Research on the Construction of Smart Cities by the Big Data Platform of the Blockchain

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Abstract—In the process of rapid development of information technology, to promote the further construction of new smart cities, comprehensive utilization of cloud computing technology, big data technology and Internet of Things technology will help improve the convenience of residents’ lives. The development of blockchain technology provides more possibilities for the construction of new smart cities. The use of blockchain and other new technologies to build a smart city big data platform can realize a point-to-point communication mechanism. At the same time, this can also establish a more reliable trust agreement. It is conducive to the realization of applications such as smart IoT, government affairs, and big data. Using the blockchain big data platform to build a new type of smart city can break information islands and achieve the purpose of data sharing and information security. This is a key issue that must be paid attention to in the current construction of new smart cities. In this link, it is necessary to strengthen the research and analysis of blockchain technology to understand the problems that exist in the process of building a smart city on a big data platform. This article discusses the application advantages and related strategies of a smart city big data platform based on blockchain technology.

1. INTRODUCTION
In the context of the continuous improvement of the socio-economic level, the total urban population is constantly increasing. Improving the level of urban construction is an important part of promoting the sustained and stable development of the Chinese economy. However, there are various problems in the process of rapid urban development. In order to effectively solve these problems, we need to make full use of new technologies. We should use advanced information technology to build a smart city system to promote the healthy development of cities. We need to make full use of new technological means. This can not only optimize the urban living environment, but also help solve various problems such as irrational allocation of urban resources, environmental degradation, and traffic congestion. In the construction of smart cities, we need to build infrastructure based on the Internet of Things technology. At the same time, we must make comprehensive use of mobile internet technology and artificial intelligence technology. Only by deeply integrating these technologies with urban planning, construction, management and operation, can we build a green, coordinated, open and shared smart city development model and promote the healthy and long-term development of the city. In the construction of smart cities, the big data platform is the core technology and key content. However, the big data platform smart city system has some problems. We need to apply blockchain technology based on the original big data platform smart city system to solve the problems in smart city construction and improve the level of smart city construction.
2. OVERVIEW OF BIG DATA PLATFORM
In the application of big data technology, the amount of data is increasing, and effective handling of various data problems is an important challenge that must be faced in current urban development. In the development of society, government departments must continuously improve their information processing and integration capabilities and improve their handling of social issues. Once a problem occurs, the system must be able to respond in the shortest time. At the same time, the system needs to predict and solve the emergence of crises and problems. Only in this way can the government's service quality be truly improved. In order to improve the comprehensive level of government governance, we need to make full use of advanced technical resources, use distributed network management, and improve the level of data openness. This technology is conducive to improving the openness of government affairs. However, data analysis technology and big data technology can assist the government in management and decision-making to a certain extent, and can prevent the problem of doing things based on experience.

At present, data assets are one of the core assets of the government and related enterprises, and they have been agreed by all sectors of society. The government has a strong guiding role in the development of data assets. Collecting and using data resources in various fields of society with government data as the core is conducive to building a smart city big data platform, so as to realize data interconnection, interaction, openness and sharing. In the process of government affairs, government agencies can use data analysis technology to improve the effect of data application. This will not only ensure comprehensive work efficiency, but also help save resources and enhance the government's management and service capabilities. In addition, the use of data analysis models can not only warn about possible problems, but also simulate the consequences of government decisions, which can improve the correctness and predictability of government decisions. The full application of big data technology in people's livelihood can provide residents with more accurate and comprehensive information resources, make residents' lives more convenient, and improve residents' happiness in life [1].

In short, the use of big data and related technologies can greatly improve the government's comprehensive service level, which is important to improve the government's service capacity and decision-making level. Therefore, we need to pay attention to the construction of smart cities based on big data platforms.

