



Web 3.0: The Future of Internet :A review paper

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Abstract

The emergence of Web 3.0 has paved the way for a new era of the internet, where data ownership, privacy, and personalization take centre stage. In this paper, we explore the concept of a web and future of it, which involves a more intuitive and interactive web experience that prioritizes user control and agency. We discuss the various technologies and frameworks that including blockchain, Artificial intelligence, and machine learning. Additionally, we examine the challenges of web3.0 and its formula, particularly in the areas of data collection and security. The way we conduct research and interact with the internet, and it represents a crucial step forward in the evolution of the web and promoting the use of web 3.0.

Keywords: Web3.0, Blockchain, Artificial intelligence, decentralized.

I Introduction:

In the 1980s, British scientist Tim Berners-Lee created the World Wide Web while working at CERN, the European Organization for Nuclear Research [1]. Berners-Lee developed the concept of hypertext, which allows users to navigate between different documents via hyperlinks. At the end of 1990, Tim Berners-Lee proved his idea and ran the first web server and browser at CERN. He developed the web server's code on a NeXT computer. To prevent it from shutting down, the computer has a note written in red ink: "This machine is a server. Do not turn off the power!!".

Internet growth was recorded at 342.2 percent in years from 2000 to 2008, indicating the importance of the Internet for people [2]. The way people communicate, work, and live has been completely transformed by the Internet and the World Wide Web. The web is the best medium for collecting and disseminating information in the fastest and cheapest way. The web has changed our daily lives, changing the way students, teachers and companies work.

We have now discussed the many web generations and their shortcomings. Web 1.0 was a very basic platform. Web 1.0 features static information that is more challenging to update. Considerably more accurate and informative. It essentially only contained read-only messages [3], but not a very good talk. Web 1.0 is not more creative and useful. As I exploring about web 1.0 is all about getting information and reading.

The emergence of the next generation of the web, known as Web 2.0, promises to revolutionize the internet yet again by introducing a more interactive and collaborative online experience [4].



With Web 2.0, users can now create and share content, collaborate with others, and participate in social networking, making the web a more creative and useful tool for people.

Web 2.0 features dynamic information that can easily update. It allowed for the creation of applications such as Facebook, Twitter, and Wikipedia.

Web 2.0 refers to the current era of the Internet where it is more important for users to create content and improve usability for end users compared to previous versions of the website, Web 1.0. The move to Web 2.0 has led to the freedom to create content online, allowing users to easily create and share their own content and improve relationships and collaboration between users. This evolution of the Web has made the Internet more collaborative and powerful, paving the way for the development of new applications and new services.

Now web 3.0 are going to coming, it's going to be championing principles of decentralization. Web 3.0 is described as "read-write-execute". It is known as the future of the internet. It involves a space where people operate on decentralised [5], almost anonymous platforms. This means moving away from the big, guiding hands of tech giants like Google, Facebook, and Twitter. Web 3.0 was originally called the Semantic Web.

Web 3.0 has many advantages, including the use of technologies that allow machines to understand and interpret information more effectively. Another key aspect of Web 3.0 is the use of artificial intelligence and machine learning to help automate tasks and make the website more responsive to user needs. This includes the development of intelligent agents that can perform tasks such as purchasing on behalf of customers.

Web 3.0 also promises users greater security and privacy through features such as privacy and secure communication. Web 3.0 should be driven by technologies such as blockchain, artificial intelligence, and the Internet of Things (IoT) that will enable new forms of information sharing, collaboration, and trust.

II Related Works:

Vojir S [6] described that the web has evolved into a sociotechnical phenomenon with centralization being a key issue. Regulatory responses and efforts to re-decentralize the Web have emerged. The future of the Web remains uncertain with potential developments towards a highly decentralized Web posing new practical problems and regulatory challenges.

Sharma K et al.[7] described as the exact impact of Web 3.0 on privacy is difficult to predict, it is likely that it will have a positive impact on privacy, leading to a privacy-first culture out of necessity, possibly augmented by privacy regulations specific to Web 3.0.



Liu Z [8] described as presents a generic and measurable definition for Web3.0 based on blockchain infrastructure evolution. The HyperService prototype implementation and experiments demonstrate its practicality, showcasing its potential for advancing the era of Web3.0.

Filippi De et al. [9] described as blockchain technology has enabled the implementation of smart contracts, which offer the potential for more efficient and automated contract execution.

Mougayar W[10] described that injecting trust into the network and cutting out intermediaries, blockchains offer a level of security and resiliency that was previously unavailable. They have the ability to run a new generation of decentralized services and software applications that are more reliable and efficient than their centralized counterparts.

Pattal M [11] at al. described that the security of public and private metadata is a critical concern, as illegal access and lenient control can result in irreversible changes to the business market. A focus on secure data tagging and legal access can mitigate risks in the era of Web 3.0, which presents both opportunities and threats. It is imperative to address these challenges and ensure that the Web continues to evolve in a manner that promotes security and integrity.

Kevin W [12]described as the blockchain's disruptive potential should not be seen as a barrier to its adoption. Instead, its unique attributes can be leveraged to foster innovation and promote responsible use, benefiting both businesses and society.

