Volume 7, Issue 4, 2023 ISSN: 2617-4537
DOI: https://doi.org/10.31058/j.data.2023.74002

Research on the Construction of Modern New Smart City System Based on Big Data Technology

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Received: 7 September 2023; **Accepted:** 22 October 2023; **Published:** 6 December 2023

Abstract:

With the rapid development of social economy, science and science and technology, it has driven the further optimization of big data technology, and various industries and fields in the society have begun to make full use of big data technology, committed to improving work efficiency and precision. Government departments and related staff should actively build a modern new smart city in the information age, and improve the data and intelligence of service work. The organic combination of big data technology and modern new smart city system can develop and use big data to the greatest extent, and realize the integration of urban big data, so as to promote the construction and development of modern new cities.

Keywords:

Big Data Technology, Modern New Type, Smart City, System Construction

1. Introduction

At the present stage, in the process of further developing smart cities in China, it is found that there is a serious problem of "information island", and the urban data is not shared. For example, the lighting, transportation and construction of urban construction are usually not open to the outside world. Based on big data technology, the creation of modern new smart city system is an important channel for the construction of new energy generation data and urban data integration, as well as a key technical method to achieve power system data and city data.

2. Overview of the Modern and New Smart City

2.1. The concept of a smart city

Smart city is an urban form established based on a high degree of information technology, which can greatly improve people's living standards, strengthen urban management, and promote the sustainable development of the city. Construction wisdom city is based on all kinds of modern computing technology, including: big data, Internet of things, cloud computing, etc., by protecting the environment, public

services, public security, intelligent information management, etc., comprehensive realize urban management, planning, development, construction of intelligent, ensure the accuracy of urban operation response [1].

2.2. The characteristics of smart cities

Friendly in the ecological environment

Eco-friendly is also one of the characteristics of smart cities. It advocates low-carbon environmental protection and green travel, and has a resource recovery and ecological governance mechanism, which is conducive to sustainable operation and management of cities.

High degree of informatization

Highly information is the basic function of smart city, relying on communication technology and computing technology to achieve the effect of intelligent city operation, so as to realize data sharing.

people oriented; people foremost

Residents' needs are the focus of smart cities. Through efficient and personalized public services for urban residents, the quality of life of urban residents can be improved and a good, comfortable and safe environment should be created.

Through the use of a variety of modern technology, including: big data, cloud computing, Internet of things, etc., wisdom city can realize decision-making data, data analysis, and data collection, to ensure the overall efficiency of operation management, strengthen the management effect, at the same time, with the use of intelligent interaction and intelligent management means, human-machine interaction function, and more convenient service for urban residents [2].

3. The Relationship Between Big Data Technology and Modern New Smart City

In smart cities, big data technology has a particularly critical use value. A large amount of data is the foundation of building a modern new smart city, and the city management staff can use big data technology to accurately and quickly extract effective information from massive data, and carry out in-depth research and analysis of data, laying a foundation for subsequent decision-making work.For example, in the process of implementing traffic management related work, the big data technology can predict and analyze the time of congestion and traffic bottleneck, so as to scientifically control the traffic flow. The construction of modern new smart city also promotes the development of big data technology, and more technology use scenarios and processing measures appear [3]. For example, in the process of building modern new wisdom city, all kinds of intelligent technology for the development of big data technology provides the scene and data source support, including: intelligent traffic, Internet of things, etc., not only that, based on the use of big data technology, to the above technology for better operation and development, drive the construction of modern new wisdom city.

Big data technology and smart city help each other, involving many fields of urban governance and operation, including energy, public transportation, municipal roads, public safety, environmental protection, etc., to facilitate the better development of urban management, and create a better living environment for residents [4].

4. Construction of Modern New Smart City System Based on Big Data Technology

4.1. Overall design of the system

Based on the Internet of Things technology, reference model and theory, the overall design of the modern smart city system architecture is conducted.

Power big data platform: Use various functions provided by the power big data platform, including data analysis, data calculation, data storage, etc., and effectively predict the failure interval of the power grid according to the information data generated by the meteorological information system, production management system, TCM system and SCADA system of the power company.

Based on the integration of mature open source products, the big data platform technology components can effectively improve and transform the existing reusable SG-ERP components, and the relevant production and use can be timely migrated to the big data platform. By adopting the Hadoop technology system in the technology or open source products, including: distributed computing framework, Storm, distributed storage, etc., at the same time, the application of big data platform, unified rights and directory, with the function of data management and security control function [5]. To analyze the intelligent prediction grid fault interval model as the core of the distribution network repair the lean management system, relying on big data platform technology and other big data technology (MapReduce distributed parallel, kafka real-time acquisition, storm flow calculation, etc.), has the function of integrated real-time massive load data and fault repair data, so as to realize rapid and efficient processing of large amounts of data information.

Data source: it usually involves the business information and data in the business system.

Integrated data: organic combination of various technologies, including: sqoop offline data extraction, kafka real-time data distributed message queue, etc., can efficient and rapid access to heterogeneous data, create integrated distributed data function, has the effect of real-time acquisition and processing data, to better monitoring data source to the platform storage, further develop related configuration.

