The Impact of Big Data on Agricultural Economic Management in the Construction of Smart Agriculture

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Abstract: The impact of big data on today's social industries can be described as extensive, and agriculture as the primary industry has naturally been greatly radiated. Through the effective combination of agriculture and big data, it can help the development of agriculture in an efficient and scientific way, so that agricultural economic management can reach a high level of standardization and uniformity. By building a big data platform, deploying smart agriculture, expanding data space, using remote planting monitoring to provide corresponding technical guidance to cloud agriculture, laying smart irrigation systems, designing the IoT, promoting the interconnection of agriculture and the Internet, and vigorously saving agricultural costs. Make agricultural big data truly become the future development trend.

1. Introduction

Big data refers to the process of optimizing the traditional data processing process to obtain potential information and value in the network data that processes a large amount of information. Therefore, big data technology is also called intangible assets. Big data provides enterprises with a large amount of information and data resources. It is the information and data collected by enterprises from the market, cooperative companies, users, and other subjects in the process of operation and development [1]. The data processing technology and information equipment of enterprises cannot meet the marketing needs of enterprises in a highly competitive market. With the development of information technology, more and more companies are aware of the value of big data. Mining the information in big data can provide valuable reference information for the company's operation and management decisions in the shortest time and optimize business plans.

At present, China's agricultural development has ushered in information technology management, which has promoted the development of agriculture in the direction of modernization. The use of big data technology to carry out agricultural economic management has improved the level of agricultural management and made the agricultural operation model develop in a smart direction [1]. Through the effective application of big data technology and information technology, the waste of resources in agricultural production has been reduced, and the economic benefits of agricultural production have been improved.

2. Current Status of Agricultural Economic Management

Although China's agricultural development is transforming from traditional agriculture to modern agriculture, there are still various problems in the development of modern agriculture. First of all, there is a problem of asymmetric information differences in agricultural economic management. At present, China’s agricultural economic system is in a stage of gradual improvement. There is an information asymmetry between the production of agricultural products and actual demand, which has led to oversupply or short supply of some products, which may cause chaos in the market order of agricultural products [2]. Leading errors occur in the process of scientific research and planting and

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breeding of agricultural products. Some products that consumers do not actually need appear in large quantities, or agricultural products that are already saturated in the market are still undergoing scientific research to launch new products, thereby increasing the operating costs of agricultural economic management.

Secondly, the social attention of agricultural economic management is not high. Many agricultural areas in China pay more attention to agricultural production, but relatively little attention is paid to agricultural economic management. This is mainly manifested in the orderly management of agricultural planting, scientific research, and sales. Some agricultural products supported by policies are offered at low prices [2]. Market sales have seriously affected the market prices of similar agricultural products, or slow sales have occurred, resulting in serious economic losses for growers. Especially in terms of agricultural product sales, many regions have not yet established online sales channels. E-commerce has become one of China's economic models and has been vigorously promoted by the country. Some regions with rapid development have realized the e-commerce of agricultural products. During the exchanges, the problem of backward areas continuing to lag behind and the continuous advancement of advanced areas has been formed, causing serious imbalances in the development of agricultural economy.

Third, there is a phenomenon of separate governance in agricultural economic management, which mainly occurs in some villages. Affected by economic interests, the interest competition between farmers is serious, and the premise of common development is ignored, so internal price competition and technology Phenomena such as barriers are not conducive to the promotion of agricultural technology and advanced business models, leading to a relatively backward agricultural economic development in some areas, and it is difficult to occupy a place in market sales [3]. Of course, agricultural economic management is a complex and cumbersome task that involves many industries and types of agriculture. There are other problems in the management process, but most of them are individualized problems. The above three have common characteristics.

3. Functions of Agricultural Big Data Platform

Agricultural big data is constructed based on the big data analysis platform in the era of information technology. The data collection with the goal of agricultural operation and economic development is the product of China's continuous agricultural economic optimization. Agricultural big data is the process of self-built database since collecting and filtering agricultural information data. Because agricultural planting and production involves many upstream and downstream industries, and the requirements for natural and man-made environments are also more complex, large agricultural databases usually have diversified data types, large data scales, and require fast processing speed and accuracy [3]. Therefore, it is necessary to update the database regularly, and carry out extended analysis and deep analysis of the collected data, to play the role of the large agricultural database and provide a basis for agricultural economic management.

