues. 2021 third IEEE international conference on trust, privacy and security in intelligent systems and applications (TPS-ISA), Atlanta, GA, USA.
[14] Duan, H., Li, J., Fan, S., Lin, Z., Wu, X., & Cai, W. (2021, October 20-24). Metaverse for social good: A university campus prototype. Proceedings of the 29th ACM International Conference on Multimedia, Virtual Event, China.
[15] OGDEN, S. S.; GUO, T. Characterizing the deep neural networks inference performance of mobile applications. arXiv preprint arXiv:1909.04783, 2019.
[16] XU, X.; TODOROVIC, S. Beam search for learning a deep convolutional neural network of 3d shapes. In: IEEE. 2016 23rd International Conference on Pattern Recognition (ICPR).
[17] EWAK, M.; SAHAY, S. K.; RATHORE, H. An overview of deep learning architecture of deep neural networks and autoencoders. Journal of Computational and Theoretical Nanoscience, American Scientific Publishers, v. 17, n. 1, p. 182–188, 2020.
[18] MUZAHID, A.; WAN, W.; SOHEL, F.; WU, L.; HOU, L. Curvenet: Curvature-based multitask learning deep networks for 3d object recognition. IEEE/CAA Journal of Automatica Sinica, IEEE, v. 8, n. 6, p. 1177–1187, 2020.

INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor: 8.165

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर
NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

Scan to save the contact details