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Research Article

Production Management of Professional Farmers under the New Rural Construction Based on Big Data Technology

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By collecting theoretical research and practical cases on the application of big data in agricultural production and management at home and abroad, this article is based on the actual production and management of rural farmers, deeply analyzes the current situation of big data construction, and finds a model suitable for the development of local agricultural big data. We establish an agricultural big data system suitable for rural characteristics and provide suggestions and suggestions. First of all, this article is based on actual research. Through interviews and questionnaires on the occupational differentiation and agricultural production management of local farmers, the relevant theoretical connections are made, through descriptive statistical analysis of data, and Stata is used for intersectionality. This study uses modular construction methods to build a complete industrialized farm house system and, on this basis, combines the nature of family industry and family intergenerational relationship to divide the unit types and combinations of industrialized modular farm houses. In corresponding analysis and discussion, the test shows that the professional differentiation of farmers is related to the willingness of agricultural production management and agricultural production management behavior. Secondly, this paper uses logistic model to carry out empirical analysis of influencing factors and conducts research on the influencing factors of agricultural production management willingness and agricultural production management behaviors of farmers with different occupational differentiation degrees and models agricultural production management willingness and agricultural production management behaviors, respectively, for empirical testing. Farmers' professional differentiation has related influence factors on agricultural production management willingness and land transfer behavior. After analyzing the results of the model, this article concludes that the occupational differentiation of farmers has a significant impact on the willingness of agricultural production management, and the specific manifestations are significant in many aspects such as farmers' age, education level, whether they have nonagricultural employment skills, and the number of family agricultural labors. The professional differentiation of farmers also has a significant impact on agricultural production management behavior, which is specifically manifested in many aspects such as farmers' age, education level, nonagricultural employment skills, and geographical location of land.

1. Introduction

With the continuous increase of population pressure and the continuous reduction of available arable land, a new kind of reform is urgently needed in agriculture to meet the increasing material needs of mankind [1]. The popularity of Internet technology on a global scale and the increasing acceleration of social informatization have made big data, cloud computing, and the main force of this change. In the future, agricultural big data will be widely used in rural areas and agriculture, which will become the country's economic structure transformation with an important promoter of all-round economic and social development [2]. Land as a means of production for traditional agricultural production activities has lost its role, and more and more land abandonment and abandonment of farming have appeared. At the same time, due to the impact of international agricultural product prices and food security issues, people are more eager to excavate land resources with the greatest effect through scientific and technological means [3]. Therefore,

resolving the relationship between people and land is conducive to promoting the orderly development of society. Agricultural big data is an important manifestation of agricultural informatization in the current market. Research on agricultural big data can further enrich the theory of agricultural informatization [4].

As the most important material production sector in the national economy, it is also the oldest and most basic sector. Agriculture is the foundation for human survival and development [5]. With the advent of the era of big data, research on the application of big data in agriculture, a traditional industry that is closely related to everyone's life, has not only important theoretical significance but also far-reaching practical significance. On the one hand, it is conducive to continuously enriching the theoretical knowledge of various aspects of farmer differentiation and agricultural production management. On the other hand, in practice, it is conducive to the rational allocation of rural surplus labor and land and other production materials and guides the orderly circulation of rural land. Centralized agricultural production, to a certain extent, promotes the efficiency of rural land use and promotes the modernization of rural agricultural development [6–8]. The operation of the entire industrial chain of agricultural products is an innovative business model of agricultural industrialization. It is oriented to the needs of consumers and integrates various industrial links such as crop planting, processing, transportation, and sales into a complete industrial chain system to promote the agglomeration of agricultural industries. And then, we release a huge development potential, which not only can derive corresponding service industries in processing and storage, marketing, agricultural products market, etc., but also accelerate the realization of agricultural modernization [9].

Aiming at the current background of the rapid development of big data, this article collects theoretical studies and practical cases on the application of big data in agricultural production and operation at home and abroad, based on the actual production and management of rural households, deeply analyzes the current big data construction situation, and finds suitable local agricultural big data development model and suggestions and suggestions for the establishment of an agricultural big data system suitable for rural characteristics. For the study and research of agricultural production management policies and regulations, we construct the theoretical model and analysis framework of farmers' willingness to participate in agricultural production management and the differences in agricultural production management behaviors of different differentiated groups and obtain farmers-related agricultural production management willingness and circulation behavior data through field investigations. Through the empirical model, we in-depth study of farmers' professional differentiation on the different choices of agricultural production management willingness and circulation behavior and its influencing factors. This paper starts with the key links of the entire agricultural single product industry chain and proposes a framework for building a large data platform for the entire agricultural single-product industry chain, hoping to provide a model and experience that can be used for reference and can be replicated for the construction of related agricultural and rural big data systems.

2. Related Work

As for the research on big data, compared with it, thanks to the rapid development of the third industrial revolution, it started earlier in European and American countries and has made certain achievements in theoretical research and practical application. Policy support is the key to the new-type professional farmer training project. To build a sound cultivation system, we must start with improving the policy support system. Support policies in different regions are almost different. When formulating new-type professional farmer support policies, local conditions must be adapted to the existing conditions. Develop supporting policies for two major types of issues. In general, the research on big data abroad is relatively extensive, and the focus of the research is mainly on the analysis of the combination and use of big data and a single industry [10].

