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Intelligent mechanization cloud service data platform application

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Abstract. In the steady development of social economy, our intelligent mechanization technology level is getting higher and higher. Especially in agricultural fields, our country agricultural big data is mainly reflected in market management, economic production, environmental resources and so on, related agricultural machinery big data technology research lacks the specialized systematization big data platform as support. Taking agriculture as an example, this paper mainly discusses the development status of the intelligent mechanization cloud service data platform, and then focuses on the application of the intelligent mechanization cloud service data platform according to the platform system design and experimental verification analysis.

Keywords：Wisdom; Mechanization; Cloud services; Data platform.

1. Introduction

In the steady development of modern society and economy, big data refers to the data set that cannot be captured, managed and processed by ordinary software within a specified time, and needs to be transformed into an information asset with more decision-making power, insight and discovery power and process optimization ability by using a new processing mode. It has the characteristics of diversification, high growth and mass. The development of big data in the field of agriculture refers to the important scope within this scope, which includes work data, state data, feedback data, technical data, talent information and many other contents. The existing or updated processing mode can be used to form the big data information required by the goal. Intelligent mechanization cloud service data platform in the field of agriculture has begun to be popularized all over the world. It is not only necessary to improve agricultural machinery and equipment by using modern technical theories, but also to regulate the whole process of agricultural activities by using information flow.[1-3]

Nowadays, countries all over the world begin to deeply study the intelligent mechanization cloud service data platform in the field of agriculture, and install the remote real-time monitoring system on most mechanical equipment, which helps the vehicle terminal can use the network to transmit the basic parameters such as the location and working status of the current agricultural machinery and equipment to the monitoring management center server in real time. For example, in the development of modern agricultural production management, the American Trimble Company developed a farm information management system, the specific structure is shown in Figure 1 below:[4-5]

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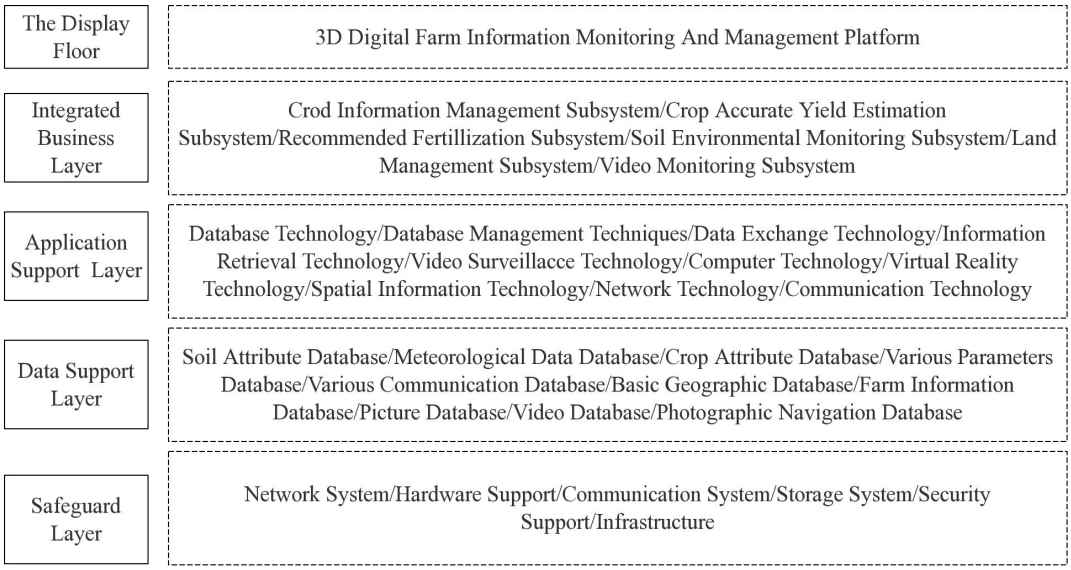

Figure 1 Structure of farm information management system

Based on the analysis of the figure above, it can be seen that the overall system operation is mainly divided into five aspects: support layer, data support layer, application support layer, integrated business layer and display layer. Different levels of design can better meet the needs of information supervision in the agricultural field. From the perspective of practical application, the fundamental reason why the United States invests a lot of time and energy in collecting data about agricultural machinery and equipment is that agricultural production is profitable. In order to further improve the production quantity and work efficiency of agricultural products, more valuable information can be collected by integrating mechanical equipment and data information, which provides technical support for the research and development of intelligent mechanization cloud service data platform in the agricultural field in the new era and can better achieve the goal of efficient operation and comprehensive management.[6-7]

