Blockchain Based Social Network

Srisha S, Deeksha A B, Srilakshmi T N, Usha K N, Dhanya P M
Dept of Computer Science and Engineering Sri Siddhartha Institute of Technology, Tumakuru -572105

Abstract— Social networks are becoming more and more prevalent in people's life, they face the problem of privacy leakage due to the centralized data management mechanism and unwanted comments and use of inappropriate words like bad or vulgar words, illegal are being used in social network which may affect the mental state of users. Meanwhile, we separate the storage services so that users have complete control over their data and remove the toxic users which affect the environment of network users.

Keywords— Social network, Decentralization, Privacy, Verification.

I. INTRODUCTION

Social Network is a platform for people to build connections with each other via the Internet. It is a major platform that the public can obtain and disseminate information, exchange views and share their lives on it. Social network in the world therefore, it can be found that interacting with social network is a very popular online activity for Internet users.

Nowadays, most of social networks are centralized, which means the social network companies often have full ownership of all user after they agree to the agreements of social network which are enacted by social network companies. However, many agreements give the online social network companies right to use user data for personalized companies to use their data and protect their privacy, they even give up using such online social network. Data and service centralization also caused all data of users is uploaded and stored in centralized servers which are controlled by online social network companies.

Therefore, it is hard for users to protect their contents on the social network when the servers crash down. To make matters worse, if the servers are hacked, security information includes password, security problems, address of users is possible to be leaked. For many users using the same password in kinds of sites, hackers can easily hack their accounts by using a method named credential stuffing attack. This makes personal information of users at risk of leakage and abuse. Such problems of centralized social networks boost researchers to consider develop an online based social network based on the decentralization framework.

Decentralized social network have the potential to provide a safer and more con troll-able social network environment for users where privacy and information are more controllable for their owners. Because the data is stored in a distributed way service is no longer relied on centralized servers. In general, a decentralized social network is usually operated by a peer-to-peer mechanism in which each node stores some parts of data and support the service. However, it is not binding on malicious acts, and lack of self management and sustainable developing abilities.

II. LITERATURE SURVEY

Here are summaries of papers on Block chain based social network , including details of the year, authors, title, and a brief introduction to their work:

"When Block-chain Meets Online Social Network". Barbara Guidi in 2020.

In this paper, we propose a survey of Block-chain-based Online Social Media, by explaining the main characteristics both technical and social, and we described the current platforms.

He listed several current problems of these platforms and he proposed a possible new model which faces the problems listed above [1].

"A Block-chain Based Autonomous Decentralized Online Social Network", Ningyuan Chen, David Siu-Yeung Cho in 2021.
This paper presents an implementation of block chain used in OSN. Users keep their security information under their control, in order to avoid security information leakage from centralized servers.
Additionally, since the social network service is decentralized, users do not need to worry about service crash down by centralized entity. Furthermore, there is a DAO for the whole users to

self-manage their social network. It is possible for an OSN to develop sustainably without a centralized leader[2].

"A Block chain-Based Decentralized Online Social Network", Le Jiang, Xinglin Zhang in 2019
In this article, They have designed a block chain-based framework for decentralized OSN termed BCOSN. Combining with smart contracts, we have taken the block chain as a trusted server to implement the functionalities that are used to be provided by central servers in traditional OS N's.
Compared to the existing DOS's, the BCOSN can provide efficient, safe, and privacy-aware functionalities of authentication, news feed notification, and friend recommendation. Meanwhile, we have also provided users with fine-grained encryption to protect data privacy[3].

"A novel block chain-based privacy-preserving framework for online social networks", Shiwen Zhang, Tingting Yao, Vaundi Koe Arthur Sandor in 2021

The security and privacy issues seem to be a stumbling block that prevents the widespread use of online social networks. Block chain is considered a promising technology to improve system security. In this paper, we propose a novel block chain-based privacy-preserving framework for online social networks.

To protect the confidentiality and integrity of the data, we combine block chain and public key cryptography to provide secure data sharing and accessing service. Making use of a designated smart contract in block chain, we achieve a reliable and confidential keyword search scheme without any verification mechanism[4].

"Block chain-based access control management for Decentralized Online Social Networks" , Mohsin Ur Rahaman, Barbara Guidi, Fabrizio Baiardi in 2020.
In this research, we proposed an audit able and trustworthy access control system for DOS's using access control list (ACL). The resource owner has a unique personal ACC deployed on the block chain, which is used to control access to resources in the network.
The proposed solution consists of different smart contracts, which are designed to meet the trust and security requirements of DOSN. The proposed solution achieves the audit ability property successfully because all functions that are invoked[5].

III. METHODOLOGY

Our block chain network was consensus algorithm to provide secure and trust worthy network, where this algorithm is used to achieve distribute agreement. In our network we have 2 modules: user module and admin module.

