An optimization method of intelligent water conservancy project

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Abstract. At present, the deep integration of intelligent water conservancy projects with the new generation of information technology has changed the way the government manages water conservancy projects and public services. When the government vigorously promotes the construction of a network power, a data China and a smart society, comprehensively accelerating the construction of smart water conservancy, vigorously promoting water conservancy scientific and technological innovation, improving the level of water conservancy informatization and promoting the construction of smart water conservancy have become another direction of the development of smart water conservancy. By analyzing the characteristics of intelligent water conservancy project and the current application characteristics of information technology, this paper puts forward an optimization method of intelligent water conservancy project by using the latest technology.

Keywords: Water conservancy project, Optimization method, Information technology.

1 Introduction

Smart water conservancy involves many concepts, including smart city, smart manufacturing, new infrastructure, data transformation and data government. Various advanced technologies are also keen to find their own space in the field of water affairs. Smart water is a management tool for the water industry, covering all aspects of the water industry, such as hydrology, water quality, water resources, water supply, drainage, flood control and waterlogging prevention. Smart water provides real-time perception, business integration, interconnection, integration and sharing, intelligent decision-making and other functions for water operators and end users. The ultimate goal of smart water is to closely connect all links of the water system and make all links cooperate with each other, so as to improve management efficiency, increase security and enhance flexibility. The construction of smart water is divided into three stages: digitization of water information, intellectualization of water analysis and intellectualization of water decision-making.

The development of China's water conservancy industry started very late and developed slowly. The water conservancy industry is the major plan of people's livelihood and is always dominated by its own people. At present, the water industry

EAI Urb-IoT 2021, December 20-21, Shenzhen, People's Republic of China

DOI 10.4108/eai.20-12-2021.2315023

is basically in the state of regional monopoly and state-owned enterprise monopoly, which makes it difficult for excellent companies to spread their technology and management experience. The development of information technology provides more excellent schemes for the design of intelligent water conservancy projects. Therefore, the mainstream research direction in today's society is to use high and new technologies such as network, computer and 5g to complete the optimization and design of intelligent water conservancy projects.

2 Design of optimization scheme

The optimization direction of the intelligent water conservancy system designed in this paper is to statistically analyze the construction monitoring data in the construction period, water dispatching data in the operation and maintenance period, operation and maintenance data, safety emergency data, etc. through design auxiliary means. Smart water conservancy requires that the project can use big data, artificial intelligence and other technologies to conduct multidimensional and more complex comprehensive analysis and calculation, so as to find various trends. At the same time, we also expect intelligent water conservancy to supervise and correct abnormal situations as much as possible.

2.1 Decision scheme

In order to better realize the optimization method of intelligent water conservancy system, combined with high and new technology, this paper proposes an aid decision support system (ADSS). Based on the decision consultation environment, it is oriented to high-level decision makers, shields technical details and frequent user operations, requires a concise and intuitive interface, rich chart types, and centrally displays various business statistical analysis data, Achieve the goal of "knowing the overall situation on one screen and making decisions with one key"; The auxiliary decision-making system integrates relevant data such as PMIS, intelligent supervision system, safety monitoring, file management, engineering facilities management, land acquisition and resettlement, data signature system of the Ministry of water resources, OA system of water affairs, and uses scientific methods and means to process and sort out the integrated monitoring data, video data and business data to form various business themes, Comprehensively display the business indicators concerned by the project stakeholders from different perspectives and dimensions to assist the management and decision-making in overall control and macro decision-making. The specific structure of the decision scheme is shown in Fig. 1.

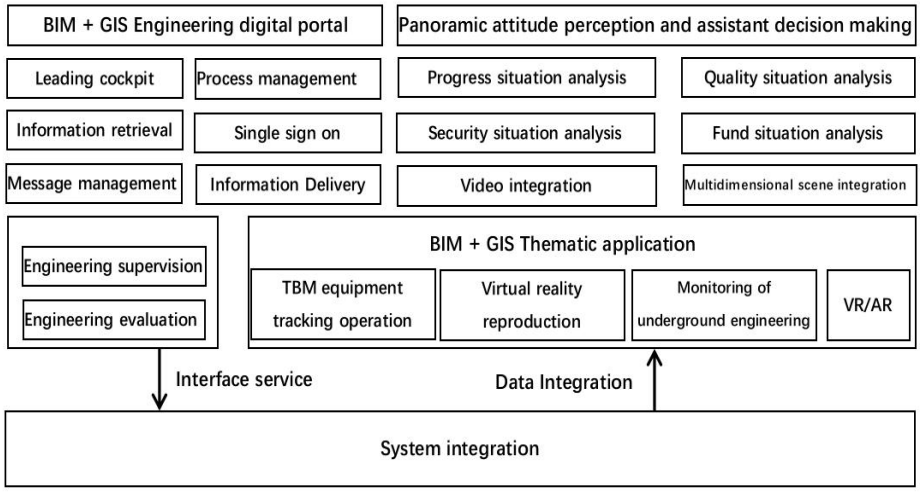

Fig. 1. specific structure of the decision scheme.

2.2 Core content of decision structure

BIM + GIS Engineering data portal. The data portal is a platform for the integration and display of engineering data. Based on the accumulation of business data, it extracts the key indicators and information related to the project as needed. After summary and statistics, it visually displays the data in the form of graphs and tables. At the same time, it integrates the data with three-dimensional scenes based on BIM + GIS platform and visually displays them to grasp the overall situation of the project.

- Management cockpit;
- Process service and retrieval;
- Single sign on: The project portal will integrate the system and data uniformly according to the system type and data business type, mainly in the form of single sign on.