While studying agricultural big data in our country, the focus will be on agricultural environment resources, agricultural production, agricultural management and other fields. The actual platform contains the strategic alliance of technological innovation in the big data industry, etc. It mainly collects and processes the data of production, consumption, market and other fields, and does not regard the big data of agricultural mechanization as a mainstream product. It only involves the information release of agricultural machinery trade, etc. The research and exploration of cloud service data platform of agricultural intelligent machinery are not in-depth. On the basis of comparing the development status at home and abroad, this paper mainly discusses the intelligent mechanization cloud service data platform in the agricultural field, and combines practical cases for verification and analysis, so as to lay the foundation for the development of agricultural intelligent mechanization in the new era.

2. Methods

2.1 System Structure

The intelligent mechanization cloud service data platform in the agricultural field mainly includes modules such as data docking, safety supervision, operation report, operation management, job monitoring, and large home screen.

The system uses the Internet of Things technology to assist managers to collect operational data, which can not only reduce labor costs and improve work efficiency, but also control the errors caused by human factors and give full play to the due role of the data platform. At the same time, the management module is regarded as a technical carrier to comprehensively control the overall

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work flow, so that managers can report data more conveniently and leaders can quickly check the project progress, which can ensure the management process is more standardized and practical work efficiency is greater. The overall system function design is shown in Figure 2 below:[8-9]

Figure 2 Structure diagram of system function

According to the analysis of Figure 3 above, the system functions can be divided into the following points: First, do a good job in field operation management, provide rich consulting services for employees of the department, and improve the competitive advantage of agricultural machinery website operation; Second, the visual management of agricultural machinery distribution provides technical support for the management decision of Marketing Department; Third, grasp the working information of agricultural machinery anytime and anywhere to help technical departments to continuously optimize product information; Fourth, grasp the location information and slavish state of agricultural machinery at any time, control the risk of mortgage sales; Fifth, active alarm and comprehensive control, in order to improve the level of after-sales service.

2.2 Technical Route

Understanding the current situation of agricultural production management in our country, we know that the intelligent management system of agricultural machinery mainly includes four functions, specific components as shown in the following figure 3:[10-11]

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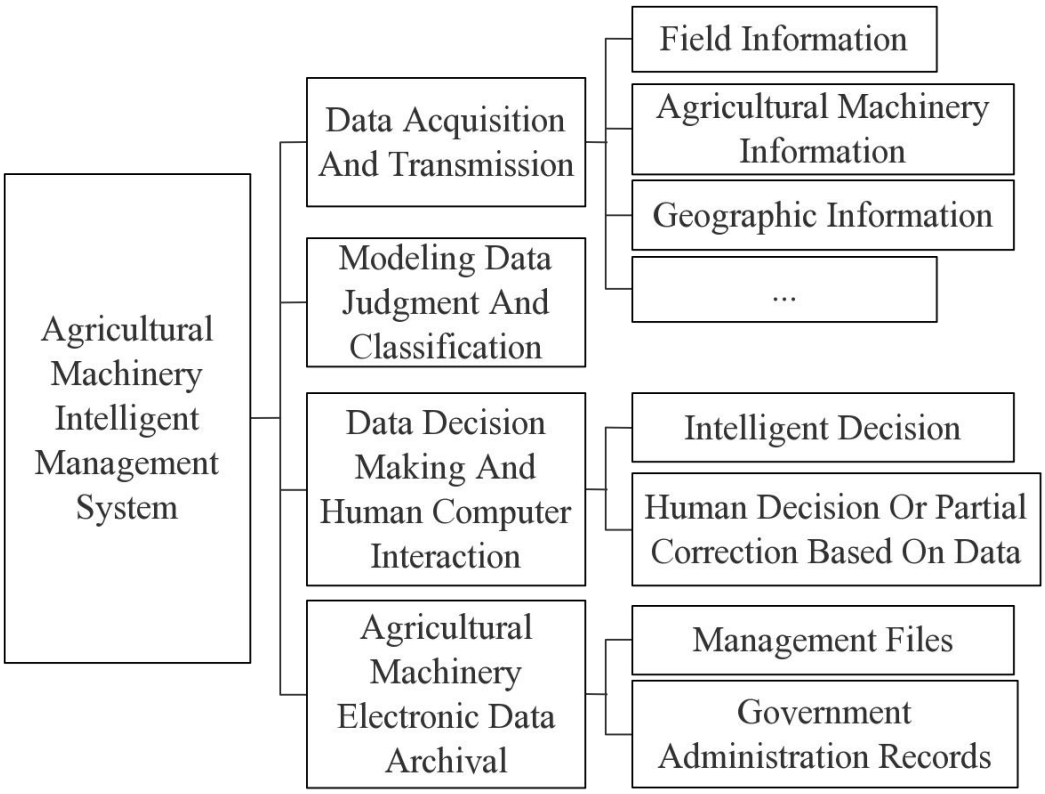