3. THE DISADVANTAGES OF TRADITIONAL BIG DATA PLATFORMS
In the process of smart city construction, using big data technology to build a big data platform is an important part of improving the efficiency of smart city construction. However, there are still some problems in the construction of traditional big data platforms. These problems are mainly manifested in the following aspects. Firstly, from a technical perspective, the effective application of big data technology can expand the types of data, but it will also cause the data to be too complex and the total amount is relatively large. This is mainly because there are more channels for data sources, and big data platforms will gather different data from different fields. We must be able to effectively store, analyze, maintain and process different types of data in order to play the value of data resources. However, when processing these data, how to respond to the data with high quality according to different requirements such as data source storage methods and application scenarios is a key issue that must be solved. This requirement determines that in the process of building a smart city big data platform, it is necessary to strengthen the construction of urban cloud computing centers. Secondly, we need to analyze the big data platform issues from the perspective of technical standards and management practices. Because the data sources are scattered, there are big differences in the data information specifications. This will increase the difficulty of data processing to a certain extent. How to effectively solve the problems of scattered data source channels and different information specifications is an important challenge that needs to be faced in the construction of traditional big data platforms. Especially when processing government data, weather data, medical data, traffic data, etc., we must effectively classify them according to different data types. At the same time, we must reasonably control the authority involved
and the degree of public disclosure. Because the nature of the data is different, the attributes of the data type are different, it is difficult to effectively manage the data [2]. Thirdly, from the perspective of data operations, the technical requirements of big data platforms are relatively high, and the construction costs are relatively large. The comprehensive cost used in the later operation process is relatively high, the subsequent resource demand is also relatively large, and the economic benefits are not obvious. In the later operation of the big data platform, a large amount of capital is required for later operation and maintenance, network and upgrading, and the local construction requirements are relatively high, which will increase the construction investment of the big data platform to a certain extent. In addition, the big data platform has relatively high requirements for the corresponding equipment technology, and relatively high requirements for the professional ability of the later technical maintenance personnel, and the equipment investment and personnel recruitment costs will increase the later operation and maintenance costs [3]. Fourth, we need to analyze the big data platform construction and operation model. In the process of building a big data platform for a big smart city, relevant government departments must strengthen the formulation of systems and related regulations to be able to effectively operate the big data platform management. In addition, in the process of smart city construction, the construction environment is more complicated, and it is difficult for government departments to bear it alone. In this case, the government needs to strengthen guidance and strengthen business cooperation. The use of cooperation can ensure the smooth development of smart city construction and operation.

4. APPLICATION OF BIG DATA PLATFORM BASED ON BLOCKCHAIN IN SMART CITY CONSTRUCTION

4.1 Application Characteristics
Blockchain technology was first applied in the financial field, which is the system framework and underlying technology of Bitcoin. The main feature of blockchain is that it can use passwords and small data blocks generated by links for information exchange. Blockchain technology can not only verify information, but also generate the next type of data block. Blockchain is not application software, nor is it a network enterprise. Simply put, blockchain technology is more like an encyclopedia, which can search for corresponding information through keywords. It is a distributed and decentralized database based on Internet technology and chain structure. In the application of blockchain technology, the amount of data stored by each network node is relatively large, which includes all assets and transaction funds records. When recording this information, we can use cryptographic encryption to ensure the security and privacy of the information. Moreover, in the entire application of blockchain technology, all areas are interconnected, which can permanently record and store all information and transaction data of the area network. The use of blockchain and network big data to build smart cities is of positive significance to improve the level of smart city construction.

The full application of blockchain technology in the process of building a big data platform smart city has a strong advantage. This is mainly determined by the characteristics of the blockchain technology itself. The characteristics of blockchain technology are mainly manifested in the following aspects. Firstly, decentralization. In the application process of the blockchain system, it can protect the nodes of each data block, and the accounting method and storage method adopted by the system are mainly distributed, and there is no centralized management part. Secondly, openness. The data in the blockchain system is open and transparent. Everyone can use the system access port to find relevant data and make effective use of data resources. When querying data, blockchain technology can encrypt and protect some private data, which can ensure the security of information to the greatest extent. Thirdly, autonomy. The blockchain system can establish a unified and standardized agreement for all nodes, which can ensure the order and security of data transmission in the entire blockchain system [4]. In this process, blockchain technology can transfer the trust of artificial trust to the machine, and there will be no trust issues. Fourth, information cannot be tampered with. After the verified data is stored in a certain node in the blockchain, it will be permanently recorded and saved. If only a single node cannot modify the information database, the system must modify more than 51% of the information data of the
entire network at the same time to achieve the purpose of data tampering. This determines the stability and credibility of the information. Fifth, anonymity. In the application process of the blockchain system, nodes are converted in a certain way of calculation. The entire information transmission process is judged by the blockchain's own rules and regulations, and there is no question of trust. Anonymity can be used during the transaction to ensure the information security and personal privacy of both parties to the transaction.

4.2 Specific Application
Blockchain-based big data platforms can solve many existing problems of smart big data platforms in the construction of smart cities. For example, by applying the decentralized distribution of blockchain technology to the original service, it can separate a large amount of data and information on different nodes, which can reduce the operating cost of the entire system. In addition, the concept of peer-to-peer stage in the application of blockchain technology can ensure the similarity of different nodes in the public service process. At the same time, this can not only ensure that different nodes perform their own operations, but also reduce the difficulty of developing a smart city big data platform, which is conducive to improving the operating efficiency of the entire system. In addition, in the application process of blockchain technology, smart contracts can give full play to their role. When the system is introduced into new application modes and information forms, it can set up smart contracts to replace the original methods. The innovative information storage methods and structures can improve the efficiency of information transmission and ensure the security of information [5].