- Consensus Algorithm: We know that Block chain is a distributed decentralized network that provides immutability, privacy, security, and transparency. There is no central authority present to validate and verify the transactions, yet every transaction in the Block chain is considered to be completely secured and verified. This is possible only because of the presence of the consensus protocol which is a core part of any Block chain network.
- Consensus algorithms enable decentralized decision-making and governance within a social network.
- Consensus algorithms, block chain-based social networks can achieve a high level of security. These algorithms help prevent malicious activities, such as double-spending or tampering with the data on the block chain.
- Consensus algorithms are a fundamental aspect of block chain technology, and their application in social networks can help create more transparent, secure, and user eccentric platforms. The specific consensus algorithm chosen depends on the priorities and objectives of the social network's development.

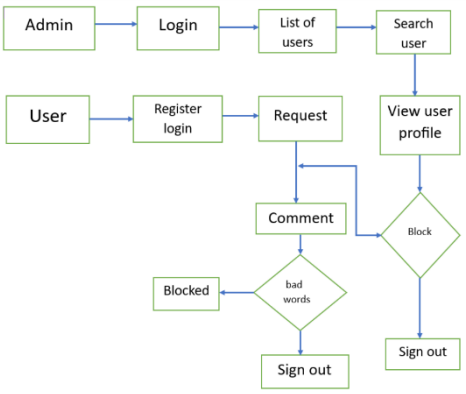

Figure 1: Architecture design diagram

1. Admin module:

- Admin is the super user of the system.
- Admin is responsible for adding of the user in the network. Admin will view the user details and he can verify the user profile.

- Admin will decide whether the user should be in the network or not.
- Admin can block the inappropriate user.

2. User module:

- Create Account and Login.
- View Profile.
- Send Request to Friends.
- Add and View Comment.
- Sign Out

3. Java server pages(JSP):

It is a server-side technology which is used for creating web applications. It is used to create dynamic web content. JSP consists of both HTML tags and JSP tags. In this, JSP tags are used to insert JAVA code into HTML pages. It is an advanced version of Servlet Technology i.e. a web-based technology that helps us to create dynamic and platform-independent web pages. In this, Java code can be inserted in HTML/ XML pages or both. JSP is first converted into a servlet by the JSP container before processing the client's request. JSP has various features like JSP Expressions, JSP tags, JSP Expression Language, etc.
Coding in JSP is easy : As it is just adding JAVA code to HTML/XML.
Reduction in the length of Code : In JSP we use action tags, custom tags etc.
Connection to Database is easier : It is easier to connect website to database and allows to read or write data easily to the database.
Make Interactive websites : In this we can create dynamic web pages which helps user to interact in real time environment.
Portable, Powerful, flexible and easy to maintain : as these are browser and server independent.
No Redeployment and No Re-Compilation : It is dynamic, secure and platform independent so no need to re-compilation.
Extension to Servlet : as it has all features of servlets, implicit objects and custom tags.

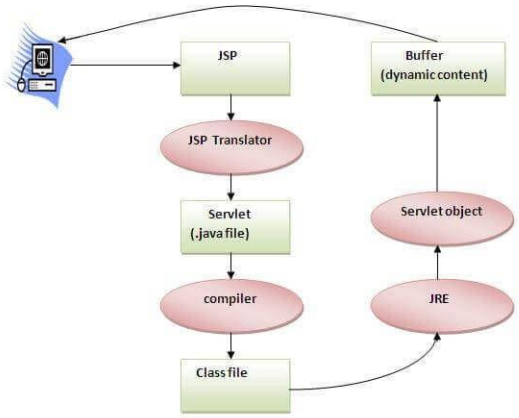

Figure 2: Working of JSP

JSP page is translated into Servlet by the help of JSP translator. The JSP translator is a part of the web server which is responsible for translating the JSP page into Servlet. After that, Servlet page is compiled by the compiler and gets converted into the class file. Moreover, all the processes that happen in Servlet are performed on JSP later like initialization, committing response to the browser and destroy.

4. IDE:

An integrated development environment (IDE) is a software application that helps programmers develop software code efficiently. It increases developer productivity by combining capabilities such as software editing, building, testing, and packaging in an easy-to-use application. Just as writers use text editors and accountants use spreadsheets, software developers use IDEs to make their job easier. Integrated development environments (IDEs) include functionality that goes beyond text editing. They provide a central interface for common developer tools, making the software development process much more efficient.

In our project we have used Apache Net-beans IDE, Net-beans is an open source integrated development environment (IDE) for Java. Net-beans allows applications to be developed from a set of modular software components called modules. All the functions of the IDE are provided by modules. Each module provides a well-defined function, such as support for the Java language, editing, or support for the CVS versioning system, and SVN. Net-beans contains all the modules needed for Java development in a single download, allowing the user to start working immediately.

Net-beans runs on Windows, mac OS, Linux and Solar-is. In addition to Java development, it has extensions for other languages like PHP, C, C++, HTML and JavaScript.

5. Cassandra:

Cassandra emerged as critical components of the block chain ecosystem, providing the scalability and performance needed to support block chain applications.

