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Web 3.0: Information Security and Application for Library Services

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***Abstract*: The paper summarizes about the version of web i.e., Web 1.0 started as a Read only medium; the next version Web 2.0 established itself as Read-Write medium. Now the currently evolving version of web, viz., Web 3.0 is said to be a technologically advanced medium which allows the users to Read-Write-Execute and also overcoming the issues of information security. To begin with, this paper discusses evolution of web and definition of Web 3.0. Next, about the technologies associated with it, technologies and upcoming platforms for overcoming information security, advantages and challenges of Web 3.0. Lastly, the features and applications of Web 3.0 in library to provide better library information services to the users.**

***Keywords*: Advantages and challenges of web 3.0, applications of web 3.0 for library services, evolution of web, technology for information security, web 3.0.**

1. Introduction

Web has changed drastically its nature since its inception. From simple e-mail sending tool to modern social media, which has now become an undetectable part of human interaction. We are living in the era of Web 2.0 where modern technology is although used to protect data but ultimately it has lack of control over security and privacy. Web 2.0 is soon going to be replaced with its smarter sibling i.e., Web 3.0; overcoming the issues of information security.

Web 3.0 is the next generation of Internet technology that heavily relies on the use of machine learning and artificial intelligence (AI). It aims to create more open, connected, and intelligent websites and web applications, which focus on using a machine-based understanding of data. Instead of insecure databases and opaque data sharing practices, Web 3.0 will return control to the users which mean they will be able to access data from anywhere; mainly being driven by cloud applications and smart-phones.

2. Review of Literature

The review of related literature contains the technologies associated with web 3.0 for the security and privacy of web contents and application of Web 3.0 technologies in library information services. The core content of the articles found on related topic are:

The traditional version of web i.e., web 1.0 started as a read only medium; the next version web 2.0 established itself as read/write medium and the current version of web 3.0 is said to be a technologically advanced medium which allows the users to read/write/execute and also allows the machines to carry out some of the thinking so far expected only from the human beings (Rajalaxmi A. Govanakoppa & Kumara B, 2014). Basically, it is development part of second generation of information technology based on Internet. As called as artificial intelligence, those using semantic web, micro formats, natural language search, data mining, machine learning, cloud computing and artificial technologies which put stress on machine-facilitated understanding of information with a view to providing a more productive and intuitive user experience. (Anindya Bhattacharya, 2016).

The advances in science and technology have made a tremendous improvement and changed all activities of library administration. Presently, there is a great influx of the electronic media and the information is available in a variety of formats, which require specialized equipment to read the information inscribed in it. In this era the librarians are very much pertinent in the electronic environment. It became necessary for the librarians to equip and update themselves with the current technologies for providing the appropriate and up-to-date information (Wankhede, Raju S., Sonwane, S. S. & Mukhyadal, B. G., 2019).

3. Objectives of the Study

The objective of this study is to understand the Web 3.0 technologies, information security, its benefits and challenges of implementing and its application for the advancement of library information services.

4. Methodology

The study conducted by literature reviewing of past research studies on Web 3.0 and application of Web 3.0 in library. Study is based on the articles with different issues related with information security, privacy, safeguard and upcoming solutions published in the last few years.

5. Evolutions of Web

The Internet has rapidly changed in different phases, from

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Web 1.0 to Web 3.0. Web 1.0 was only "read-only" web which allowed only to search information and read it. Where internet was a set of static websites and pages.

The next was "web 2.0" or the "read-write" web. Where users were not just idle visitors, they could create their own content and upload it to a website. Web 2.0 was focused on social networking, collaboration, social bookmarking, and media sharing. We saw the emergence of social networking websites such as Facebook, Twitter, YouTube, Instagram, Orkut etc. Everything on the web became about interacting with people. From sharing news articles to a picture of what we ate for breakfast became something we could share on the internet. The main aim was to make the internet more democratic and make it as user-accessible as possible.

Web 3.0 or the semantic web will be the emergence of an intelligent web. Tim Berners-Lee, inventor of the World Wide Web, thought up the idea of semantic web. He had said that one of the major obstacles so far has been that most information on the Web is designed for human consumption. In order for the shift to take place, the web needs to be readable not only by humans but also by machines. This would allow the web to be more intelligent. Many companies such as Best Buy, Google, Facebook, Amazon, Johnson & Johnson, NASA, and others—now rely on Semantic Web technologies to run critical daily operations.

