

Evolution of Web 3.0: A Comprehensive Review

Harshitha Reddy Chitukula^{1*}, S. Phanindra Reddy², M.D.N. Akash³ and Ramesh Karnati¹

¹Department of Computer Science and Engineering, Vardhaman College of Engineering, Hyderabad, Telangana, India

²Web3 Wibe, Hyderabad, Telangana, India

³Searce Inc., Hyderabad, Telangana, India

*Correspondence to:

Harshitha Reddy Chitukula
Department of Computer Science and Engineering,
Vardhaman College of Engineering,
Hyderabad, Telangana, India.
E-mail: harshithareddychitukula@gmail.com

Received: September 19, 2023

Accepted: December 06, 2023

Published: December 11, 2023

Citation: Chitukula HR, Reddy SP, Akash MDN, Karnati R. 2023. Evolution of Web 3.0: A Comprehensive Review. *NanoWorld J* 9(S4): S540-S545.

Copyright: © 2023 Chitukula et al. This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY) (<http://creativecommons.org/licenses/by/4.0/>) which permits commercial use, including reproduction, adaptation, and distribution of the article provided the original author and source are credited.

Published by United Scientific Group

Abstract

In this paper, we explored the potential impact of Web3 technologies on the future of social media. Web3 technologies, such as blockchain and decentralized networks, offer new opportunities for social media users to own and control their data, leading to increased privacy and security. However, they also present challenges in the form of technical complexity and the need for platforms to achieve sufficient scale and reach. Overall, the future of social media in Web3 is both exciting and uncertain, with the potential for decentralized technologies to transform the landscape of online communication.

Keywords

Web 3.0, Blockchain, Crypto

Introduction

Nanotechnology's potential impact on information processing within Web 3.0 is a key focus. This includes discussions on nanoscale computing, storage, and transmission capabilities, potentially revolutionizing how data is handled and utilized in the decentralized web landscape. This review provides an insightful exploration into the convergence of Web 3.0 and nanotechnology, highlighting the potential synergies and the transformative impact this integration might have on the future of the internet and technological advancements.

Evolution of the Web

The period of time spanning the 1990s and the early 2000s is typically referred to as Web 1.0. During the time of Web 1.0, the flow of information and content was mostly unidirectional. Websites made information available for consumers to take in with minimal to no participation required on their part. This began to change in the early 2000s with the advent of social media platforms such as Facebook and the growing popularity of blogs. On these platforms, users became more than just consumers of information and also creators of their very own content, which was a significant shift from the previous state of affairs. Web 2.0, also known as the Social Web, refers to the two-way interaction that takes place among users and the internet. This is the type of the web that is currently in use by most people.

Shortcomings of Web 2.0

Although Web 2.0 is interactive and allows users to create their own content and share it with their followers, it has some drawbacks that Web 3.0 seeks to address. Closed ecosystems and centralization are the main causes of Web 2.0 prob-

lems. A small number of huge, centralized companies control access to platforms, own the data they collect, and dominate the Social Web. The following is a list of the major advancements that Web 3.0 applications aim to make.

Ownership

Users are strongly reliant on the platform providers even when they create content on websites like social media or save data in the cloud. This has a number of drawbacks because centralized organizations can delete accounts at will, ban particular content, or abuse user data. In Web 3.0, users are the owners of their information and have control over how it is used, including the option to be compensated if their information are utilized for profit-making endeavors.

Openness

Web 3.0 applications share the transparency of public blockchains. The source code for these programs is freely available online. As we have seen in the DeFi space, users can check to see if a protocol actually performs what it claims to, and they can also replicate, change, and enhance protocols. This introduces a level of openness and creativity to the web that is now impossible due to the prevalence of proprietary systems and algorithms.

Interoperability

In Web 2.0, it might be difficult, if not impossible, to move a user's data and audience from one platform to another. The size of an influencers or brand's YouTube viewership is not necessarily indicative of their potential Instagram following. As such, content creators need to build individual fan bases for their various works. Web 3.0's open and interoperable architecture allows content producers and businesses to follow their audiences and consumers wherever they go [1, 2].

Reliability

Recent global outages affected social media platforms like Facebook, Instagram, and WhatsApp. Decentralized networks allow Web 3.0 applications to continue functioning even if a single node (server) fails, eliminating the need for a kill switch or maintenance windows. When compared to their centralised predecessors, Web 3.0 apps benefit from this infrastructure's increased security and dependability.