Feng [11] believes that in the agricultural field, big data can help increase crop yields, promote risk management, and solve agricultural problems that were considered almost impossible in the past. Data such as weather forecasts, soil conditions, GPS maps, water resources, commodity market environment, and market demand are increasing day by day. In this era of more health consciousness, big data can accurately predict the entire agricultural value chain and make timely decisions. Wu and Tan [12] believe that data collection, sharing, and utilization not only help decision makers in the scale and field of the farm but also include other points in this field. Farmers and companies have invested a lot of time, money, and experience in data points. For "big data," farmers have all these useful data, so that they face new challenges and opportunities, including the management of this information, increase production efficiency, and improve the agricultural environment. At the same time, challenges include access to data and how to use this data to make decisions. Nie et al.'s [13] analysis shows that as an important part of agricultural big data, the Internet of Things plays an increasingly important role in the development of modern agriculture, and proposed a cloud computing-based agricultural Internet of Things design, which uses MapReduce programming model database, and distributed programming framework; this design provides scalable storage and efficient data access and simplify sensor data deal with.

Liu [14] believes that agricultural big data is the use of big data concepts, technologies, and methods to solve a series of problems in the collection, storage, calculation, and application of data in agriculture or agriculture-related fields. It is the application and practice of big data theory and technology in agriculture. Based on the current analysis of the main application areas of agricultural information technology and the main sources of big data, Zhang and Wang [15] believe that the main application areas of big data include production process management data, agricultural resource management data, agricultural ecological environment management data, agricultural products and food

safety management big data, agricultural equipment and facility monitoring big data, and big data generated by various scientific research activities. Modern farmers should focus on the following and aspects when carrying out production and operation activities. First of all, we pay attention to collecting market information, study the laws and trends of market changes, and select the right and adjust the direction of production and operation in a timely manner. Second, we strengthen the quantitative analysis and forecast of the market and determine the structure of agricultural production. Then, we strengthen the monitoring of the production and operation process and strengthen management. Finally, he is good at learning and introducing advanced practical technology and management experience to improve the level of production and management [16–18]. The alliance will use big data research methods to collect and store meteorology, land, water conservancy, agricultural materials, agricultural scientific research results, animal and plant production development, agricultural machinery, pest control, ecological environment, marketing, food safety, and public health. On the basis of big data in many links such as agricultural product processing, through professional processing, the massive data is quickly "purified" and valuable information is obtained, which provides support for the decision-making and development of governments, enterprises, and various types of units, and provides convenience for the public service [19–21].

3. Construction of Professional Farmer Production Management Model Based on Big Data Technology under the New Rural Construction

3.1. Hierarchical Distribution of Big Data Technology. The most basic application of big data is data collection, through cameras, sensors, and scanning recognition equipment to intelligently perceive the data to collect information, and then use wireless networks and optical fibers to transmit and store the data in a cloud data center; therefore, three basics are required to support the operation of the entire process, namely, basic network facilities, perception infrastructure, and cloud infrastructure. Figure 1 shows the hierarchical topology of big data technology.

The platform establishes the specification name and code specification table of the indicator ontology and its attributes. The platform automatically generates the same number of specification mappings through the specification table, realizes the normalization of the database related fields when the digital resources are fragmented, and solves the problem of the inconsistency of indicators from different sources to form a standardized database.

$$X[t] = \{ t \in R \mid x(1), x(2), \cdots, x(t) \}, \tag{1}$$

$$y(n) = A \times X(n) - t \times x(n-1). \tag{2}$$

The overall construction idea of the big data platform for the whole industry chain of agricultural single products is to build the whole industry in accordance with the key links of

the whole industry chain such as breeding, cultivation, harvesting, storage, processing, and industrialization development, and relying on technologies such as the Internet, the Internet of Things, and big data. The chain data resource system realizes the automatic collection, dynamic update, multisource data storage, and data governance of the entire industry chain data.

$$h(x) = \begin{cases} \varepsilon(i, n) \times x(t), & 0 < t < 1, \\ \delta(i, n) \times x(t), & t > 1, \\ y(n) \times x(t), & t < 0, \end{cases} \tag{3}$$