6. What is Web 3.0

The term 'Web 3.0' was first coined by John Markoff of the New York Times in 2006. The definition of Web 3.0 is all about the evolution of third generation internet services that is a blend of semantic web, microformats, natural language search, data-mining, machine learning, recommendation agents and artificial intelligence technologies, which emphasize machine-facilitated understanding of information in order to provide a more productive and intuitive user experience. It aims to create more open, connected, and intelligent websites and web applications, which focus on using a machine-based understanding of data.

1) An example of Web 3.0

In Web 3.0, while we are driving, we can simply ask our automotive assistant a question "I would like to watch a Romantic Movie and eat South Indian food". The search engine embedded in the car assistant provides us with a personalized response that takes into account our location, suggesting the closest cinema that matches your request and a good South Indian restaurant by automatically consulting the reviews on social media. This scenario of Web 3.0 is not a dream. For the most part, it's already a reality today.

Search Engine will learn about us and our habits from each search we perform and will gather details about us from our previous activities, like, our likes and social postings and present the answers as per our preferences.

7. Technologies Associated with Web 3.0

A. Technologies which are associated with Web 3.0

1) Semantic Web

It improves web technologies in order to generate, share and connect content through search and analysis based on the ability to understand the meaning of words, rather than on keywords or numbers.

2) Artificial Intelligence

Combining this capability with natural language processing, in Web 3.0, computers can understand information like humans in order to provide faster and more relevant results. They become more intelligent to satisfy the needs of users.

3) 3D Graphics

The three-dimensional design is being used extensively in websites and services in Web 3.0. Museum guides, computer games, ecommerce, geospatial contexts, etc. are all examples that use 3D graphics.

4) Enhanced Connectivity

With Web 3.0, information is more connected thanks to semantic metadata. As a result, the user experience evolves to another level of connectivity that leverages all the available information.

5) Ubiquity

Content is accessible by multiple applications, every device is connected to the web, the services can be used everywhere.

8. Technologies for Information Security

As everything on the web will be linked and the machine will save the user's preferences, it raises the issues about security and privacy.

Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system. A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain.

Blockchain Technology makes it possible to store data in a secure way. With the decentralization of data, personal information will not be stored in the large data centres and databases of the companies. Rather all data will be controlled by a single company which would drastically decrease the personal data openings. Public Blockchain provides the decentralized platform to run smart contracts and removes the middlemen enabling the individual to communicate directly. In Web 3.0, Apple, Google, Facebook to the name of few would have no control over the data of the users which would result in a high security and privacy.

9. What Makes Web 3.0 Superior

There are a number of advantages that make Web 3.0 superior:

1) No Middlemen to Control Data

It would provide a platform where data will be decentralized, where no entity will be able to alter the code without the permission of other entities in the network. Moreover, no one will have rights to block the websites and services.

2) Increased Information Interconnectivity

As more products become connected to the Internet, larger data sets provide algorithms with more information to analyze. This can help them provide more accurate information that

accommodates the specific needs of the individual user.

3) Reduced Data Breaches

Because data will be decentralized and distributed, it will be difficult for hackers to have control over the entire network. However, data cannot be erased or altered once it is in the block chain. This will create a continuous flow of accurate information and ultimately result in no data loss.

4) Ability to Work on any Gadgets

Today, applications are OS-specific which means it runs on a single operating system. Web 3.0 will provide easy to customize and device-agnostic applications i.e., applications will run on any device which includes television, refrigerators, microwaves, sensors, smart-phones and many more devices.

5) More Efficient Browsing

When using search engines, finding the best result used to be quite challenging. However, over the years, they have become better at finding semantically-relevant results based on search context and metadata. This results in a more convenient web browsing experience that can help anyone find the exact information they need with relative ease.

6) Uninterrupted Service

DDoS attack will be drastically reduced! Due to the decentralized system, there will continuous data processing; no system can be blocked to stop a service; no single hardware infrastructure can hold the service. It will have multiple backups to prevent server failure.

7) Better Customer Support

When it comes to websites and web applications, customer service is key for a smooth user experience. Due to the massive costs, though, many web services that become successful are unable to scale their customer service operations accordingly. Through the use of smarter chatbots that can talk to multiple customers simultaneously, users can enjoy a superior experience when dealing with support agents.