Closing thoughts

The introduction of Web 3.0 holds forth the possibility of further democratising and opening up the internet. If it is implemented successfully, the fully decentralized web will provide consumers with increased control on their data, a significantly heightened level of transparency regarding the protocols utilized by applications, as well as improved dependability and safety. In the next entry of this blog, we will discuss a few of the exciting new ventures being undertaken in the Web 3.0 arena [3].

Deep dive

For Web 1, in the 1990s, we still remember the IP addresses that we used to type in order to access the news and our email. The web page starts loading, and you obtain the information you were looking for. It is exactly the same as read-

ing a letter, with the exception that you are unable to respond to the sender. You are currently browsing Web 1.0, which only provides you with static information and does not allow you to participate in any discussions. Reading the material is the sole option, and it is very fundamental to the web. During the 2000s, we gained access to platforms such as Facebook and YouTube, on which we are able to produce content, send messages, and do much more. It's the same as being able to receive and send letters to anyone, but the postman can read your letters and sell any information he gleans from them. All of the apps we use, like Google and Facebook, have authority over our data and are trying to sell us advertisements. All of our data will be stored in their data centers, where they will be able to access it and utilize it for their own commercial purposes. This is the issue relating to privacy that concerns us, and we do not benefit in any way from it. They have certain points in our lives where they decide what is in our best interest and control our interests. Even the content that you produce does not belong to you solely in any way. It is the property associated with the platform. To find solutions to the issues in Web 2.0, we would use Web 3.0. You will have access to all of the features of Web 2.0 and even more, but the information you share will remain confidential. Using blockchain technology, all of the information is kept safe and secure in an encrypted blockchain that contains blocks from all over the world. Here, you can write and receive letters in whatever way you wish, but the postman will not be able to read your letter because it will be written in a specific code and will be fragmented. Even through Web 3.0, it is possible to make money. Such as the web browser Brave, which allows users to choose whether or not to display advertisements and then shares 70 percent of the revenue generated by those advertisements. Your data will be saved in blockchain, and rather than being exploited or sold to other merchants, it will be kept private. Your information will be in your sole control at all times. The information presented here pertains to Web 3.0.

Social Media Changes for Web 3.0

At this time, you do not have ownership over the content you upload to social media platforms like Facebook and YouTube. They are owned by the platforms. There is a problem with the fact that creators are not accorded sufficient importance. You have no control over whether or not the platform decides to restrict or remove any of their content, and the platform can do either. You are eligible for a share of the advertising revenue, but there are several conditions attached. In this Web 2.0 context, the creators' full potential is not being utilized at all. The key players are the only ones who can have any kind of impact or change. Regular individuals are unable to construct on such a huge scale and still improve upon what already exists. There is no choice for you to make on the platforms that you use. In the Web 2.0 space, people are nothing more than a commodity, and they have no authority within their grasp. The upcoming modifications will involve different aspects, such as data ownership, user experience, decentralization, and privacy, among other things.

User benefits

For using the platform or watching the advertisements on

Web 2.0, there is no incentive for you to use the site because you will not receive any incentives for doing so. However, in Web 3.0, you may receive financial compensation for doing so. When you use Web 3.0, none of your data will be viewable by other users. You have the ability to put your data to work for you, such as with the Web 3.0 application of the Brave browser. With this application, you may earn brave tokens simply by surfing the web, and the application also preserves your data in a distributed ledger [4]. You will receive compensation for viewing those advertisements, and you are free to switch off the feature whenever you like. This is not the case at the moment, but things will be different on Web 3.0 social media in the future.

Advantages for the creator

You are not allowed to assert ownership over the content that you produce as a creator because it legally belongs to the platform. All of your material will be stored in non-fungible tokens (NFTs) when you go to Web 3.0. You will always have full ownership of your material, and you will be able to earn and trade NFTs in a market. You have the ability to bring people together around you and to establish an economic system in which everyone benefits. You are not going to be stopped by companies, and you cannot be discriminated against by anyone. Censorship is not an option for you. It is possible to realize unrestricted freedom of expression. The Web 2.0 platform will take a significant portion of the money that you have earned while using their service. In the Web 3.0 applications, it will be significantly less than that.