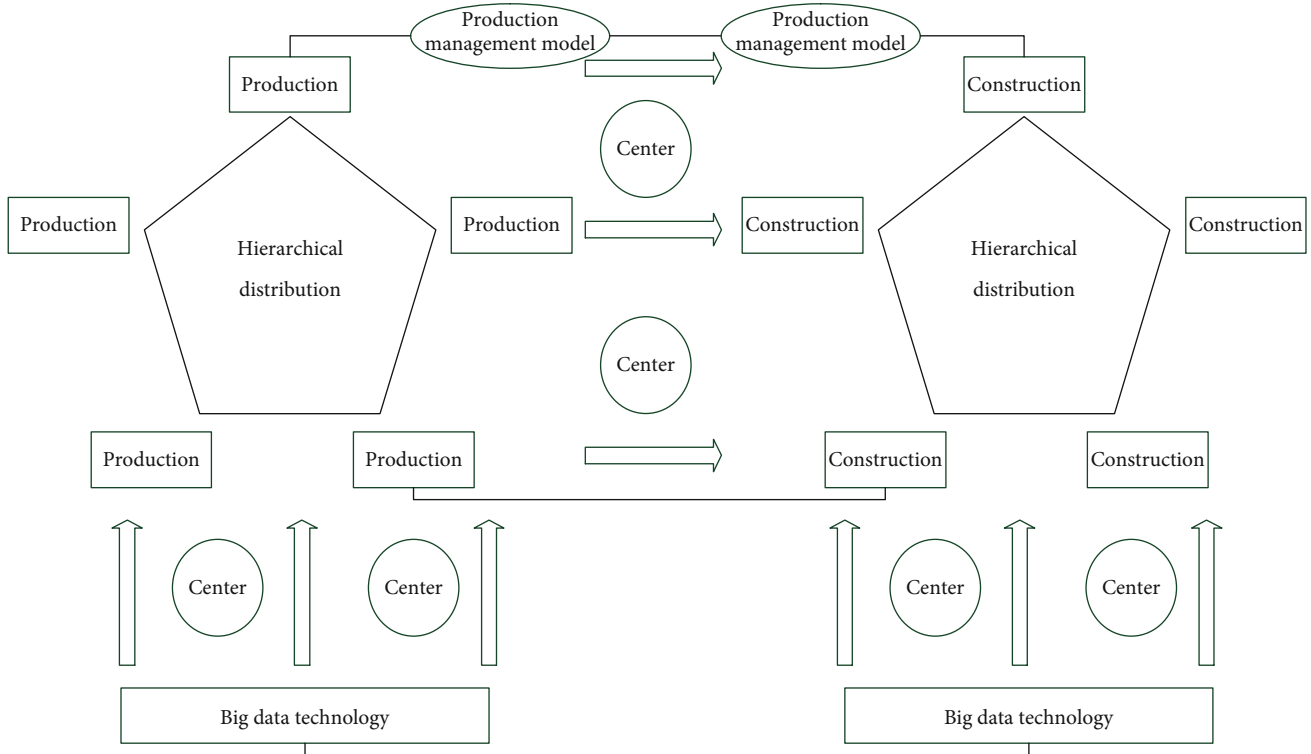$$g(x, k) = \frac{1}{n} \times \sum_{i=1}^{n} (1 - \alpha(x))(1 - \beta(x)) \times x(t). \tag{4}$$

The sensing layer mainly includes various sensors, which are the tentacles for the Internet of Things to perceive objects and collect information, such as carbon dioxide sensors, electronic tags, infrared cameras, and global positioning systems. The network layer mainly completes the transmission of information and processes the information obtained by the perception layer. It is composed of networks such as the Internet and network management systems. It is no exaggeration to say that the network layer is the nerve center of the entire Internet of Things.

$$L(x, y) = \sqrt{\sum (C_a(x, y) - C_b(x, y))^2}, \tag{5}$$

$$g(x, y) = \frac{|k(x, y)|^2}{t} \times \exp\left(-\|k\|^2 * \frac{(x+y)}{2t} \right). \tag{6}$$

The application layer is the ultimate goal of the Internet of Things. All information collection and network construction are to serve the application layer and combine with industry needs to achieve interactive output with users. The agricultural big data is classified according to the source. The agricultural big data mainly includes relevant data such as crop growth, crop production, food sales, agricultural management, and natural environment. We use big data technology to give full play to the role of agricultural big data in guiding market forecasts and regulation, so as to realize agricultural product price forecasts and analysis and crop quality and safety inspections.

3.2. Intelligent Analysis of Data Resources. Big data serves the entire agricultural industry chain. It is necessary to efficiently integrate various data resource elements; improve the mechanism of agricultural big data collection, aggregation, analysis, and service; and create an intelligent big data platform for the entire industry chain to serve as various entities in the entire industry chain. We provide scientific and accurate decision support services and make full use of information technology to promote the transformation and upgrading of the entire agricultural industry chain. In order to solve the above problems, it is necessary to use the entire industry chain as the baseline to construct a data indicator system covering the eight complete industry chain links

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FIGURE 1: Big data technology hierarchy topology.

including production, processing, circulation and storage, price, consumption, trade, cost-benefit, and public opinion, so as to realize the entire industry chain of agricultural data for directory navigation and retrieval, so as to satisfy platform users' quick access to data, and promote the redevelopment and reuse of data resources. The platform is based on the data resource center and supported by the knowledge map technology. The cultivation of new-type professional farmers has a long system. The government department must first be responsible for the education and training of the new-type professional farmers' labor force, and then strengthen the management of them through accreditation and assessment, and finally exert their various functions to coordinate the resource allocation of relevant departments to achieve the goal of the purpose of normalized cultivation of professional farmers. Through the intelligent optimization of search results, it meets the requirements of different user groups to obtain information on the platform, and realizes the intelligent search of data. According to specific business requirements, the platform realizes the visual display and analysis of data in the form of data maps, data charts, and a data chart. Figure 2 shows a histogram of agricultural product market monitoring and management efficiency. The platform conducts in-depth mining and analysis of massive data, and based on the association of knowledge graphs with CNKI fragmented and reorganized journal texts, it combines knowledge resources and data analysis to realize the automatic generation of industry reports.

Since the dependent variable is a dual qualitative variable with willingness to transfer and without willingness to trans-fer, a binary selection analysis is performed. The logistic regression model is a relatively simple regression analysis method, through regression set to explain the nonlinear relationship between the probability of variables and the probability of occurrence of practice, under certain conditions, the probability of occurrence of events and the probability of explaining the combination of values of different variables. It has a wide range of possibilities. The analysis of two-valued results is also called binary logistic regression. The platform conducts in-depth mining of structured and unstructured data. In addition to some general model algorithms, such as data classification, regression, clustering, correlation dimensionality reduction, time series, identification, prediction, and optimization, it also needs to be based on the entire industry chain. The characteristics of data analysis, the construction of a coordinated analysis model of agricultural industrial structure and natural resource endowment, a balance of supply and demand of agricultural products, and an agricultural product market monitoring and early warning model, etc., to form a whole industry chain monitoring and early warning analysis algorithm library.

