

Research on Network User Behavior Management System Based on Blockchain Technology

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Abstract—In the information age, the network environment has become the main platform for information exchange and transmission. The complexity of Internet information and the diversification of network user behavior have brought many difficulties to the Internet information management. Standardization of network user behavior and analysis and management of network information have become an important research hotspot in the Internet age. Based on the characteristics of distributed storage, this paper proposes a network user behavior management system based on blockchain technology, which can improve the information management and behavior constraints of the network environment on the premise of ensuring the free behavior of network users.

Keywords—Network user behavior management; Blockchain; Smart contract

I. INTRODUCTION

With the development of the Internet era, the network user behavior is increasing rapidly, and its information release, information interaction, information transmission have become the main user behavior in the network environment. Due to the large space of the network platform, the freedom of user behavior is relatively high, and user behavior is prone to violation of network security, laws, regulations, humanitarian and other related constraints. The research and management of user behavior in the network environment is the main subject after the development of Internet. According to the activity information and related trajectory of users in the network environment, the user behavior in the network environment can be analyzed and managed. As the mainstream of current new technology development, blockchain technology has the advantages of decentralization, tamper proof, distributed and high data security. It has been integrated with finance, economy, education and other industries, providing new ideas for data analysis and management. In this paper, according to the characteristics of network user behavior management, combined with the advantages of blockchain technology, the application of blockchain distributed data storage, data encryption technology, intelligent contract technology and Internet user network behavior management, constrains network user behavior, analyzes user behavior rules, filters data information, and proposes an innovative network user behavior management system. Information management provides technical reference[1].

II. INTRODUCTION TO THE BLOCK CHAIN AND RELATED TECHNOLOGY

The block chain technology originated from the development of Bitcoin, mainly working with the bottom of Bitcoin technology. Block chain technology can be defined as: distributing and updating data using a point-to-point distributed technology, using the encrypted chain block structure to store and verify data, with a detrimental architecture of the intelligent contract as a means of managing data[2]. And the block chain is a new infrastructure and distributed calculation paradigm. As a technical solution, block chain technology integrates a variety of types of technologies and innovative technology models.

The core of block chain technology has mainly distributed book technology, asymmetric encryption algorithm, intelligent contract technology. The distributed book technology mainly combines the block chain as a book, and the node of the entire distributed environment completes the bill of transaction, and the accounts recorded by each distributed node are complete, and the entire distributed environment is used. The centralized method, breaking the traditional administrator's one-point accounting method, reflecting the integrity of its transactions; the asymmetric encryption algorithm is encrypted, decrypting the data using the public key and the private key, thus improve data transmission, storage security; intelligent contracts exist in the form of computer programs, with an embedded programming contract, mainly running in a shared area block chain data accounting environment, contract participants together, code scripts formed. It is a transparent form storage. After debugging, the deployment is deployed on the block chain, improves the credibility of the program, and data operation[3].

Decentralization, consensus mechanism, traceability, and openness are the main characteristics of block chain technology. Decentralization refers to the permissions to distribute records and storage on all systems in the block chain. Each node in the block chain communicates with each other, presenting a mesh information structure, implementing verification, transmission, and data management of data. There is no one, and the permissions and tasks of all nodes are equivalent to the task, and the

entire functional implementation of the joint maintenance system is implemented. The consensus mechanism refers to the characteristics of the district block chain technology through intelligent contract, and improve reliability and credit by means of corresponding technical rules. Traceability technology refers to the time dimension of the block chain to embed the time dimension in the block chain to record the specific time of the transaction[4]. Finally form a time chain, making the data high traceability.

As one of the block chain technologies, the consensus mechanism refers to the process of reaching a unified protocol on the status of the network in the way, and is also known as consensus algorithms, which helps verify and verify information to be added to the classified book. Make sure that only real transaction is recorded on the block chain. The consensus mechanism has the characteristics of the block chain to centralize. Since the consensus mechanism is mainly for the purpose of unified consensus in the system, the consensus mechanism has reached a unified protocol for the authenticity and accuracy of the data. When the system data is updated, the consensus mechanism is responsible for securely updating the data status in a distributed network. The protocol rules embedded in the network ensure that the state of the public classification account is always updated with the public's consensus.