Cassandra is a open-source, distributed No SQL database that is highly scale-able, fault-tolerant, and capable of handling large amounts of data across many commodity servers, providing high availability with no single point of failure. These characteristics make it an ideal choice for use in block chain applications, where data needs to be stored and managed in a decentralized and highly available manner.

Cassandra can be used to store a wide range of block chain data, including transaction data, block information, and smart contract data. Its distributed architecture enables it to handle massive amounts of data across multiple nodes, making it an ideal choice for highly scale able block chain applications.

IV RESULTS AND DISCUSSIONS

Figure 3: Admin module

Admin is the super user of the system. Admin is responsible for adding of the user in the network. Admin will view the user details and he can verify the user profile. Admin will decide whether the user should be in the network or not. Admin can block the inappropriate user.

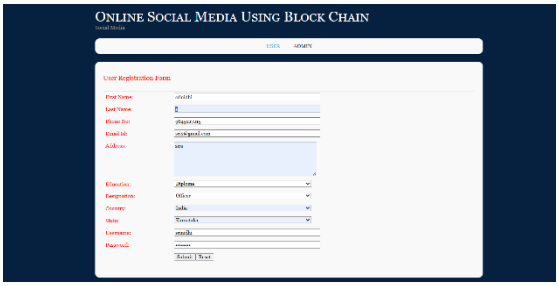

Figure 4: User register page

If the user is new to network, He/She need to register to network providing the information such as First name, Last name, Phone number, Email id, Address, Education, Designation, Country, User name And Password. After submit of all registered information users profile will be created and can login through login page by entering user name and password.

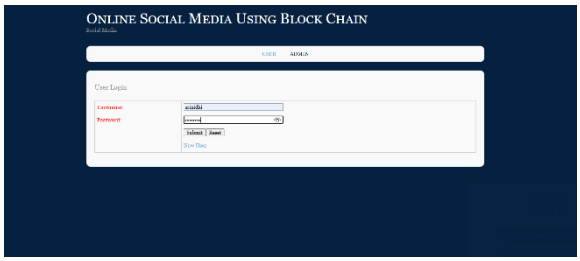

Figure 5: User module

Create Account and Login. View Profile. Send Request to Friends. Add and View Comment. Sign Out .

V CONCLUSSIONS

The project " Block chain based social network " aims to keeps users security information under their control in order to avoid security information from leakage centralized servers. Additionally, since the social network service is decentralized, users do not need to worry about service crash down by centralized entity. The security and privacy issues seem to be a stumbling block that prevents the widespread use of online social networks. Block chain is considered a promising technology to improve system security. Different from prior works, this framework enables authorized data queries to enjoy secure, convenient and efficient data sharing, data retrieving and data accessing service in online social networks. To protect the confidentiality and integrity of the data, we combine block chain provide secure data sharing and accessing service.

In this study, we had planned to address the safety and security of social medial application using block chain technology. In block chain technology, we will store the data in the blocks or node and it will get stored in decentralized manner. So that man in the middle attack is not possible and data will be stored in the decentralized server with the help of node address. The same will be implemented in future with the help of latest trends technologies and the same can be implemented in private/public cloud.

REFERENCES

[1] Barbara Guidi "When Block chain Meets Online Social Network" Pervasive and Mobile Computing Volume 62, February 2020.

[2] Ningyuan Chen, David Siu-Yeung Cho "A Block chain Based Autonomous Decentralized Online Social Network" paper published in 2021.

[3] IEEE Transaction on Computational Social Systems "A Block chain-Based Decentralized Online Social Network" IEEE Transaction on Computational Social Systems (Volume: 6, Issue: 6, December 2019).

[4] Shiwen Zhang, Tingting Yao, Vaundi Koe Arthur Sandor "A novel block chain based privacy preserving framework for online social networks" Revived on 21st July 2020, accepted on 8th Nov 2020, Published online on 7th January 2020.

[5] Mohsin Ur Rahaman, Barbara Guidi, Fabrizio Baiardi "Block chain-based access control management for Decentralized Online Social Networks" Received 14 October 2019, Revised 15 April 2020, Accepted 21 May 2020, Available online 4 June 2020, Version of Record 9 June 2020.

[6] Mahamat Ali Hisseine , Deji Chen, Xiao Yang ; The Application of Block chain in Social Media; 28 June 2022; College of Electronic and Information Engineering, Tongji University, Shanghai 201804, China;

[7] Staff, C. Block chain Social Media and Crypto Social Media.2022. Available online: https://www.gemini.com/cryptopedia/ block chain-social-media-decentralized social-media (accessed on 14 June 2022)

[8] Kayes, I.; Iamnitchi, A. Privacy and security in online social networks: A survey. Online Soc. Netw. Media 2017, 3–4, 1–21. [CrossRef]

[9] Guidi, B.; Michienzi, A. The Decentralization of Social Media through the Block chain Technology. In Proceedings of the 13th ACM Web Science Conference 2021, Virtual Event, 21–25 June 2021; Association for Computing Machinery: New York, NY, USA, 2021; pp. 138–139. [CrossRef]