FIG. 3 Structure diagram of intelligent agricultural mechanization management system

First, data acquisition and data transfer. This part is the core content of the system operation design. In order to obtain the required data, the intelligent management system is required to be equipped with perfect software and hardware. In the aspect of software, the main influencing factors of agricultural mechanization production should be carefully sorted out, the parameters required for data transmission should be obtained, and the appropriate operation scheme should be proposed. Then, appropriate hardware should be equipped according to software requirements, including satellite positioning equipment, sensors, supporting data networks, etc., mainly observing mechanical equipment parameters, disease and insect pests, soil moisture and temperature, etc.

Secondly, based on the computer model screening processing data, directly exclude unnecessary information, on the basis of effective classification, convenient for subsequent application.

Thirdly, the CPU and the preset program are used to compare the data information of different periods, independently decide the type and quantity of agricultural machinery and equipment to be applied, and put forward effective schemes according to the performance of agricultural machinery. At the same time, the intelligent management system also has good man-machine interaction function, it can facilitate the user to process the job information and operation plan faster, or through the intelligent management system to view the number of idle agricultural machinery and equipment, for the machinery and equipment in idle state to arrange work, to avoid excessive idle waste of agricultural machinery resources.[12-15]

Finally, in addition to the management of agricultural machinery operations, but also intelligent management records product parameters, operation quantity, work efficiency, work failures and other content, convenient management personnel and government departments to jointly deploy agricultural machinery and equipment.

2.3 Software System

After making clear the agricultural wisdom mechanization cloud service data platform, we should develop and design details and application functions according to the preset theme program. Because the function of management software has great influence on agricultural mechanization

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production, so in the design and development of software function, it should be combined with the regional agricultural production habit, product planting type, geographical conditions, the number of agricultural machinery and other influencing factors, truly do according to local conditions; The basic function of software system is convenient management, so in the design and research, we must consider the convenience and intuitiveness of practical operation. The normal software function layout logic is the basic function, adjustment scheme, data access, data debugging, data storage these five levels of design; To ensure that the function of the software system matches the important data and parts, the decision threshold of the software system is designed scientifically, and then the data processing module is established to ensure that the data acquisition matches the three-dimensional scene in the field. The system can be adjusted according to the changes of agricultural production mode and agricultural machinery types. The data platform can build a good communication platform with the command platform and technical department of local agricultural machinery management department to meet the needs of technical service, guidance and management, and production process as soon as possible. To provide technical support for the development of intelligent mechanization of agriculture.

2.4 Hardware Facilities

In the operation of the cloud service data platform of agricultural intelligent machinery, the matching of hardware facilities is the basic guarantee for the realization of internal functions. The specific requirements are shown in Figure 4 below:

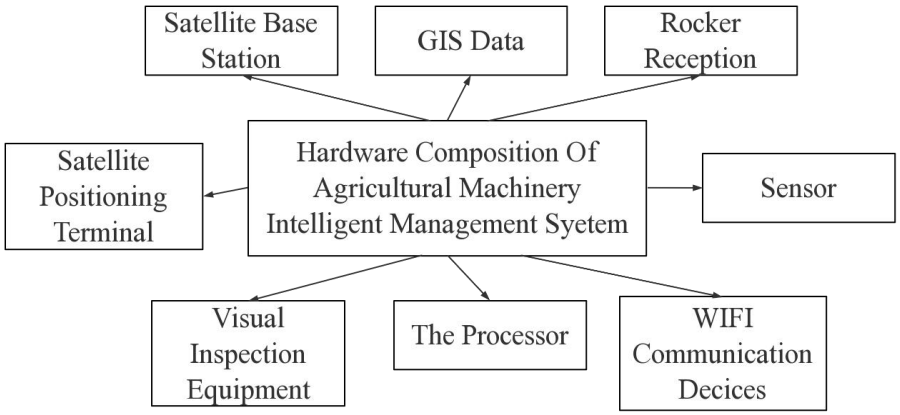

Figure 4 Fundamental requirements for hardware facilities

From the perspective of the development of agricultural intelligent mechanization, the matching of hardware facilities of the management system mainly involves two aspects: on the one hand, it should form an association with the existing infrastructure equipment around the farmland, such as connecting the intelligent system with the positioning boundary and wireless communication network; On the other hand, unable to use the existing infrastructure, need to combine the functional requirements of the software system to increase the design, common hardware facilities to increase projects include temperature and humidity sensors, agricultural machinery supporting terminals, data processing host, etc., the actual cost expenditure also needs to consider debugging, technical installation and other content.

3. Result analysis

3.1 Functional Test

To test and analyze the system structure studied in this paper, it is necessary to test and analyze the functional modules that are practical for business decision-making, and focus on determining whether the functional modules can operate normally. Log in to the data platform with the user name "Normal", test and analyze whether the account login is smooth, and whether each function

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module can run normally by clicking on it. At the same time, it is necessary to study the purchase function after the user selects the required agricultural products, and directly enter the detailed information page of agricultural products to test and analyze the quality function of agricultural products. The final test results are shown in Table 1 below:

Table 1 Functional test table

Test module	Test function	Operate	The intended target	Thetest results
User login	Consumerlogin	Enter the account password	Log in successfully	Asexpected
Agricultural purchases	E-commerce sales of agricultural products	Click on desired produce,add to cart,select address,buy,personalized recommend produce	Successful purchase of agricultural products, and recommend success according to user preferences	Asexpected
Quality traceability of agricultural products	Two-dimensional code traceability	Click to enter the page of detailed information of agricultural products,scan the two-dimensional code	Information of agricultural products traceability link is displayed normally	Asexpected

At the same time, by studying the monitoring service function of production and operation information of the system, the results shown in Table 2 below can be obtained:

Table 2 Information monitoring service function test table

Test module	Test function	Operate	The intended target	Thetest results
User login	Operation personnel Log in	Enter the account password	Log in successfully	Asexpected
Production information module	Production informationmonitoring	Clickto view farm planting,fertilization,pest,harvest, processing,storage information	The infographic normally displays	Asexpected
Business information module	Business information monitoring	Click to view agricultural sales,trading,circulation,prices,inventory information	The infographic normally displays	Asexpected
Warning and notification module	Information change notification	Click for Notificationof changes in farm production and Operation Information	Information notification normally updated display	Asexpected

3.2 Development trend

Based on the analysis of the development status of intelligent mechanization technology concept in recent years, it can be seen that learning and applying various technical theoretical knowledge, integrating various basic software equipment, and identifying the application functions and technical solutions of mechanization cloud service data platform in the agricultural field can not only build a high-quality service platform, but also meet the needs of agricultural economic construction and development in the new era. Therefore, after clarifying the main combination and

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basic functions of intelligent mechanization cloud service data platform in the agricultural field, it is necessary to formulate effective solutions according to the problems faced by practical operation and production and management, so as to better meet the development needs of the design field. At the same time, it is necessary to combine the fundamental needs of the development of The Times, give full consideration to the constantly increasing data information, and pay attention to improving the application technology based on the changes in demand, so as to avoid excessive waste of data resources and hinder the storage space and running speed of new business data. In addition, the construction and application of the intelligent mechanization cloud service data platform should be oriented to two groups, namely, consumers on the one hand and agricultural operators on the other. Therefore, relevant technical theories must consider the needs of different groups, and continue to explore the services for different groups, such as government decision-making departments and agricultural resource distributors, while further studying the data analysis and mining technology. Finally, a cloud service data platform of agricultural intelligent mechanization with regional characteristics will be created to accelerate the pace of local economic construction and development, promote the comprehensive development of characteristic production and operation activities, and lay the foundation for realizing the sustainable development goals.

Conclusion

In summary, on the basis of understanding the development trend of agricultural big data, this paper mainly discusses the construction and application of intelligent mechanization cloud service data platform. The final experimental results prove that the intelligent mechanization cloud service data platform in the agricultural field is consistent with the economic construction and development in the new era, can better meet the needs of users in different fields, can research and promote the intelligent service system, and has practical significance for application and development.

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