III. FRAMEWORK OF NETWORK USER BEHAVIOR MANAGEMENT SYSTEM BASED ON BLOCKCHAIN TECHNOLOGY

In this paper, combined with blockchain data encryption, distributed storage, consensus mechanism and smart contract sub technologies, the network user behavior management system based on blockchain technology is proposed. The system can intelligently screen, mark and manage user behaviors such as information release, storage and data sharing after network users log in, so as to realize the management and analysis of user behavior in the network environment on the basis of purifying the internet environment, improve the intelligence and security of user management[5].

Figure 1 shows the network user behavior management system architecture under block chain technology, and the entire system is divided into application layer, protocol layer, data encryption layer, and distributed storage four layers. The application layer provides user registration and information registration, with the browser or client to display the system entry and present user behavior information. After the network user is registered by the unique username identifier, the behavior trajectory in its network environment is recorded. The user's behavior instruction is submitted to the protocol layer after being submitted. The protocol layer contains smart contracts and consensus mechanisms under block chains, providing contract creation and execution, consensus algorithm, and information verification. The protocol layer sets intelligent conditions such as network subscriber rules contract, information specification, user behavior specification, screening and tagging network user behavior and information. After screening, the data

encryption layer is entered, and the network information is encrypted with the corresponding user in accordance with the data encryption algorithm, and the security and non-tamper-making of the guaranteed data storage. After the data information is processed, it is stored on each block in the block chain environment in the form of distributed storage. Distributed storage improves data storage space to achieve detrimental data storage and application.

Under the blockchain technology, the network user behavior management system, on the premise of ensuring the normal network behavior of network users, realizes the constraint and analysis of network user behavior by creating intelligent contract and consensus mechanism algorithm, filters non-standard information, and marks dishonest network users. On the basis of purifying the network environment, the user information and data are encrypted and distributed stored to improve the security of data and the reliability of the system platform.

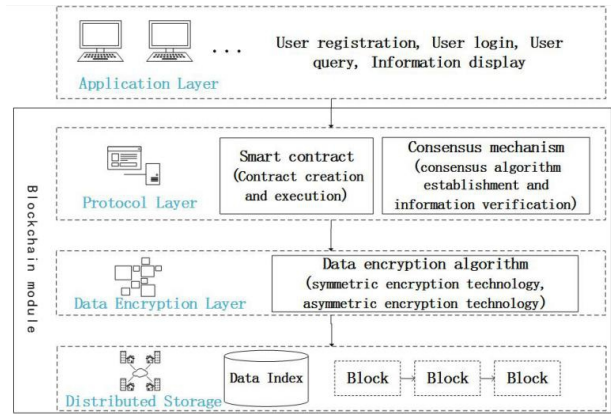


FIGURE 1. Figure 1 Framework of network user behavior management system based on blockchain Technology

IV. DETAILED DESIGN OF NETWORK USER BEHAVIOR MANAGEMENT SYSTEM BASED ON BLOCKCHAIN TECHNOLOGY

A. Process design of network user behavior management system based on blockchain technology

In the network user behavior management system based on blockchain technology, the user behavior of network users after information registration is constrained by relevant protocols. The system protocol layer can create corresponding contracts and mechanisms to control network user behavior. The specific process is shown in Figure 2.

After the user enters the system, submit the behavior application, and the user behavior application is activated and enters the protocol layer. The protocol layer is formed by intelligent contract and consensus mechanism algorithm. System administrators first create basic agreements such as laws and regulations, platform constraints, and create custom intelligent contracts in real time. After the consensus has reached a consensus, the contract takes effect. After the user's behavior information is incorporated into the protocol layer, the legality of the information is first verified. Verify invalid information will perform the rejection user behavior, information tag

and black, and mark user informal behavior. This ensures the legality of user behavior in the network environment. If the verification information is legal, the user behavior is executed and recorded. According to the security level of legal user behavior information, the system is encrypted. The system encrypts data information based on the hash function, digital signature technology, timestamp tag. In response to the implementation and storage of legitimate information, the intelligent algorithm can be analyzed. System analysis network user behavior track, predictive behavior development, based on analysis data, establish more advanced intelligent contracts, improve system security and intelligence. The encrypted data information stores in the form of a decentralized block chain environment in the form of distributed storage. The system combines storage data such as user name, timestamp, information keyword.