![Figure 1. Big Data Platform Structure of Blockchain](image)

When building a smart city big data platform based on blockchain, we need to strengthen the participation of different roles such as blockchain node network data participants, service data source operators, and supervisory access services. In the construction of an intelligent big data platform, we will realize various functions such as blockchain technology as the basis to connect each node of the blockchain to monitor and control the access to rights and interests service information, provide information, and manage applications. In the process of blockchain system application, we can use data synchronization to ensure system input and output and information storage efficiency, and improve the level of information interaction. The smart city system monitoring and management mode of the big data platform based on the amount of calculation is the key content of the entire big data platform. Blockchain technology has unique characteristics of decentralization, and its supervision form is jointly
participated by different nodes in the blockchain. For example, in the process of intelligent transportation construction, when analyzing different information data such as roads, traffic flow, weather, road management, etc., it can be controlled by different nodes. The traffic flow data needs to be shared by the transportation department or Gaode map and Baidu map to obtain the data. Weather data can be obtained through the meteorological department or learn about road management and control measures from different government departments. Using this decentralized management can ensure the comprehensiveness and accuracy of information acquisition. Moreover, each participant can conduct a comprehensive analysis and processing of the acquired data, and then use the node to upload it to the platform for users to use.

5. **Blockchain Based Big Data Platform Smart City Construction Strategy**

Blockchain-based big data platform smart city construction must start from the construction of the basic platform to ensure the order and stability of the smart city construction work. First, we should make overall plans for the construction of smart cities. At the beginning of the construction of a smart city, a comprehensive and complete construction plan must be formulated. We need to build a big data platform that integrates different fields such as health, education, agriculture, public security, civil affairs and energy on the basis of blockchain technology and big data platform. Then, we will use big data analysis technology to analyze the specific status and specific conditions of different provinces and cities. In this way, the smart city construction plan design can be completed according to different priorities, which is conducive to the rational allocation and utilization of city data and material resources. When building a smart city based on the blockchain big data platform, it is necessary to improve the characteristic level of the smart city based on the specific economic development, cultural customs, geographic location and other relevant information of the city area. Second, we must pay attention to people's livelihood needs in the construction of smart cities. The important purpose of building a smart city is to improve the living standards of urban residents and build a more harmonious and stable urban environment. As a result, in the construction of smart cities, it is necessary to face the people's livelihood, so that residents can make better use of the Internet to obtain more convenience, so that residents can better live in the city. Otherwise, in the construction of smart cities, it is necessary to understand the specific needs of the people, and conduct research and analysis on specific regional modules of the blockchain according to the needs of the people. Using the Internet to create a multi-functional platform for the people is conducive to the formation of a smart livelihood service platform, an urban management information service platform, a smart government information service platform, and an economic information service platform. At the same time, this can give play to the responsibilities and roles of different platforms, and use Limin projects to promote the further development of smart cities. Third, we need to pay attention to the full application of new technologies in the construction of smart cities. The city itself is a relatively complex integrated system, and different scenes will come together. Therefore, in the construction of smart cities, we need to fully apply various existing technologies to ensure the effect of urban smart city construction. Blockchain technology is not a single technology, but a new type of technology based on the existing Internet technology and cloud computing technology to reshape the trust mechanism. In the application process of blockchain technology, we need to use this technology to realize the characteristics of digital proof of physical assets. Only in this way can we increase the speed of asset circulation, reduce transaction costs, break through information islands, ensure smooth delivery between the upstream and downstream of the supply chain, and reduce time and economic costs. In the subsequent construction and utilization of smart cities, there are many interaction scenarios. Therefore, the construction of smart cities requires full application of blockchain technology. Meanwhile, we must pay attention to technological innovation and improvement to ensure that the smart city system built on the basis of the blockchain technology big data platform is compatible with China's social development status [6].
6. CONCLUSION
In recent years, in addition to the application of data encryption currency, the application of blockchain technology in other fields is still in the initial stage of development. The various functions involved in the application of blockchain technology will have certain changes at the technical level. This requires us to analyze the relationship between the original system and the new system, and strengthen the effective integration between blockchain technology and the original system as much as possible. When building a smart city system based on a blockchain-based big data platform, the initial investment is relatively large. In this case, it is necessary to comprehensively measure the input and output. Only in this way can the later application benefits of the smart city construction system of the blockchain big data platform be ensured.

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