More Web 3.0 Uses

Metaverse

Imagine a future in which you will be able to travel, have fun, and earn money all at the same time. The virtual reality platform known as Metaverse enables users to engage in conversation with their own individualized digital personas. You have a wide variety of possibilities available to you, such as a world in which you can work for a specific firm or a place in which you can socialize with your friends and play video games. The term “metaverse” refers to an immersive collection of online gaming settings that rely heavily on either 3D interactive play with other players or offline augmented reality experiences. On the other hand, this will develop over the next few years. When we are in lockdown, our schools, offices, and every aspect of our lives become replaced with video conversations and online meetings. However, the immediate necessity is for the creation of a better atmosphere. Because of this, the use of social media to create metaverses has increased. Everything changed when Facebook made the announcement that it is a meta business and is in the process of developing a metaverse. According to a survey by a global investment firm called Citi, the business is estimated to be worth more than 47 billion dollars and would probably be worth more than 13 trillion dollars by the end of this decade with 5 billion users. There are so many different ways in which the social metaverse can be put to use; we will go over some of them here.

Take away the geographical restriction

Within the comfort of our own homes, we are able to complete all of the necessary tasks, including shopping, enjoying entertainment and gaming, and traveling. You are able to collaborate with anyone, regardless of their location, anywhere in the world. There will be countless opportunities, and those with talent will be recognised and rewarded regardless of where they live.

Representation

You are able to portray yourself in 3D while still maintaining your anonymity if you use an avatar. You are able to preserve both your public and private selves if you keep up a social profile.

Understanding

The utilization of the metaverse can increase learning by a factor of ten, due to the fact that people learn considerably more quickly after gaining extensive experience. One of the most important applications of the metaverse will be in the areas of learning and implementation.

Gaming

One of the most widespread applications of the metaverse is gaming, which will play a significant role in the development of social media and entertainment in the years to come. The new era of blockchain gaming has arrived with GameFi. SandBox and Decentraland are two of the most important projects currently underway.

Virtual real estate

Developing virtual worlds for a variety of uses, including amusement, workplaces, gaming zones, travel, and other applications. These could see an increase in demand, which would result in an entirely new real estate market for lands. Due to the fact that we will have identities and investments in the social media of the future, this is an essential component. Ex: Upland.

Health care

Doctors are able to treat patients from any area in the world because there are no geographical restrictions. The standard of medical care will dramatically improve, and blockchain-based health ledgers will allow for the efficient modification of necessary procedures.

Privacy

Because your public identity can be concealed, you will have more control over the privacy of both yourself and the data you provide.

Effectiveness and inventiveness

Because the majority of the systems will be based on the blockchain, many users will be able to contribute to the system's evolution and create entirely new applications for it. Because everyone will have the ability to build, the level of innovation will reach its highest point. You have the ability to

bring people together around you and to establish an economic system in which everyone benefits [3, 4].

Web 3.0 Advantages

Ownership of information or data

End users will restore sole control of one's data, and encryption will ensure that their data is safe. Then, people could share information based on permission, need, or case basis. Large companies such as Facebook and Amazon store personal data like interests, income, credit cards, dietary preferences, and so on, on a large number of servers. They don't just collect this information to improve their services; they sell it to marketers and advertisers, who spend billions of dollars each year for it.

Access to information

When it comes to Web 3.0, mobile and cloud-based applications are two of the most critical factors driving the shift toward accessing data from any location. The goal is to provide as much information as possible to the user from any location. As a result of this innovation, gadgets may gather and access user data, while smartphones can obtain information on your PC.

Elimination of the central point of control

As a result, blockchains such as Ethereum provide a secure environment in which all data is encrypted, and the regulations are immutable. As a result, there are no intermediaries in the equation. The user data will no longer be under the jurisdiction of Apple and Google. Service and site shutdowns are impossible for any government or organisation, and no single person has power over the credentials of others.

The permissionless blockchain

There is no limit to the number of addresses that can be created and used on the blockchain. Permissionless blockchains have a power that can't be emphasized. No restrictions will be placed on the users based on their socioeconomic status, location, sexual orientation, or gender. Digital assets and wealth can be moved swiftly and easily across national borders and around the world.

Uninterrupted service

A significant decrease is seen in account suspension and deprivation of distributed services. A minimum of downtime is expected due to no single point of failure. Multiple copies of the data will be saved on scattered nodes to prevent loss in the case of a server failure or theft [5].

Web 3.0 Drawbacks

Ownership concerns

Previous Twitter CEO Jack Dorsey claims that, as opposed to mainstream thinking, people won't get the responsibility for 3.0 tasks. Private supporters and venture companies will possess it. This guarantees that order and control could remain incorporated.