According to the division of business, different business users have different requirements for the scope of business use, specific to the specific requirements of various businesses for users' use authority, so as to prevent violations and unauthorized operations. Therefore, it provides identity authentication and authority control for various types of network users, and realizes the management of highly reliable and high-performance network security and user management Maintenance and safety control platform is the need for the normal and orderly operation of the system. The system will integrate the OA account of Guangdong Pearl River Delta Water Supply Co., Ltd. as the user authentication interface to realize unified access and avoid repeated login of multiple systems. At the same time, it will establish the authentication and authorization system of computer network to achieve the authentication and authorization of users. Authentication is to check whether users have the right to store and use the requested resources, Authorization is the ability that

the system gives users to use and access specific resources. Its role is to prevent the intrusion of illegal users, and also to prevent the users entering the network from operating and accessing other than authorization, so as to protect the security of the system.

- Unified messaging integration;
- Information publishing service: Project information release, news management, knowledge push and public consultation services

3 Intelligent enabled hydraulic engineering platform

The middle stage of the project is the optimized intelligent capability support platform, which is mainly composed of the basic support platform in the whole life cycle, the BIM + GIS platform in the whole life cycle, the hydraulic engineering model platform in the whole life cycle and the intelligent analysis platform in the whole life cycle. The engineering platform applies advanced technologies such as BIM, GIS, artificial intelligence, Internet of things, water conservancy professional model and big data analysis model to precipitate the universal intelligent support ability and provide full life-cycle support for upper layer intelligent applications as shown in Fig. 2.

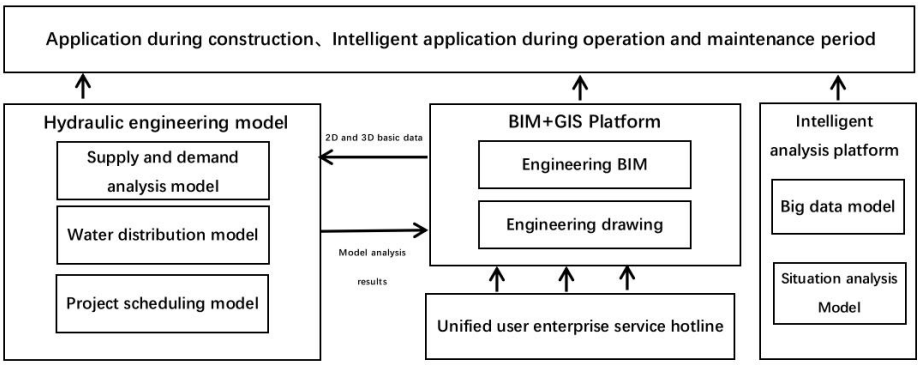

Fig. 2. Intelligent enabled hydraulic engineering architecture.

3.1 Building a basic support platform for the whole life cycle

The basic support platform mainly includes enterprise service bus, micro service management, instant messaging service and unified user service.

Enterprise service bus. The optimized intelligent water conservancy project realizes the unified integration and management of services through the service bus, and realizes the registration and management of engineering project management information system (PMIS), intelligent supervision platform, BIM + GIS platform system, intelligent dispatching system, intelligent operation and maintenance system,

emergency command system and other services. Through the enterprise service bus (ESB), the service process of each system is arranged, and the service release, registration, application, search and authorization are managed. At the same time, it provides message conversion, protocol conversion, message routing and other functions of heterogeneous systems, can dynamically monitor the service status, and provides error / exception handling mechanism and security mechanism to ensure the normal, stable and safe operation of the service bus.

Microservice management. The optimized intelligent water conservancy project realizes the micro service development and management of intelligent dispatching system, intelligent operation and maintenance system, emergency command system and data experience system through micro service management. Through micro service management, build a micro service container, unify the technical development system of the business system in the operation and maintenance period, realize the front-end and rear-end separation and distributed deployment of business applications in the operation and maintenance period, improve the rapid response of business applications to demand changes, and improve the support ability of business in the operation and maintenance period to cope with high load.

Instant messaging services. Instant messaging service provides one click communication service function to realize message exchange between PC and mobile. Instant messaging service realizes the integrated inheritance of fixed line, mobile phone, fax, SMS, email, microblog, wechat and other communication tools, and encapsulates the one click function of office phone, mobile phone, fax, SMS, email, wechat and other interactive modes.

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- OCR service: provides the functions of character recognition, layout analysis and layout text extraction;
- QR code service: complete tracking, query and analysis of materials and equipment through scenario applications such as QR code generation and identification;
- Intelligent voice service: intelligent voice service provides the function of automatically converting voice input into text input. According to the operator's speech, the computer recognizes the input method of Chinese characters (also known as voice control input). Intelligent voice service can be used for voice search, intelligent guidance, alarm prompt and other voice services of intelligent construction site and business application;

- Face recognition service: our system provides face recognition algorithms suitable for hydraulic engineering applications. Face recognition service can detect the face of personnel entering the construction site, record the entry time, track personnel's actions, and remind information according to face ID;
- Full text retrieval service: full text retrieval service provides massive, accurate and efficient full-text retrieval functions. By inputting the search words, the relevant results can be quickly retrieved. It provides personalized service functions such as advanced search, search preference, similar search tips, search history, search subscription and tag search

3.2 Building BIM + GIS platform in the whole life cycle

BIM + GIS platform provides Bim and GIS functional services for business applications during construction and operation and maintenance. It provides cross platform BIM model lightweight import, BIM model data management, BIM model operation, BIM + GIS scene display, secondary development and application.

4 Conclusion

It can be seen that by integrating the information technology construction control center and management platform, we can well complete the optimization construction of intelligent water conservancy projects.

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