The core of agricultural big data is information technology and agricultural database, which aims to realize the interactivity of agricultural economic data database [3]. Therefore, the creation of the agricultural big data platform is based on the cross-analysis and shared use of agricultural data. The large agricultural database platform can provide a wide range of data types: first, it includes comparison and cross-analysis of natural resources and environmental data, especially disaster historical data and biological resource data, which can effectively help agricultural production to find the right direction; second, it includes planting the production data of the two major industries of farming and breeding have played a guiding role in the scientific improvement of crop replanting and animal husbandry breeding methods; the third is the analysis of supply and demand information in agricultural markets including crops and animal husbandry, usually based on previous sales records, price and profit distribution, consumer purchasing power and purchasing frequency analysis to help scientific researchers or business decision-makers make correct judgments; the fourth is to include

basic information in the national economy, international import and export information, domestic and foreign trade information, etc. [4].

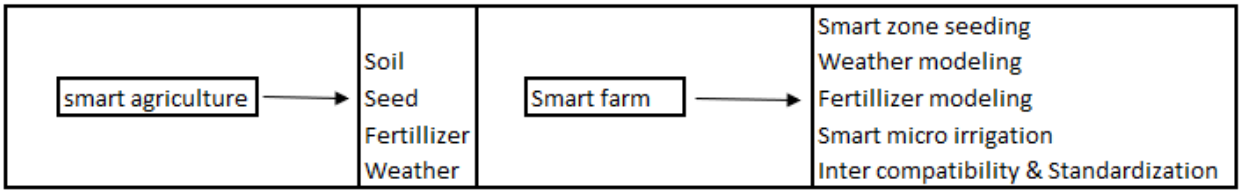

Fig.1 Smart Technology for Smart Farming

In short, the agricultural big data platform can provide all the information needed for agricultural economic development, greatly improve the interaction of the database platform, and realize functions such as online collection and online query. Various functions such as collection, integration, storage, processing, mining, and analysis of existing data can be carried out to ensure the simplicity and convenience of users in the process of use and provide basic data for social and economic development.

4. The Application of Big Data Technology in Agricultural Economic Management

4.1 Building a Smart Agricultural Big Data Platform

The establishment of an agricultural big data management platform can effectively control the agricultural development of each region in China and adjust the structure of each regional development model to achieve the digital development of agricultural production. The construction of an agricultural big data analysis management platform can effectively control each region of China The related dynamics of agricultural development are shown in Figure 2. In the technical processing work, the relevant system acquisition work is carried out through the agricultural big data platform, and the IoT technology integration work is carried out on it, the relevant agricultural data is processed, and the advantages of agricultural data processing are strengthened to establish a timely and efficient a large data application platform to ensure the efficiency of data acquisition [4]. When designing the structure of the agricultural big data platform, first consider the quick configuration function of the big data platform itself, which can cooperate with the production of agricultural resources and meet the changes of agricultural production processes [5]. It is necessary to ensure the stability of the construction of the big data platform and facilitate the technical personnel to carry out the research and application of agricultural big data.