3.3. Composition of Rural Construction Database. The basic layer meets the requirements of big data applications for infrastructure. The key to the second stage is the integration of data, resulting in three major database groups: the public basic database group, public application database group, and special application database group. The public basic database group aggregates household registration information, geographic information, economic information, medical
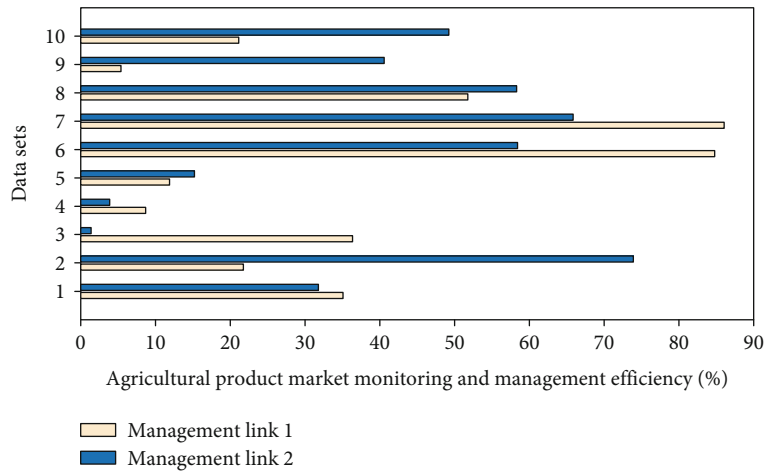
Figure 2: Histogram of agricultural product market monitoring and management efficiency.

information, education information, health information, and other information data of various social entities in various periods, covering departments and administrative units that have direct business services with citizens. The public application database group mainly stores data in various application fields of smart cities, such as smart transportation, smart agriculture, and smart government affairs. Establishing a benign interest linkage mechanism is the center of ensuring the long-term operation of the new-type professional farmers' support policies. The final consolidation of government functions means that new types of professional farmers will eventually appear in the interest chain with various identities. Therefore, the construction of the policy support system should be based on the formation of new interest linkage mechanisms between new types of professional farmers and other subjects and promote them as soon as possible. The big data platform for the whole industry chain of agricultural single products realizes big data resource management, intelligent search of massive data, visual data analysis, and industrial intelligent reports. The platform gathers multisource heterogeneous resources such as CNKI journals, books, forms, videos, Q&A resources, and public opinion information related to the single product industry, forming a big data resource center, and realizing agricultural single product data based on the single-product whole industry chain data indicator system with centralized management, real-time update, exchange, and sharing of resources. Figure 3 shows a line chart comparing the update rate of agricultural single product data resources.

Big data storage systems generally include three aspects: file system, database technology, and programming model. The key to its core is database technology. Currently, commonly used data storage technologies also include developing new database technologies, partitioning massive data, writing good program codes, establishing extensive indexes, increasing virtual memory, establishing caching mechanisms, using temporary and intermediate tables, and using text format processing, optimize query SQL statements, and use data warehouse and multidimensional database storage, etc. Structured data is a data type defined according

to user attributes, and different data types are set according to different user attributes. Most systems have large amounts of structured data, which are generally stored in relational databases such as Oracle, MySQL, and SQLServer. The entire platform is composed of three major parts: an agricultural big data center, a comprehensive agricultural service command and decision-making platform, and an IoT demonstration point system. The agricultural big data processing center provides data collection, data sharing, data processing, data analysis, and data services; the rural integrated service command and decision-making platform is to analyze the data resources gathered in the agricultural big data center with index analysis, comprehensive analysis, information mining, and data application. Thematic map decision-making and other realization elements complete the comprehensive decision-making analysis of information resources.

3.4. Identification of Production Management Resources. Based on the annual increase and decrease of agricultural production, the annual increase and decrease of consumption, as well as the daily increase and decrease of price, and the cumulative annual increase and decrease of agricultural products, we set the monitoring and early warning thresholds for the production, consumption, and price of agricultural products. The grades are divided into four grades, which are represented by red, orange, yellow, and green colors, and provide early warning reminders for agricultural products whose growth rate exceeds a certain value in order to diagnose and analyze the supply and demand process of agricultural products in a timely manner. Many places are preparing to establish a free continuing education system for fostering new-type professional farmers in order to achieve the continuity of scientific and technological services for new-type professional farmers. At the same time, some demonstration counties set up special rewards for the promotion of the transformation of scientific and technological achievements to further promote the modernization of agriculture. The platform grants different access rights to the underlying data for each model, that is, grants access rights
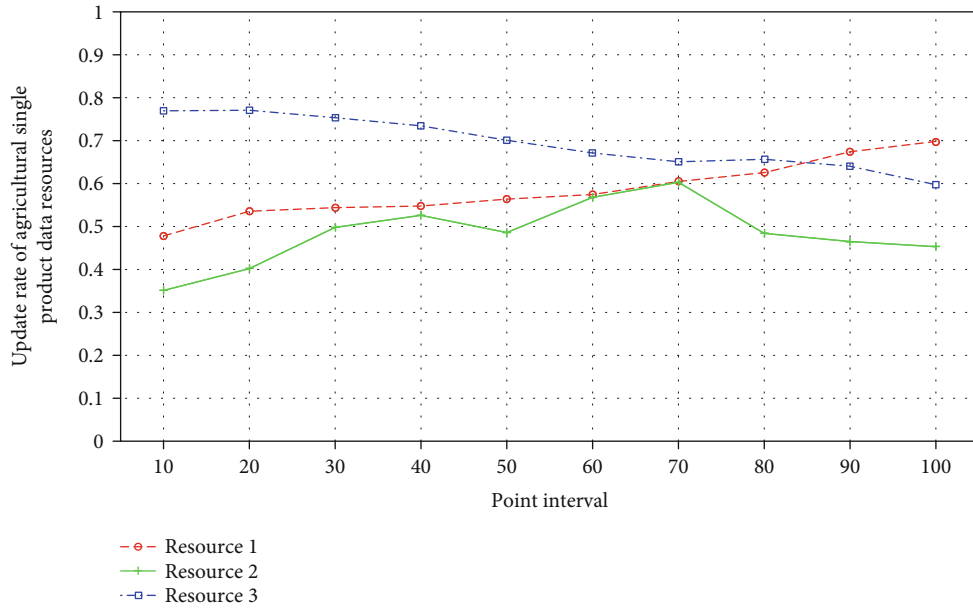
Figure 3: Line chart comparing the update rate of agricultural single-product data resources.

