

## Discussion on Construction of Land Engineering Database Based on Big Data Background

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### Abstract

**In the era of big data, in order to realize the full utilization, sharing and security protection of land engineering data resources. This study will combine the diversified data of various fields involved in land engineering, base on the application status of database technology in the era of big data, aiming at data types, data collection and processing, data storage and other aspects, formulate land engineering database standards and construct land engineering database. Aimed at providing comprehensive and highly shared data support and technical support for land engineering project management, and speeding up the process of land engineering information construction.**

### Keywords

**Database, Land engineering, Big data.**

### 1. Introduction

In the era of big data, more emphasis is placed on the diversification of data value. Data can be used effectively in the management and sharing of data resources. At present, big data has entered various industrial fields and become a new driving force for global economic development. The new information technology revolution marked by big data technology, AI technology, communication technology and cloud computing has greatly promoted economic and social development and exerted a significant impact on industrial structure and organizational form<sup>[1]</sup>. The technical development and application of database is the important foundation of strengthening data development and application. With the continuous development of database technology, the combination of customer-oriented technology, multimedia technology and artificial intelligence technology is the important direction of the current database application and development<sup>[2]</sup>. With the continuous development of database technology, the era of big data in the database construction of present a "unity" "sharing" and "flexibility", etc, to go further by calling for the application of database, should strengthen the effective building of database technology, data labels, node construction, large virtual system, access to information, such as content, is the important foundation of the current database application and development. Based on the research of database, this paper sets out from the background of the era of big data, and specifically expounds the effective application of database in the era of big data.

Land engineering is a process of solving land problems by means of engineering, transforming unused land into usable land or efficiently utilizing utilized land, and coordinating the

harmonious development of man-land relationship. In the process, data in many fields such as natural resources, engineering construction, humanities and social sciences are involved, and the categories of applied data are varied and complex, with significant heterogeneity characteristics, forming big data with typical 4V (i.e. Volume, Variety, Value, Velocity) characteristics [3]. However, the degree of digitization and database construction of land engineering data resources is not high at present, and there is no unified mechanism and platform for land engineering resource sharing. Traditional way of data management lack of unified standards and the application of engineering data of land, human intervention, sharing and independence is poor, lead to digital information display of a single project of land resources, resources scattered, cannot work for land reclamation and utilization of the business in a timely manner to provide accurate and effective data information [4]. Therefore, it is urgent to accelerate the solution of decentralized management and insufficient data application of land engineering data resources. It is urgent to build land engineering resource database to realize data standardization and resource sharing, and break the current situation of lack of data sharing and exchange and the phenomenon of "data island".

In this paper, the data results reflecting the quantity, quality, characteristics, spatial distribution and other major data elements with different standards, different formats and their own systems will be correlated and integrated, so as to promote the construction of land engineering database and realize the daily management and decision-making of various land engineering information by data results. For these different types of data, a standardized database is needed for storage, and there is an important problem at this stage. The database established is a "dead database", and how to change the "dead database" into a "live database", so that the dynamic management of land data becomes the inevitable demand of land information construction.

## 2. Construction rules of land engineering database

Unity: database construction, the need and the other database, for data exchange between different database compatibility problems, lead to difficult to effective application of database resources, the formation of idle resources, waste and other issues, so the construction of the database to meet the unity of different database, improve data resource application in the construction of a traditional database system. In the era of big data, the application of database can be built based on the unity of different databases to achieve more convenient and effective information operation in the display and retrieval of database resources. In the construction of land engineering characteristic database, through the unified construction of different databases, in a unified search interface to achieve one-stop "search" and "query". Therefore, in the database compatibility application, how to achieve the unity of different databases, become an important basis to improve the database application, but also a strong guarantee of resource utilization[5].

Sharing:the construction and sharing of database resources to achieve convenient access to resources. The value of data information is reflected in improving the sharing of data resources, which can improve the effective application of resource information in convenient access to resources. In the application construction of database, virtual data center can be used to realize the construction of each sub-node, and then play an important role in the realization of functions, resource information sharing and other aspects. Therefore, with the continuous development of database technology and application, the sharing and construction of database resources can further achieve convenient access to resources, meet the needs of different user groups, and improve the application value of the database[6].

Flexibility:The information processing mechanism is flexible, the database application of each node of the database is optimized in the era of big data, and the flexibility of database

construction is more emphasized. Based on actual needs, the effective construction of the database system can better meet the needs of users. In terms of information processing mechanism, each node of the database should be optimized based on the principle of flexibility, so that the service efficiency can be better played in data processing, transmission and application. Therefore, from the perspective of the technical application of the database, the flexibility of the application characteristics, is to better build a complete database system, to adapt to the rapid development of the application field<sup>[7]</sup>.