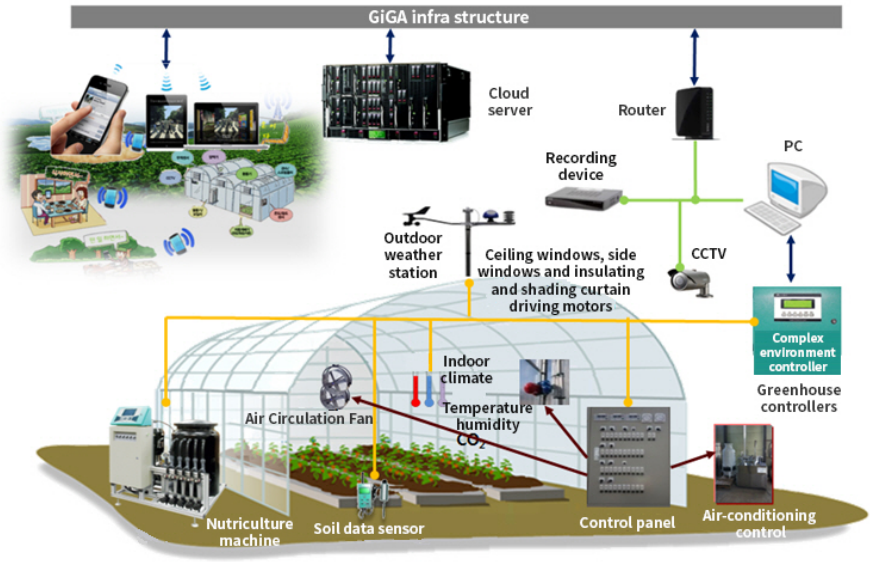

Fig.2 Smart Agriculture Big Data Platform

4.2 Realize Intelligent Control

In the original agricultural production model, it is necessary to judge the growth status of crops through the farmers' own experience. The existing agricultural production is based on agricultural big data to analyze the growth of agricultural products, which makes the analysis more accurate and more efficient. It provides prerequisites for the development of smart agriculture. The best method can be obtained by analyzing the surrounding factors of agricultural production, and accurate data can be obtained through the analysis results [5]. Through the application of remote sensing monitoring technology, various indicators of crops can be predicted, and corresponding solutions can be formulated for possible situations to prevent unnecessary losses of crops and ensure the scientific nature of crop planting methods, as shown in figure 3.

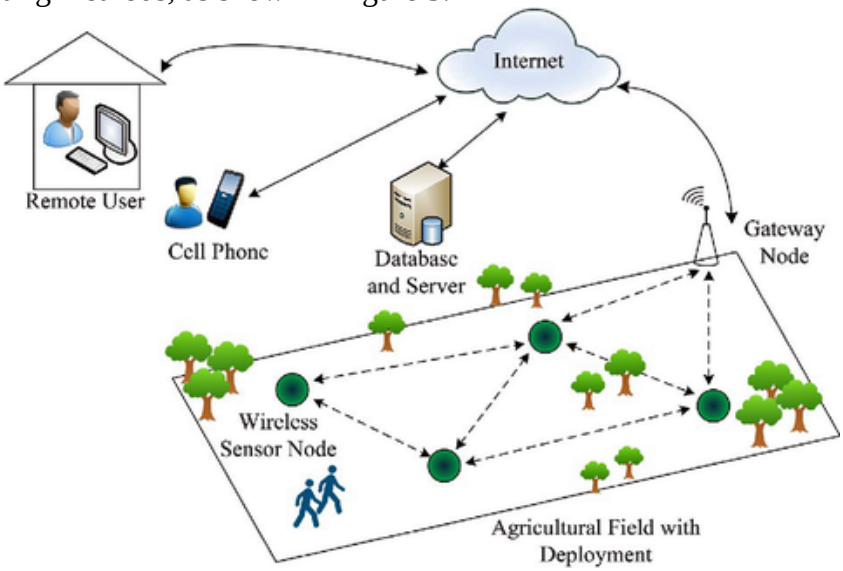

Fig.3 Big Data Realizes Intelligent Control of Agriculture

4.3 Mining Big Data

Through the effective application of the agricultural big data platform, and then strengthen its integration with contemporary Internet information technology, a new model of agriculture is formed. At present, the safety issues that are of great concern in China are affected by the quality of agricultural products. Food safety issues have always received widespread attention from all walks of life [6]. Through the analysis and mining of agricultural big data technology, the improvement of agricultural models has been completed, so that the application of big data platforms can obtain the growth of agricultural products. Data at each stage of the process, and real-time monitoring of the growth process can be carried out [6]. Through the transmission of the safe growth data of agricultural products, the public can understand the production process of agricultural products, clarify the safety of the agricultural products themselves, and ensure the safety of the food eaten.

4.4 Improve the Quality and Safety of Agricultural Products

Real-time supervision of the production process of agricultural products is carried out through the big data platform to ensure that the safety and quality of the agricultural products produced comply with China's food safety laws and regulations, so that consumers can eat agricultural products safely and safely. Supervise the entire process of agricultural products from the very beginning to the end when they are eaten, to ensure that each link is safe and reliable, and to strengthen the quality of the agricultural products themselves, to ensure the safety of agricultural products [7]. When the quality of agricultural products is unqualified during the supervision process, it is necessary to deal with it in a timely manner to prevent it from flowing into people's lives and affecting consumer life safety, and to reduce unnecessary losses for enterprises.

4.5 Promote the Development of Agricultural Economic Management

It is necessary to design management plans suitable for local development according to the different levels of agricultural development in different regions of China, and strengthen the application of Internet technology, combined with the agricultural big data platform, complete the agricultural economic information technology, and accelerate its progress [8]. After completing the construction of agricultural economic informatization, it is necessary to cultivate professional talents and strengthen the training of modern information technology to meet the discovery needs of agricultural economic informatization and lay the foundation for the construction of a new agricultural economic management model.