to the underlying data to a model, and then, users who can use the model have the access rights to these data. For users, this system architecture does not need to master the basic implementation details of the distributed system to develop distributed programs. This development method can speed up computing power and access efficiency through clusters. Hadoop implements a distributed file system (Hadoop Distributed File System), referred to as HDFS. HDFS is designed to be deployed on relatively low-cost hardware, but it can provide applications with higher throughput to access data resources and has the characteristics of high fault tolerance. For applications with large data sets, HDFS is ideal for streaming data in the file system.

Unbalanced supply and demand of agricultural products, difficulty in selling and buying, and abnormal price fluctuations are the main risks in the operation of the industrial chain, which require monitoring and early warning. Figure 4 shows the identification distribution of the production management resource data set. By setting monitoring and early warning thresholds for the production, consumption, and prices of agricultural products, the platform will provide early warning reminders for agricultural products whose growth rate exceeds a certain value to diagnose and analyze the supply and demand process of agricultural products in a timely manner. In terms of data processing, the existing data and various algorithms are mainly used to achieve the prediction effect, and then, some advanced data are further analyzed. For example, through the analysis of agricultural big data, the market price trend of agricultural products, the inspection of crop diseases and insect pests, and the forecast of crop growth can be well predicted. Data extraction, data cleaning, data conversion, and data loading are performed through tools to complete data processing. Among them, data cleaning refers to the use of data statistics, predefinition, data screening, data mining, and other

technical methods to prescreen the data summarized in the data pool to remove data resources that do not meet the data quality standards and reduce data inconsistencies during postdata processing. The problem is to realize the process of object recognition.

4. Application and Analysis of Professional Farmer Production Management Model Based on Big Data Technology in New Rural Construction