10. Challenges of Web 3.0

Web 3.0 has a number of things to offer which can make user's life easier. But there are few challenges like:

1) Huge Data Set

There is no doubt of concern that web contains billions and trillions of web pages and terminologies. Existing technology is not sufficient enough to get rid of duplicated terms. The new system will have to deal with a huge input of data and may not be able to understand the context.

2) Scalability

Entrepreneurs will have to worry about how to manage the data in a scalable manner, that is, how to organize it, where to store it and how to find the right content.

3) Visualization

With the increase in the overloaded information, visualization will play a key role for the easy recognition of the relevant content and the purposes.

11. Applications of Web 3.0 in Libraries

Application of Web 3.0 tools in to library and information centres will lead to Library 3.0. Some of the features of Library 3.0 are discussed below.

1) Web OPAC

Web OPACs of various libraries which are forming a part of visible or invisible web would be brought together in Library 3.0. Metadata of contents would be seamlessly accessible and searchable from single user-friendly interface.

2) Ontology

This technique gives richer semantic relationships between terms and thoughts of knowledge. And furnish more standardization in managing the web contents instead of merely indexing the terms. Ontology aims at how the information is organized rather than organizing the information. Librarians can adopt various ontological techniques to define the web contents in more professional as well as personal manner.

3) Ubiquitous Contents

Ubiquitous contents are the personal contents of the people persistently stored on the web in the form of movies, blog posts, RSS feeds (Real Simple Syndication), wikis, stories, articles, music, games etc. These are always there on the web and accessible from everywhere over the Internet through all mobile and Internet accessible devices. The contents of this generation need to be created in various formats and can also be easily shared, transferred and accessible through all modes of communication. Libraries can make use of this technique in rendering faster information services in future.

4) Geo Tagging

It is simple marking of various media or digital contents like images, photographs, video, websites or RSS feed etc. Most of the cell phones and mobile devices have GPS (Global Positioning System) facilities, which allow users to add metadata exactly where the data or image or video was created. This helps users to find specific information located at specific location. Adopting this feature in libraries can work as a part of cataloguing and helps the library users to mark their information in which they are interested for their future reference.

5) Virtual Reference Service

Technology is developing very fast in all domains; librarians are more determined to serve the users who are away from the libraries. Libraries are new developed transferable and readable access to the users for collections search as an assistance. Like mobile devices or apps. MOPAC i.e., Mobile Open Public Access Catalogue is the best examples of virtual reference service.

6) 3D Web

Higher bandwidth and increase in computer processing power have enabled the potential of a 3D web. The 3D web offers the opportunity for users to interact with one another in real time and explore information and virtual objects in new ways. Many information professionals have recognized the potential of such virtual worlds for providing information services.

7) Cloud Computing

Cloud computing is a central remote library which help to maintain data of resources of library which is available on internet. New days it becomes popular because it helps to become repositories, online union catalogue, and access anywhere and anytime without any type of special software and

hardware, networks among the library professionals and library users, communicate with each other using social networking sites, also help for library automation.

8) Unique Search

Unique search is important advantages of web 3.0. So many databases are available for searching data; these databases want different logins for searching and output. It would be easy for users to find a search result which is displayed in one place and in one way, as a Google Search. New days unique searching is become widespread for libraries because Information technology has intense effect on development and progress of libraries. The advances in science and technology have made a tremendous improvement and changed all activities of library administration. Much library management software is developed in world and unique searching facilities already in management software, open-source software.

9) Mobile Library Catalogues

New day's science and technology has made a tremendous improvement and changed in technology and it's become very small in size using nanotechnology. Mobile is a small size device it uses very far. Like communication, searching, storages, camera etc. Library has own management software for manage all type sources and they have WEB OPAC. It can be provided facilities to their users to access through their phones of other mobile devices.

12. Conclusion

The application of Web 3.0 will establish unorganized set of web contents into a systematic and organized set of web contents. The fundamental features of Web 3.0 have capability to use unstructured information on the web more intelligently by formulating meaning from the context in which the information is published. The introduction of new technology led to adopt new ideas and innovations to reform the traditional things with the modern science and technology to cope up with the phase of development. The library should adopt and make full use of advanced technologies to provide more active, in-depth and effective information service to the users.

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