4.6 Avoid Management Problems

The construction of the agricultural big data platform can be realized in the agricultural economic management work to avoid the occurrence of related problems. For example, big data will combine current common agricultural economic management issues into a systematic, scientific, and digital analysis mode, providing agricultural economic managers with early preventive strategies, and at the same time, making emergency plans for related issues [8]. In the model, the transformation of the agricultural economic management system is realized, and science and figures are used to further express the implementation effects of related management measures. There is a difference in quantity and quality from the traditional manual management mode. Due to certain subjective factors, manual management causes some judgment errors in the management process, which affects the specific results of management work. The application of the agricultural big data platform can effectively improve the management plan. With science and technology as the main testing standard, the implementation of digital management and control mode for the management of the agricultural economy not only reduces the occurrence of related problems, but also improves the management efficiency of daily work. To achieve the best presentation effect of agricultural economic management with the best management model and management plan [9].

4.7 Constructing a New Supply and Marketing System for Agricultural Products

Based on the technical advantages of the big data platform, building a new supply and marketing system for agricultural products has become an important choice for the development of the current agricultural industry [10]. Through big data technology, the effective combination of agricultural product sales and customer demand is realized. In addition, the relevant supply and marketing system platform is constructed to realize in-depth investigation of current agricultural product demand. The data models of customer demand, product classification, supply and demand relationship are comprehensively and systematically Analyze and research to further classify and refine the current supply and demand market and help agricultural planters and breeders to further understand and understand the future market development trend, to establish corresponding development plans. Based on the all-round construction of the current big data platform, further improve the future development situation of agricultural production, use the best optimization strategy to achieve the best improvement effect of production and marketing services, and at the same time, achieve further reduction and optimization of the cost of raw materials in the agricultural industry [10].

5. Summary

As an indispensable tool for the transformation of traditional agriculture to smart agriculture, agricultural big data has played an important role in agricultural economic management. With its characteristics of cross-regional, cross-industry, cross-season, diversity and periodicity, agricultural big data uses information technology to realize the construction of an online platform for the data of agricultural arable land, planting, harvesting, storage, and sales. The combination of traditional agricultural economic management with the Internet and mobile clients has greatly reduced the control process of each link, laid the foundation for the integration of agricultural economics, and realized the take-off of intelligent agricultural economic management.

References

[1] F.J. Wen, Agricultural Big Data and New Opportunities for Development, China Rural Science and Technology, vol.10, pp.14-16, 2013.

[2] Ch.K. Guo, Yanzhong. Liu and Yingyi. Chen, The main problems and main tasks of the development of agricultural big data, Anhui Agricultural Sciences, vol.3(27), pp.9642-9645, 2014.

[3] P. Z. Liu, Application of Agricultural Big Data Platform in Smart Agriculture--Taking Bohai Granary Technology Demonstration Project Big Data Platform as an Example, High Technology and Industrialization, vol.11(5), pp.68-71, 2015.

[4] X.Q. Zhang, X. C. Jiang and X. Xiao, Planning and Research on the Intelligent Agricultural Park in Wuhu City, Journal of Mianyang Normal University, vol.39(05), pp.109-116, 2020.

[5] D.J.Wang, Zh.M..Li and J.H.Zhang, Analysis of the Status Quo of Agricultural Big Data Sharing and Countermeasures Research, China Agricultural Science and Technology Review, vol.18(3), pp.1-6, 2016.

[6] Y.L. Li, The role of agricultural big data in agricultural economic management, Rural Economy and Technology, vol.4(7), pp.196-198, 2015.

[7] Zh.P. Sun, Research on the Application of Agricultural Big Data in Agricultural Economic Management, Henan Agriculture, vol.3(26), pp.44-47, 2016.

[8] R.M. Qiao and G.Zh. Ren, Talking about Classroom Teaching Reform of Agricultural Economic Management Major, Science and Technology Prospects, vol.25(34), pp.192-195, 2015.

[9] Y. N. Xu, The Important Impact of Big Data on Agricultural Economic Management in the Process of Constructing Smart Agriculture, Communication World, vol. (7), pp.319-320, 2018.

[10] X.F. Tang, The important influence of big data on agricultural economic management in the process of constructing smart agriculture, Shanxi Agricultural Economics, vol.4(09), pp.11-12, 2018.