4.1. Feature Extraction of Agricultural Data. In order to ensure the validity and authenticity of the sample data, this study used random sampling to select 10 villages in the region and randomly interviewed 276 farmers. Questionnaires were distributed to the outside world. 276 questionnaires were randomly distributed, 276 questionnaires were returned, and the questionnaire recovery rate was 100%. Among them, 271 questionnaires were valid, and the response rate was 98.19%. Among the sample farming households, 174 households have participated in agricultural production management behaviors, accounting for 64.21% of the total sample farming households. Among the farming households participating in agricultural production management, the number of transferred out farm households reached 144, accounting for 82.76% of the number of rural households in circulation. The total transferred land area is 93.28 mu; the number of transferred farmers is 46, accounting for 26.44% of the transferred farming households, and the total inflow of land is 138 mu. The platform grants different access rights to the underlying data for each model, that is, grants access rights to the underlying data to a model; then, users who can use the model have access rights to these data. The number of farmers in agricultural production
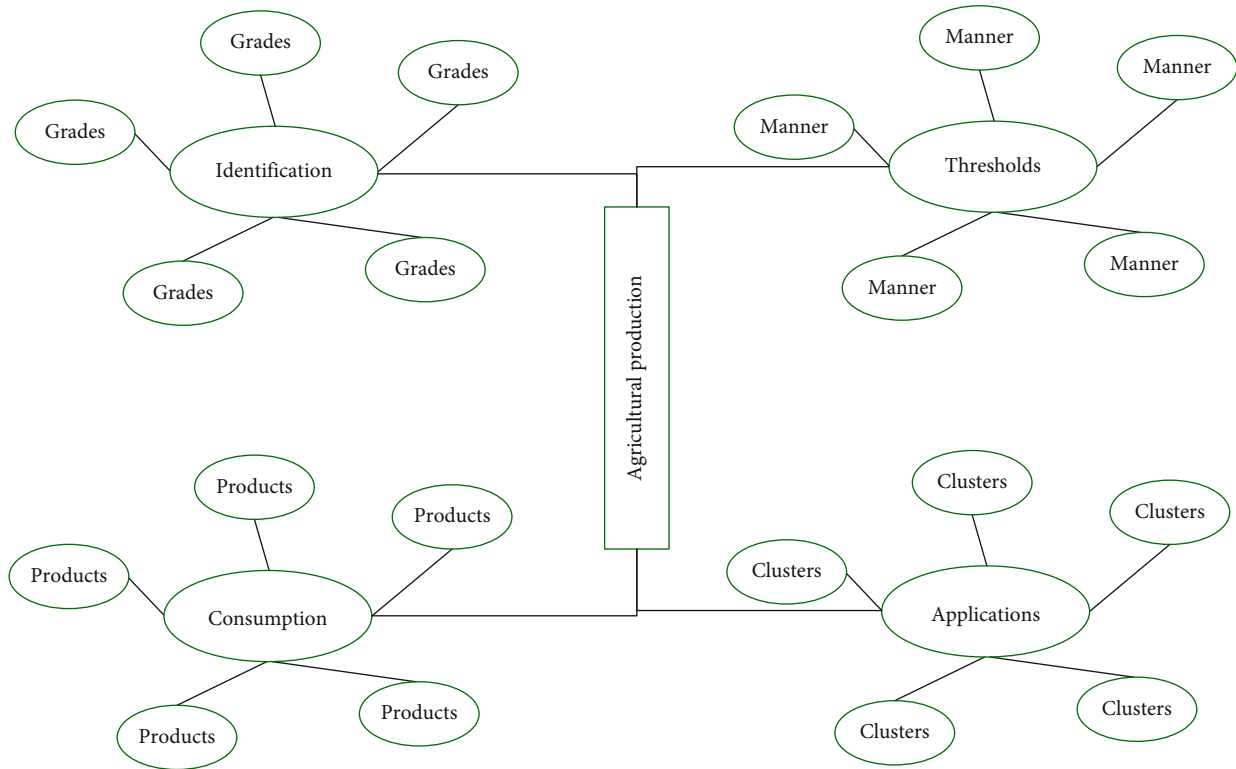
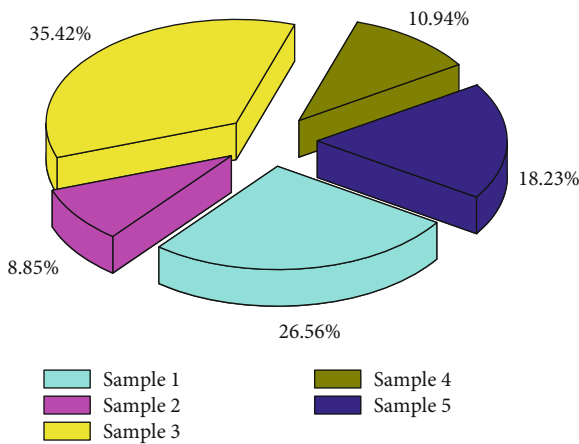Figure 4: Identification and distribution of production management resource data sets.

Figure 5: Fan chart of professional farmers' production management interview survey.

management reached 97, which accounts for 35.79% of the total. Figure 5 shows the pie chart of the professional farmer's production management interview survey.

Through sample analysis, the types of farmers' occupational differentiation have shown a diversified tendency, and the phenomenon of farmers taking part-time jobs is obvious. Although the largest proportion of migrant workers in the sample is 23.99%, there is no significant difference between the proportions of pure agricultural workers and individual industrial and commercial households. Individual industrial and commercial households accounted for 19.93%, and pure agricultural workers accounted for 20.66%. Next are migrant skilled workers, rural managers, rural intellectuals, business managers, and finally private business owners. Its proportions are 17.77%, 4.06%, 3.55%, 3.55%, and 1.52%, respectively. It can be seen that the number of people who work in agriculture has been greatly reduced compared with the traditional agricultural society, and more farmers tend to be nonagricultural employment and part-time jobs. Based on the data index system of the whole industry chain of the single product, the centralized management, real-time update, exchange, and sharing of agricultural single-product data resources are realized. Pure agricultural farmers have become the main force in land transfer. Pure agricultural farmers have a greater demand for land. Among those who transfer, pure agricultural farmers account for 56.52%, followed by part-time farmers. The proportion of nonagricultural farmers is different, accounting for 39.13%. Pure nonagricultural farmers have basically separated from land as the basic means of survival. Therefore, land transfer behaviors occur less frequently, accounting for 4.34% of the total number of transfer behaviors. Therefore, transfer behaviors and the object of the occurrence of the transfer-in behavior are more significant.

4.2. Realization of Production Management Model Simulation. In data processing, we can use the parallel programming model MapReduce to do it. The distributed parallel programming model MapReduce can abstract the extremely complex parallel computing processes running on large-scale computer clusters into Map functions and Reduce functions. Even if the user does not know distributed programming,

he can easily integrate his own with MapReduce. The program runs on a distributed system to perform big data operations. The parallel programming model MapReduce has good scalability and can realize the parallelism of many algorithms. Among the 6,448 pieces of data obtained in total, the local dynamic section contains the most data, reaching 3239 pieces, accounting for 50.23%; the project information section has the least data, only 216 pieces, accounting for 3 to 35%; for the other three in the sector, there were 1604 corporate news items, accounting for 24.86%; industry thoughts 1,035, accounting for 16.05%; 354 industry policies, accounting for 5.50%. Through the empirical analysis of the factors influencing the willingness of part-time farmers to agricultural production management, it is found that farmers' personal characteristics, family characteristics, and agricultural production environment all have a significant impact on agricultural production management willingness. In terms of individual characteristics, age has a negative and significant effect on both the willingness to transfer out and the willingness to transfer in, indicating that as part-time farmers age, the willingness to transfer out weakens and the willingness to transfer in also weakens, and the farmers among part-time farmers can maintain the original farming area; the increase in educational level has a positive effect on the willingness to transfer out, indicating that with the increase in educational level, the willingness of part-time farmers to transfer out is more pronounced, while the relationship between the willingness to transfer in and the educational level is just the opposite, the higher the educational level is, the lower the willingness to transfer is, and for part-time farmers with higher educational level, they are more inclined to give up agricultural production. Figure 6 shows a line chart of the significance of agricultural production management willingness.