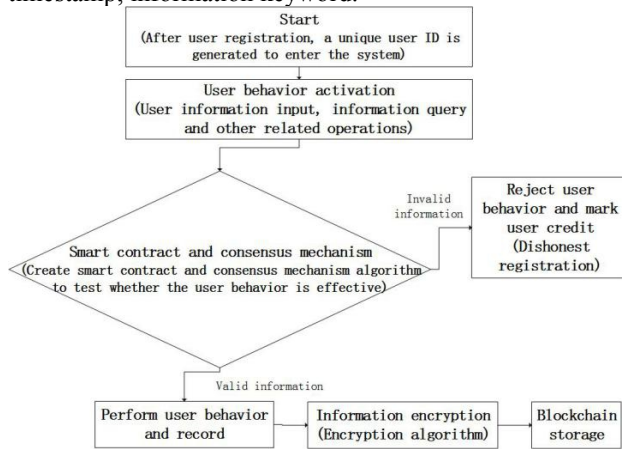


FIGURE 2. Figure 2 Flow chart of network user behavior management system based on blockchain Technology

B. Data flow design of network user behavior management system based on blockchain technology

Under block chain technology, network user behavior management systems form a standardized data stream from user registration. Data streams will change the data item content in the system layers, and increase the corresponding operation information until the system flow is completed. The entire system data stream is shown below (Figure 3):

- The user uses the system through the browser or client in the application layer. After registration in the system, the unique username UI, the UI is an abbreviation for the unique user ID, including the personal information required for user registration;
- Users use the UI account to enter the system, submit a behavior operation application (including the upload, information update, information query, information deletion, information extraction, etc.). According to the user behavior instruction, the application time (timestamp) and UI, the system finally generates user behavior registration data items: (BI, TS, UI). Among them, BI is an abbreviation of behavioral instructions, TS is an abbreviation of timestamp;
- (BI, TS, UI) data item enters the protocol layer, performs verification of intelligent contract and

consensus mechanism. Intelligent contracts include the created laws and regulations contract FC, user rights protection contract BH, user credit management contract XC, personalized contract BS, etc. The consensus mechanism includes a working volume certificate mechanism (POW), equity certification mechanism (POS), part of the byzantine consensus algorithm (PBFT) and other consensus algorithms. According to the intelligent contract and consensus mechanism, the generated BSn(n is the intelligent contract number), and the PSn(n is a consensus algorithm sequence number), and finally in the form of (BI, TS, UI, BSn, PSn) data items. If the data in the (BI, TS, UI) data items do not meet the protocol layer, the username UI is marked, and the operation request for the (BI, TS, UI) data item is denoted, thereby logging the corresponding illegal information and stored ;

- (BI, TS, UI, BSN, PSN) data item according to data encryption, according to the encryption algorithm generating ciphertext ASR (ciphertext ASR mainly according to the user name UI private key, the encryption algorithm rule generates the corresponding public key, and then with the help existing public key encryption forms an ASR ciphertext);
- Data ciphertext ASR incoming block chain distributed data store, according to the detrimental characteristics of the block chain, the data dispersion stores and the corresponding blocks to facilitate the operation of the data.

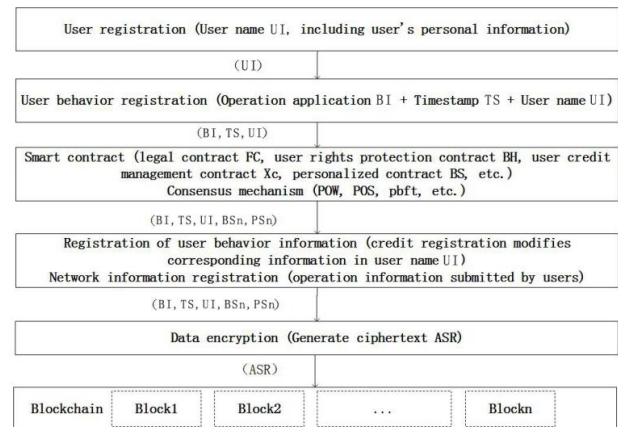


FIGURE 3. Figure 3 Data flow diagram of network user behavior management system based on blockchain Technology