Tough to regulate

Some analysts worry that Web 3.0's decentralization could further complicate its monitoring and regulation. This may result in an increase in cybercrime, online exploitation, etc.

Surfing Web 3.0 will require better processors

Web 3.0 will not function on older devices. As a result, in order to use the upcoming interpretation of the internet, you would need a device with above average standards.

Existing website owners will be compelled to upgrade

As Web 3.0 sites and applications gain notoriety, laid out firms will be headed to work on their advanced administrations to try not to lose their ongoing piece of the pie.

Easier access to one's personal and public data

Web 3.0 is a huge and connected network. However, this is one of its benefits, semantic organisation additionally empowers it basic for anybody to acquire admittance to the private and public data you give on the web [6].

Web 3.0 Challenges

Web 3.0 is chaotic

Online 3.0's defining characteristic is decentralization, which implies web applications are kept in a blockchain. All blockchain participants are the owner, and they decide product modifications through consensus. The primary argument is that there is no separate entity responsible for the data. There are no regulations or laws that specify what types of programs or content can be distributed. It will be an enormous hassle to control it and determine who is responsible for harassing and fraudulent content. The rule is out of contact with technology and will encourage fraudsters to sort new ways to exploit the system.

Web 3.0 is hard to develop

Web 3.0 applications are known as DApps, which stands for decentralized applications. The data will be kept in peer-to-peer networks and the codebase will be spread around the blockchain. This architecture generates additional complications. The consensus-based approach impedes development. The program will be dependent on the specific blockchain, which may have flaws. Relying on third-party mechanisms which provide the services to construct the application (these services are still quite new and have not proven themselves over the long term). Testing and debugging difficulties.

DApps are not actually decentralized

DApps are built on blockchain and powered by cryptocurrency, however some people had to set up a blockchain campaign and issue a token. If you look at the numbers, you'll notice that. You'll see that vulture investors and Silicon Valley insiders control a major portion of the blockchain sector. If you plan to create your Web 3.0 software on one of the blockchains, keep in mind that it could be shut down at any time due to the manipulation of a small group of people who control the big crypto market.

No benefit for mainstream business

Theoretically, the Web 3.0 stack can be used to develop any web application. Well, blockchain, cryptocurrency and decentralization all sound impressive, but converting your firm to a decentralized application is equivalent to handing off your assets for no cause. There is no apparent explanation for why everyone must do it, such as banks. Too many individuals are thriving in the financial world, only to be forced to give up their jobs and businesses. Blockchain technology is promising and powerful, but it will require time to determine its optimal application.

Crypto crush will ruin all Web 3.0 perspectives

For any transaction on a blockchain, the fundamental source of payment is cryptocurrency (tokens). There is no Web 3.0 without it. You can't use cryptocurrencies or NFT to purchase a car or a house since they don't have any other worth. Because of this, the cryptocurrency market is extremely vulnerable. To make a long story short, it only emerges because of the efforts of a few dedicated individuals [7]. Some cryptocurrencies' prices, on the other hand, have soared without any apparent cause. Such a bubble could burst at any point, causing Web 3.0 to slip into obscurity.

Vastness

The internet is enormous. It has billions of pages, with 370,000 class names in the SNOMED CT medical terminology ontology solely, and current technology hasn't been able to delete all semantically duplicated terms. Any reasoning system that is capable of reading all of this data and comprehending its usefulness must be able to deal with large amounts of information.

Vagueness

User searches aren't always very detailed, and they can be quite unclear at times. To deal with ambiguity, fuzzy logic is used.

Uncertainty

The internet deals with a lot of numbers with a lot of different values. A patient might, for example, appear with a collection of symptoms that correlate to a number of alternative diagnoses, each with a different likelihood. To deal with uncertainty, probabilistic reasoning approaches are commonly used.

Inconsistency

Inconsistent data might result in logical inconsistency and unpredictability in analysis.

Deceit

While artificial intelligence can assist with data filtering, what if all of the data presented is purposefully incorrect and misleading? This problem is currently being addressed using cryptography approaches [8].

Web 1.0 vs Web 2.0 vs Web 3.0

Web 1.0

This is the first version of the World Wide Web, which appeared in the 1990s. You are able to view information because the website is static. That is the primary effect that it had. You may only view content that the publisher has made available, as other users did not contribute anything. The vast majority of the sites are of this type, which only allows traffic in the direction that it came from.