Although from the overall distribution of the data, the word "rural" is mentioned in a very low number, and the frequency of mentions does not exceed 1% in a single sector; but by comparing the data from 2016 to 2020, it can be found that the number of times the term is mentioned has shown a significant upward trend, indicating that the industry as a whole is paying more and more attention to rural areas, and the development of construction industrialization in rural areas of the country is gradually receiving attention and attention. In terms of the occupational status of the survey respondents, there are 84 large professional households, accounting for 22.22% of the total number of respondents, 120 family farmers, accounting for 31.75% of the total number of respondents, and 42 leaders in rural cooperatives, accounting for the total number of respondents. 11.11% of the population, 60 agricultural workers or employees, accounting for 15.87% of the total number of respondents; 12 agricultural machinery services, rural information officers, and other service personnel, accounting for 3.17% of the total number of respondents; and 36 migrant workers returning to their hometowns are accounting for 6.36% of the total number of respondents. Among the survey subjects, family farmers account for a relatively large proportion. It can be seen that the larger the scale of agricultural production is, the higher the operating income is, and the more sta-
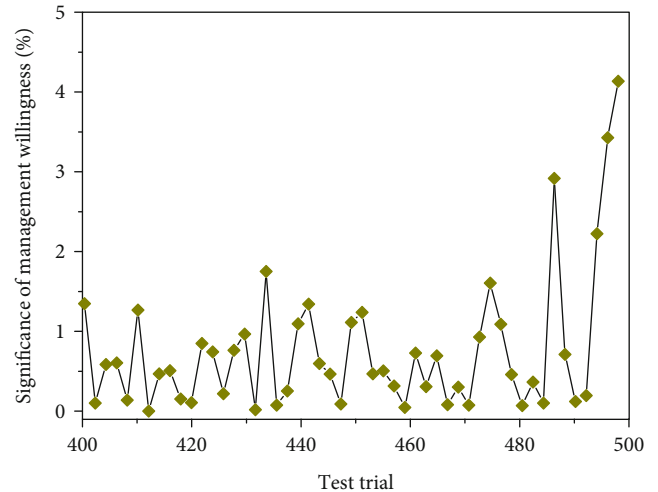

Figure 6: Line chart of the significance of agricultural production management willingness.

ble the operating status of farmers is, the greater the need for the cultivation of new professional farmers is, and the more eager to obtain professional knowledge and operation training and upgrading of skills, management capabilities, etc. The platform is based on the data resource center and supported by the knowledge graph technology. Through the intelligent optimization of search results, it meets the requirements of different user groups to obtain information on the platform and realizes the intelligent search of data. The cluster development model between the three provinces will facilitate the convenient transmission and timely sharing of various related information and data within the region; the geographical advantage of the three provinces linked by mountains and rivers will also be conducive to the formation of a good regional linkage mechanism and industrial innovation alliance; the mutual influence of the three provinces. The layout relationship will also provide sufficient intellectual foundation and technical support for the development of construction industrialization in the region, highlighting the broad development prospects of construction industrialization in this area.

4.3. Example Application and Analysis. This article builds an early warning and forecast analysis model for agricultural product market prices. The purpose is to integrate food crops, vegetables, forest fruits, livestock, and poultry that are scattered across various business systems, localized files (Excel), the Internet, agricultural scientific research institutions, government service windows, and other channels. The production information and logistics transaction information of the main agricultural varieties are reasonably collected in the agricultural big data center on demand. Through data collection and dimensional cleaning, data verification, data auditing, and data mining analysis are performed on various data. We extract data that meets certain characteristics from the agricultural product price data resources and perform rule matching and prediction and combine the physical model and conceptual model of the
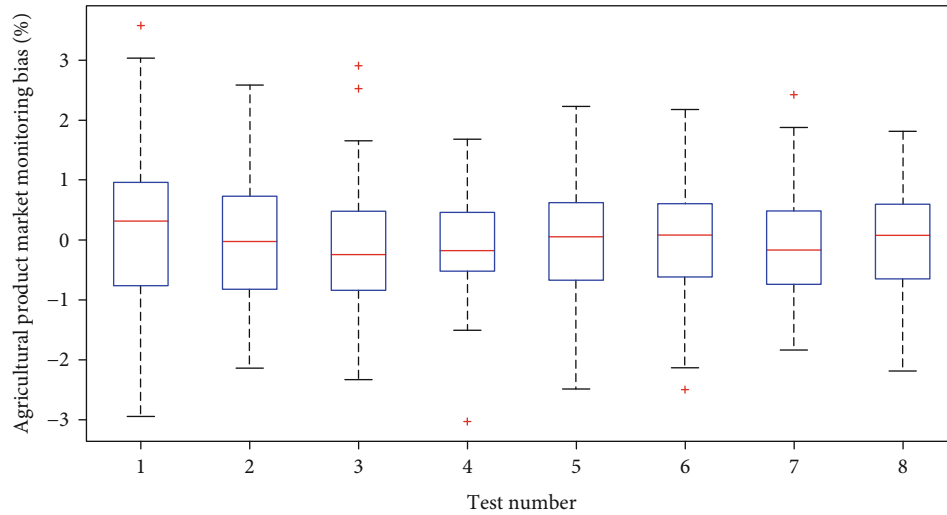
FIGURE 7: Box diagram of deviations in agricultural product market monitoring.
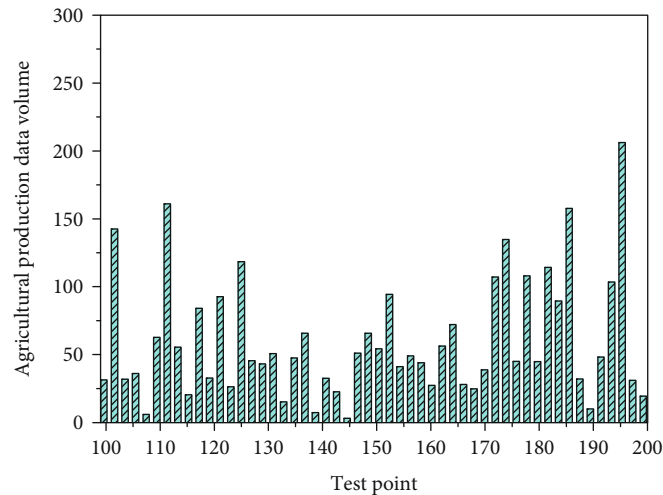