III Comparison and analysis

Centralization vs. Decentralization: Vojir S [6] and Filippi De et al. [9] highlight the issue of centralization in the current web and the potential for Web 3.0 to offer a more decentralized and distributed approach through the use of blockchain technology. This could potentially address concerns around concentration of power and control in the hands of a few entities, and enable a more democratic and inclusive web.

Privacy and Security: Sharma K et al. [7], Liu Z [8], Pattal M [11], and Kevin W [12] discuss the implications of Web 3.0 and blockchain on privacy and security. Sharma K suggest that Web 3.0 may lead to a privacy-first culture, with the potential for privacy regulations specific to Web 3.0. Liu Z presents the concept of Web 3.0 based on blockchain infrastructure evolution and showcases the potential of blockchain through a prototype implementation. Pattal Mhighlights the critical concern of securing public and private metadata, while Kevin W emphasizes that the disruptive potential of blockchain should not be a barrier to its adoption, but rather leveraged for innovation and responsible use.

Efficiency and Automation: Filippi De et al. [9] mention the potential of smart contracts enabled by blockchain for more efficient and automated contract execution. This could lead to increased



efficiency, transparency, and reliability in business transactions, reducing the need for intermediaries.

Trust and Resiliency: Mougayar W [10] discusses the ability of blockchain to inject trust into the network and reduce reliance on intermediaries, leading to increased security and resiliency. This could potentially disrupt traditional models of trust and create new opportunities for decentralized services and applications.

In summary, the authors highlight the potential of Web 3.0 to address issues of centralization, privacy, security, efficiency, and trust in the current web. While there are regulatory challenges, security concerns, and uncertainties about the future of the web, the authors generally view the advent of Web 3.0 technology as a positive force that can foster innovation, promote responsible use, and enable a more decentralized and inclusive web.

A table is given below illustrating the differences between different versions of web [13].

TABLE 1: Comparison among the Web's

Web1.0	Web2.0	Web3.0
Read-only Static web	Read-write interactive web	Read-write intelligent web
Company-oriented	Community-oriented	Individually oriented
Low-portability (computing equipment)	Medium portability(mobile)	High portability(mobile and consumer electronics)
Professionally developed stand-alone applications	User-developed open applications	User-developed smart applications
Syntax-aware basic browsing and search capabilities	Syntax-aware advanced browsing and search capabilities	Content(semantic)-aware and context-aware next-generation browsing and search capabilities
Low data richness(HTML)	Medium data richness(XML)	High data richness(RDF)
Point-to-point/hub & spoke architecture	Service-oriented architecture(SOA)	Web oriented architecture (WOA) andinternet of things
Sliced data	Light interlinked data	Worldwide database

Formula of web 3.0

The formula for the future: **Web 3.0 = (4C + P + VS)** [14]

The definitions of the terms are listed below.

4C represents the four key pillars of Web 3.0:

Content, Community, Commerceand Context[15].

P stands for **Privacy**, which is expected to be a natural consequence of Web 3.0's decentralized nature.



VS stands for **Virtual and Augmented Reality**, which are immersive technologies that can enhance user experiences in Web 3.0.

CAPABILITIES OF WEB 3.0 TECHNOLOGIES:

The web has evolved from the early INQUIRE projects to the Web 3.0 revolution. Overall, Web 1.0 added natural persons to WWW and Web 2.0 added natural persons using www to Web 3.0.

Web 1.0 will contain a fake representation of real users using www. So, we say Web 1.0 is about providing information, Web 2.0 is about load and Web 3.0 is about information management.

As mentioned above, Web 1.0 is often referred to as the "read-only web" and creates content that can be accessed online for viewing.

IV Challenges of web3.0

Here are some challenges related to the development of Web 3.0 along with relevant references:

Interoperability [16]: Web 3.0 is expected to be composed of multiple decentralized applications and platforms, which raises the challenge of interoperability between these systems.

Scalability [17]: Web 3.0 is expected to handle large volumes of data and transactions, which poses a challenge for scalability.

Privacy [18]: Web 3.0 aims to give users more control over their data, which raises the challenge of ensuring privacy and security of data

Governance [19]: Web 3.0 is expected to be decentralized, which raises the challenge of creating effective governance mechanisms that ensure the stability and security of the system.

Adoption [20]: Web 3.0 technologies and platforms need to gain widespread adoption to be successful, which poses a challenge due to the complexity and technical nature of these systems.

These challenges need to be addressed for the successful development and adoption of Web 3.0 technologies and platforms.

V Conclusion

In conclusion, Web 3.0 is poised to revolutionize the internet and bring about a new era of decentralized, user-centric, and transparent online experiences. It is a paradigm shift from the current centralized web, where data and control are concentrated in the hands of a few powerful entities, to a more democratized and open web, where users have greater control over their data and online interactions.



Web 3.0 technologies, such as blockchain, smart contracts, and decentralized apps, enable new forms of trust, security, and transparency, and have the potential to disrupt industries from finance to healthcare. However, there are also challenges and concerns to be addressed, such as scalability, interoperability, and regulation.

Overall, the future of the internet looks bright with the advent of Web 3.0, as it promises to create a more open, democratic, and innovative online environment that benefits everyone, not just a select few. As more applications and use cases are developed, it will be exciting to see how Web 3.0 transforms the way we interact, transact, and communicate online.

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