Web 2.0

This is the beginning of user-generated content platforms such as Facebook and YouTube, among others, where people create material that is hosted on the site. When you use Facebook, your images are uploaded by you; it's not as though Mark Zuckerberg personally takes each picture. The platform is driven by the user-generated content that is shared on it. This resulted in a significant sea change and pushed every significant sector into Web 2.0 [9]. We use Web 2.0 programs on a daily basis, from Chrome to Facebook and YouTube to Snapchat; at the moment, all of our ecosystems are Web 2.0. These businesses generate revenue by displaying advertisements of various types to us.

Web 3.0

Gavin Wood, one of the people responsible for the creation of Ethereum, came up with the concept of Web 3.0, which is an internet that is decentralized in theory. Blockchain, NFTs, cryptocurrencies, and the metaverse are just a few of the categories that will be subsumed under the umbrella term known as Web 3.0 (or so we all assume). The social media platform Web3 operates as a decentralized network. It is a network in which the management, storage, and distribution of material do not rely on a centralized server at any point in the process. This indicates that the social media platform known as Web3 is not governed by a single organization and instead relies on its members to archive and disseminate material. Exactly this is the revolution about which we are speaking. Web 2.0 has a significant defect in one respect. We, the people, are the product, and we have no control over our content or the privacy of our communications. Our entire data set is kept on the massive systems of many organizations and will be sold to advertising companies. In Web 3.0, there is no centralized storage of data, and the big shots do not possess our information. It is recorded in blockchain, and you are in charge of managing its access. On the internet, you can own something, which would never be conceivable inactive. You have the ability to own yourself [10].

Conclusion

With the concept of a decentralized internet and many applications using the blockchain and metaverse, Web3 will be creating a lot of opportunities to solve the existing problems we face regarding data privacy, the future of communication, e-commerce, gaming, social media, and our economies. With

vast varieties of applications and innovation on the rise, there are imbalances to be achieved on a larger scale, such as computational power, internet bandwidth, and Web3 literacy. Even with all this in mind, the future is bright for Web 3.0 innovators as companies and customers are moving to Web 3.0 as a necessary step to evolve in the future of technology. We haven't figured out everything yet as it is similar to the internet in the 1900's and with more innovations to come, the more we evolve and grow in this space.

Acknowledgements

None.

Conflict of Interest

None.

References

1. d'Aquin M, Motta E, Dzbor M, Gridinoc L, Heath T, et al. 2008. Collaborative semantic authoring. *IEEE Intell Syst* 23(3): 80-83. <https://doi.org/10.1109/MIS.2008.43>
2. Lal M. 2011. Web 3.0 in education & research. *BVICAM's Int J Inf Technol* 3(2): 16.
3. Introduction to Web 3.0. [<https://www.sygnum.com/future-finance/insights/introduction-to-web-3-0/>] [Accessed December 11, 2023]
4. The Future of Social Media in Web 3.0. [<https://adello.com/the-future-of-social-media-in-web-3-0/>] [Accessed December 11, 2023]
5. The Biggest Advantages and Disadvantages of Web 3.0. [<https://www.techtarget.com/searchcio/tip/The-biggest-advantages-and-disadvantages-of-Web-30>] [Accessed December 11, 2023]
6. Web 3.0: What are the Likely Benefits and Risks? [<https://www.cn-bctv18.com/technology/explained--web-30-what-are-the-likely-benefits-and-risks-11941722.htm>] [Accessed December 11, 2023]
7. Web 3.0: Challenges, Advantages, and Disadvantages. [<https://medium.com/thedarkside/web-3-0-challenges-advantages-and-disadvantages-c412e51bd9ce>] [Accessed December 11, 2023]
8. 5 Reasons Why Web 3.0 will Fail? [<https://itnext.io/top-5-reasons-why-web-3-will-fail-57237e4c3db>] [Accessed December 11, 2023]
9. Burzagli L, Como A, Gabbanini F. 2010. Towards the Convergence of Web 2.0 and Semantic Web for E-Inclusion. In Miesenberger K, Klaus J, Zagler W, Karshmer A (eds) *Computers Helping People with Special Needs*. Lecture Notes in Computer Science. Springer, Berlin, pp 343-350.
10. What Is Web3 All About? An Easy Explanation with Examples. [<https://www.forbes.com/sites/bernardmarr/2022/01/24/what-is-web3-all-about-an-easy-explanation-with-examples/>] [Accessed December 11, 2023]