FIGURE 8: Histogram of agricultural production management data volume.

agricultural product price fluctuation special diagnosis and development trend analysis index system to further rule the data according to different data training dimensions for matching calculation and mining.

Figure 7 shows a box diagram of deviations in agricultural product market monitoring. In this experiment, in order to test the accuracy of the algorithm and the system, the test process is as follows: (1) dividing the data into four data subsets to facilitate experimental comparison and verification results. (2) A total of four experiments are carried out. During each experiment, three sets of data subsets are selected as the training set, and one set is used as the validation set. In order to test the effectiveness of the system and algorithm, the experiment generated three sets of data to compare the serial algorithm (when the node is set to one, it is equivalent to serial operation) and the parallel algorithm. This experiment is still based on the data to infer the type of grass. The four sets of data are, respectively (10 million, 20 million, and 30 million data). The platform per-

forms standardized processing of the above captured data. During the processing, the average value of the three-year agricultural machinery data is calculated to reflect the reality of 36 farms. The processed data is shown in the article.

Figure 8 shows the histogram of the amount of agricultural production management data. It can be seen that the accuracy of the parallel algorithm implemented by this system is within an acceptable range. It can be seen that this category of data is in areas with relatively high levels of agricultural machinery and equipment and farms with relatively reasonable large and medium-sized machinery and small machinery. Analyzing from the area of large fields, it is found that most of the farm's single plot area is large. Therefore, the large agricultural machinery equipped with this type of farm is reasonable, and the small equipment is appropriately reduced, which is more conducive to the farm's agricultural economy. Through in-depth mining and analysis of massive data, the platform has realized the automatic generation of industry reports in accordance with

the entire industry chain (production, processing, circulation and storage, price, consumption, trade, cost-benefit, and public opinion). The types of reports include price reports. Therefore, this type of farm is a developed farm with reasonable equipment level. It can be observed that farmers with different occupational differentiation have differences in the willingness of agricultural production management. According to the chi-square test of state, the chi-square value of the willingness to transfer is 23.1496, Pr = 0.000, which means that the occupational differentiation of farmers affects the transfer of farmers. The willingness to repatriate land is significant, indicating that farmers with different occupational differentiations have different willingness to repatriate. The chi-square analysis result of the willingness to transfer is 41.5673, Pr = 0.000, reaching significance, indicating that farmers with different occupational differentiations also have significant differences in the willingness to transfer land.

5. Conclusion

Based on the Internet of Things technology, through the combination of big data, mobile Internet, Internet of Things, and other new information technology means, we promote the standardization of agricultural production and circulation, the popularization of agricultural intelligent equipment, and the construction of agricultural intelligent data collection systems. This article focuses on agricultural production management and agricultural production processes. The agricultural big data information service platform integrating management, agricultural management key link supervision, agricultural data aggregation, big data analysis, and decision-making provide effective technical means for agricultural data collection, analysis, and utilization and is useful for ensuring agricultural production management and improving the development of agricultural intelligent equipment. It is of great practical significance to enhance the decision-making ability of agricultural production. The innovation of this article is to use the inductive analysis method to classify and analyze the six aspects of support for the cultivation of new professional farmers from land transfer support, infrastructure support, leading industry support, financial fund support, financial credit support, and scientific and technological service support. Countermeasures and suggestions for the problems in supporting policies in the cultivation of professional farmers were proposed. This paper proposes a framework design of a big data platform for the whole industry chain, including data index system, data analysis model, and data security and on-demand calling of the model. Source data storage and data governance provide timely industrial data visualization analysis, industrial monitoring, and early warning, and industrial intelligent analysis reports for relevant entities in the industrial chain, effectively guiding production, processing, and circulation, promoting the smooth operation of production and market, and promoting the stable development of the industry information services and data support also provides experience and reference for the construction of big data platforms for the entire industry chain of similar agriculture.

Research shows that pure agricultural farmers, part-time farmers, and purely nonagricultural farmers have a significant positive effect on agricultural production management willingness and agricultural production management behavior, and the professional differentiation of different farmers has a positive effect on agricultural production management willingness and behavior.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

All the authors do not have any possible conflicts of interest.

Acknowledgments

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