BSN and PSN will mark the agreement execution degree corresponding to the user's behavior and record the user's credit degree. For different contract users' breach of contract, non-compliance with contract provisions and violation of protocol rules, the user's credit degree will be reduced to a certain value. The system will prohibit users from publishing information or extracting data, thus restricting the network user's behavior. The smart contract contains the required contract terms. The basic terms can be set, including legitimacy constraints, user rights and interests protection, or user-defined terms, including trusted operation, increasing credit, etc., to intelligently

standardize the system platform environment. The consensus mechanism can set up a common permission mechanism according to the consensus algorithm and workload to reach the consensus of all users.

Every operation of the data in the system will be recorded and stored in the corresponding database. The data can not be tampered with in the whole system process. The process and log will be distributed storage and block chain environment according to the needs to ensure the irreversibility and security of the data, and provide strong support for the authenticity of the system data.

C. Internet user behavior management system experiment and analysis

Based on zone chain technology, this paper builds a network user behavior management system, providing a new technology platform for purifying network information environments, protecting user behavior privacy, and improving the communication rate of network platform information. The experiment of network user behavior management system under block chain technology is mainly designed with the B / S structure (Browser / Server, browser / server mode), and the experiment selection Windows 10 operating system, i5-9500 CPU, 8GB memory. System development selection SOLIDITY programming language, Visual Studio Code software is a development environment and uses assistive development of HTML, JS.

This paper climbs 2000 network resource data from the academic forum, such as small wooden worms, generic passengers, after screening, preliminary treatment, reserved 1200 effective information data as the experimental data group A (N) of this article, A (N) enters the user After the behavioral management system, the information tag is first tagged according to the user released, including information such as the user's nickname, account registration, and the labeled experiment data group AT (n). A-T (N) has passed the intelligent contract layer, the user behavioral information registration layer, the data encryption layer, and finally demonstrates and saves the experimental data group according to the user behavior information flow. Since the experimental data group A (N) is before entering the system, this paper has been artificial screening, including the validity, accuracy and availability of information.

Table 1 shows some of the results of this paper system experiment. Experiments have proven that entering 1200 effective information, the system will perform username marks, contract screening and registration, user behavior information protection, etc., the resulting results are compared with the results of the artificial screening, and can see the system's implementation accuracy. , effective information rate, etc., the information rate after manual screening is small, and the encrypted storage and propagation of information has a high execution effect.

The experimental results can be obtained, the network user behavior management system has high information screening, user identification and information filtering capability, can mark network user information, information validity screening, intelligent contract provisions user comprehensive behavior information

matches, and finally encrypts user information. In the above table, the comparison between the system and the artificial screening is shown. It can be seen that this article has a high execution effect, but the result of the organizational screening, also has a certain rise in rising space, and it also requires re-accuracy. Implementation results.

TABLE I. THIS ARTICLE SYSTEM EXPERIMENT DATA EXECUTION RESULT IS COMPARED

Experiment array A(n)	User information tag	Information valid screening	Terms of contract	User behavior match	Encryption
Perform success rate / this article	98.4%	95.1%	98.1%	98.8%	98.0%
Data effective / artificial screening	97.6%	99.3%	98.9%	99.2%	99.4%

V. SUMMARY AND PROSPECT

Under the blockchain technology, the network user behavior management system takes the application layer, protocol layer, data encryption layer and distributed storage layer as the main architecture mode. With the help of blockchain intelligent contract, consensus mechanism, data encryption, distributed storage and other sub technologies, the complex network user behavior under the Internet is intelligently managed and distributed screened in the form of contract and protocol encryption algorithm as the core to ensure the security of data, and on the basis of data flow registration and storage to ensure that the data can not be tampered with, for the Internet era to create intelligent, standardized network user behavior management system, purify the Internet environment.

This paper puts forward the theoretical framework and data flow design process of network user behavior management system based on blockchain technology, but the detailed design of smart contract, consensus mechanism and data encryption has not been put forward specific analysis. In the future, we will carry out detailed research and problem optimization on Intelligent contract, consensus mechanism and data encryption sub technology, so as to better improve the intelligence and security of the system.

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