### 3. Construction Content

#### 3.1. Information Collection

The land engineering big data platform involves two categories and 16 subcategories of data sources for research and collection of results. Two categories include public data and proprietary data. Public data includes meteorological data, environmental data, soil data, hydrological and water conservancy data, remote sensing image data, laws and regulations data, forestry data, mineral data, terrain data, groundwater information data, light radiation data, data of the second Land use survey of Shaanxi Province; Our own data includes laboratory information management system data, backup resource system data, test related standards and specifications, and free paper literature data.

At present, the data collection mainly focuses on the data in Shaanxi province, and part of the data involves the whole country. On the time scale, the data are mainly recorded in recent years. The data of the whole platform will be further supplemented and improved through the subsequent intermittent updates and accumulation.

In urban soil organic refactoring work mainly reflects in construction land development, urban infrastructure construction, tourism development, pollution control projects, such as large data software system with the advantages in the Internet to collect, accumulated relevant regional cultural economy of huge amounts of information, combined with land, hydrologic data and the laws and regulations, build joint data analysis model based on the organic combination of person, It is also applied to the retrieval of internal professional basic data before construction and the comparative analysis after the implementation of land engineering.

The data acquisition module is used to construct the core database and accelerate the planning, design and construction of land engineering projects. The core database includes basic database, public database, test database and engineering database. At the same time, it has the interface of data collection, input and maintenance required by subsequent applications as well as the data collection program, which is convenient for users to enrich the database by themselves in the later period. The data collection architecture mainly includes crawler module (oriented to different data sources), timing framework module (used for scheduling crawler tasks) and script entry module (oriented to basic data).

#### 3.2. Data Storage

Data storage is mainly based on the characteristics of various data in a unified database table structure on each data platform, and metadata management to ensure the speed and efficiency of data extraction strategy.

Currently, structured statistics and text are stored in the Xdata-AUS system, and text data is stored in the HDFS. To ensure data security, both xdata-AUS and HDFS use the copy mechanism to ensure data security. Xdata-aus defines data snapshots and backs them up to the HDFS. The stability and security of data ensures the extraction and analysis effect of data service layer and data application layer.

### 3.3. Data retrieval

Through a variety of retrieval methods, the big data technology is adopted to synthesize the disordered data into highly relevant block data, improve the efficiency of information retrieval, and provide accurate data-based support for relevant decision makers. According to the specific search scope of relevant data to carry out thematic data retrieval. Through different statistical and computational methods (such as the calculation of the highest temperature in the last decade, regional average pressure or special indicators), the key information in the data is extracted to reduce the burden of manual calculation, so that the staff can easily obtain the required data. Provide a variety of data access interface, improve the system scalability; Through various data access modes, the data after ETL is stored based on indexes. The business - oriented data warehouse is established according to the practical application requirements. All analysis and processing data and intermediate results are stored in the data warehouse of the analysis and processing platform (Liu Huanting, 2005).

The analysis and processing platform provides users with standard data access interface and data query language, and supports various types of basic operations such as query and analysis, aggregation and analysis of the retrieved data in the data warehouse.

Search criteria are rendered in the form of a form. The search object (region), data type (meteorology, humanity, hydrology, soil), related data index (temperature, heavy metal content, etc.) and time range can be selected from the form. According to the description of the query form, the retrieved content is presented in a suitable graphical manner; At the same time, the export of retrieval data should be supported as import for simulation and decision making (users need to provide explicit formulas for index transformation).

The big data center organizes all kinds of data reasonably, extracts the key attributes that can be associated with the data, and computationally searches the data in different dimensions such as space and time, so as to form specific retrieval methods and presentation forms for each different topic. This kind of data organization clustering can effectively sort out and merge the disorganized data to form more targeted thematic data information content for land construction project, and can provide the corresponding data retrieval interface as the authority mechanism for external data application and call.

## 4. Conclusion

In a word, the continuous development of database technology strengthens the effective application of database in the era of big data, and further realizes the management and sharing of data information resources. Database technology is organically combined with artificial intelligence and multimedia technology to achieve a more perfect functional system. In the discussion of this paper, the application and construction of the database show distinct characteristics, such as "flexibility", "unity" and "sharing", which further requires the application of the database in the era of big data and the effective construction of the database technology should be strengthened.

## Acknowledgements

This paper was supported by Shanxi Province Land Engineering Construction Group Project DJNY2021-32.

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