Storage data: use related storage technology, including: distributed online database, relationship database, distributed file system, etc., provide multiple storage data capability (store distributed files, storage relationship data, storage data), at the same time, ready to access the unified storage interface, strengthen the horizontal expansion data storage low cost, under the condition of high concurrency, speed up the data access response, fully meet the actual needs of real-time and real-time storage of a large amount of data.

Calculation data: relying on a variety of data processing technologies, including: flow calculation, batch measurement, etc., at the same time, using SQL query function, to fully meet the calculation needs of different timeliness. Batch computing can support mass data offline analysis such as historical data report analysis; flow computing can provide support for real-time warning and processing of power data, and it is similar to SQL translation query statement for distributed parallel computing tasks.

Analysis data: Through the organic combination of Mahout and R language, create a mining distributed data algorithm library, relying on the use of modeling design mining tools, create a perfect running engine and unified modeling analysis function. At the same time, with the help of the upgrading and transformation of the analysis and decision-making platform, the relevant functions are more perfect, including: model release, model operation, analysis and modeling, etc., to better support big data distributed computing, fully meet the offline and real-time application requirements of analysis and mining, and facilitate the construction of the company's analysis and decision-making application platform.

3.2. Multi-source heterogeneous data acquisition and integration

With the help of information interaction bus, the system data collection using each link of data, including: electricity, hair, change, match, lose, combined with economic data, traffic data, meteorological data, municipal, etc., create a highly integrated business flow, energy flow, information flow of big data system, facilitate better create and application of big data platform.

Data fusion covers the information of the external network, spanning the four areas of power security (I, II, III and IV), and carries out security maintenance work at the same time. Figure Figure 3 shows the data fusion framework of the big data service platform.

On the basis of information interaction bus multi-source heterogeneous data integration and collection, effectively solve the problems of intelligent data service platform, including: security access, data fusion, multi-source information collection, etc., synchronous database data, integrated business and system interface, cleaning heterogeneous data, provided by the data interface more standardized and intelligent,Achieve the process monitoring data flow, unified management of power grid model, the purpose of management data resources, in the access layer of security protection information work, and identify the security level of data assets, data service platform of unstructured and structured data processing layer, facilitate real-time processing of large amounts of data information.

data acquisition

System interface and business integration: using the current information interaction bus has integrated all kinds of data information content, including: marketing system, production repair platform, distribution automation, etc., with the combination of external information and data, after five new, new interface construction, at the same time, for other items data fusion big data requirements, further mining the existing system information and data, realize the extension of the system interface.

Data synchronization between database: construction and incremental maintenance of large data platform for huge amounts of data focus on the extraction and synchronous data between database, through the use of ETL technology, update detection big data platform, achieve real-time data synchronization in electricity information collection mass database, and synchronous scheduling automation system real-time library, scheduling automation system history library, the data of distribution automation system.

Standardization construction of data interface: using the information interaction bus, with the synchronous construction of business integration, database synchronization

and system interface, and to build the standardized interface design covering middleware, database, new energy data, power system and external data.

information analyse

Power grid model verification and management: power data from different sources involves the consistency of models. If the models between systems are inconsistent, the data will be unable to use effectively, and massive amounts of meaningless data will be accumulated continuously. Therefore, the model verification should be carried out. Compare the model version, and identify the unqualified data sources in the first time.

Heterogeneous data cleaning: data service platform is a large amount of data, the data covers a variety of data types, including: unstructured, structured, etc., are extracted from multiple business system, which will lead to many dirty data exist in data, filtering, modeling, can filter in data collection and set layers or correct the dirty data, and deliver the data in the data service platform. Among them, repeated information cleaning, incorrect data cleaning and incomplete data cleaning are the main objects of data pre-cleaning.

data management

Data resource management: big data platform of data source has many characteristics, including: frequency diversity, complex channels, sources, relying on the use of data service platform, the real source of data cannot be multilevel energy coordination control system, application layer, during the operation of fault and trace data should effectively manage data resources.

Construction data resource management covers a number of contents, including: data validity check, data resource query, data resource statistics, data classification of various data resources and registration, etc.

Information flow process monitoring

Through the use of information interaction bus, expand the user monitoring function, and monitor the information flow, achieve graphical management information exchange effect of bus running status, to “business-service”, “system-service” as the center of related work, provide various practical functions of the bus, including: statistical flow, real-time warning, hardware monitoring, etc.

5. Conclusions

To sum up, the modern new smart city has the characteristics of friendly ecological environment, high degree of informatization, people-oriented and convenient service. In the actual construction of modern new smart city system, the use of big data technology can better manage massive data, standardize the storage of data and access the data outside the system. Relevant personnel should deeply understand and analyze the construction of a modern new smart city system based on big data technology, including the overall design of the system, multi-source and heterogeneous data collection and integration, so as to improve the intelligence and standardization of urban services, and drive the sustainable progress and development of the city.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

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