Input-output Analysis of Agricultural Economic Benefits Based on Big Data and Artificial Intelligence

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Abstract. Agricultural modernization is not only reflected in the agricultural technology, production equipment and development model, the more important embodiment is the development of the concept of modernization. To make scientific, rational and practical analysis and guidance on the whole process of agricultural production economy by means of information is helpful to the vigorous development of agriculture and related industries. The purpose of this paper is to provide better Suggestions and technical means for the rational planning of agricultural industry economy by analyzing the input and output of agricultural industry economic benefits based on big data and artificial intelligence. In this paper, the integrated use of big data and the method of artificial intelligence technology related theory, proposed from the perspective of scientific data organization architecture framework model for the evaluation of agricultural economic data, build data acquisition process model, put forward the multi-source, scattered repetition, flooded agricultural economic data resources for centralized framework for assessing analysis and solution. Finally, try in big data environment, respectively, from the dimension of the influence factors of agricultural economic data lifecycle dimension, service dimension three different dimensions explore implementation method, the results showed that the industrial economy in the process of running efficiency of the indicators were higher than 0.76, for the big data in the application of the agricultural economy provides a good example.

Keywords: Artificial Intelligence, Big Data Era, Intelligent Agriculture, Economic Benefit, Output Analysis

1. Introduction
In the face of a new era of agricultural economic development demand of new forms of innovation, traditional agriculture data mining as well as a variety of information sources of data collection and analysis integration must be able to get data structure based on the traditional agricultural big thinking and support a new generation of technical support, thus, has produced various based on analysis of the data on the traditional agricultural science development needs, the need to constantly break original data research theory, analysis method and the limitation of data service management model, optimization of agricultural data using original management elements and information system management structure, improve agricultural traditional data service management processes, develop new data service management model is derived, Deepening the collection and integration of agricultural data and innovation, to provide a number of different levels of agricultural data services. With the rapid development of agricultural big data, cloud computing and other information technologies, as well as the gradual improvement of modern agricultural and rural economic informatization management level, the massive application of agricultural science data resources show rapid growth in an exponential way.

Agricultural expansion into tropical forests is thought to bring local economic benefits, but at a global environmental cost. The resulting tensions are reflected in the policies of the Brazilian government. Since the 1970s, the national land reform program has settled families of amazonian farmers who want to clear forests to farm their land. On the other hand, recent policy initiatives in Brazil attempt to reduce deforestation to mitigate climate change. Over a 13-year period from 1996 to 2009, Mullan Katrina contributed to the policy debate around the amazon's two goals by estimating the marginal impact of new farmland on the total income and assets of agricultural settlers. Using micropanel data from rapidly deforested agricultural settlements and controlling for factors that would otherwise disrupt this relationship, Mullan and Katrina estimated the impact of converting forests to agriculture on household income, thereby estimating the opportunity cost of preserving forests [1]. D.D. Burkaltseva aims to study the theoretical aspects of the implementation of investment processes in the digital economy's agricultural sector. The organization, implementation and management of agricultural investment process are studied from the perspective of scientists at home and abroad. The subjects, objects and objectives of the implementation of the investment process in the field of agriculture, as well as the influencing factors, and the necessity of the implementation of the activity are determined. The characteristics of the investment process, from the department of agriculture and the specific situation of agricultural production, dependent on the weather conditions, the natural and zonal characteristics of the production area, to define a root investment process concept. The sources of investment resources in the agricultural sector are identified and divided into external (borrow, loan, state) and internal (own capital, operating results, accidental) sources [2]. The impact of spending flows from rural areas on Christchurch's economy has been calculated as part of a broader research project called wheel of water, led by Aqualinc research Ltd., funded by the department of business, innovation and employment. In 2013, AERU developed and tested a method to identify and quantify the socio-economic impact of spending from the rural sector on neighbouring urban areas. In three phases of the study, Guenther, Meike estimated the impact on Christchurch's economy of spending from farms, farmers, rural service businesses and food processors in the Selwyn and waimakari regions. In the first phase the methodology was developed and expenditures from farm and rural service enterprises were estimated. In the second phase, inter-annual variations in agricultural expenditure flows and the potential impact of increased irrigation development were studied, and the contribution of the food processing sector in Selwyn and waimakari regions to economic activity in Christchurch
was estimated [3].

In this paper, based on large data and artificial intelligence technology oriented agricultural economic benefit under the number of input and output problems, to agricultural economic data resources as the research object, the integrated application of big data analysis method, empirical approach, such as research methods, in this paper on the basis of domestic and foreign relevant research and practice of development and application of artificial intelligence technology under the era of big data, constructed the agricultural economic efficiency model, and the theoretical basis of research on agricultural economic data model has carried on the back, has been clear about the agricultural economy on the basis of building the data model and analyzes the agricultural output and input of industrial economic benefit.

2. Proposed Method

2.1. Agricultural Big Data

(1) Collection method

In the current practice of agricultural production, equipped with a number of GPS positioning signal of agriculture sensor mounted various civil agricultural mechanical equipment can be quickly, a large number of land acquisition generate your own position symbol information agriculture, by a number of GPS signals system base station and a number of multiple GPS base station receiver constitute a GPS agricultural operation system, scheduling, command various is equipped with a number of GPS base station signal receiver of agricultural equipments to agricultural operations at the same time, thus greatly improve the working efficiency of management of the farm. GIS technology is another important technical means to develop China's modern agriculture in the era of big data technology. However, in the current production of modern agricultural technology in China, the development of GIS technology is relatively backward, and there is a lack of agriculture-related technical information, which is a major restricting factor for development [4-5].

The leading role of GIS in the construction of China's agricultural safety modernization system mainly includes: first, the establishment of China's agricultural production information security database, agricultural production resources safety dynamic management monitoring, effective management of agricultural safety production and agricultural decision-making. Through the use of advanced technology such as 3 d imaging remote sensing, using GPS imaging system, combined with artificial data processing of the agricultural information and mobile terminal data acquisition, drawing and load a included crop fertilizer varieties situation information, the dosage of fertilizer to crop information, crop fertilizer sowing area and other important information of agricultural information data map, by analyzing the contrast different farmland ecosystem information space for the development of time, It provides important agricultural background data materials for the research on the comparative change of agricultural information space, the analysis of the spatial change of ecological environment information, the prevention and control of diseases and insect pests, the prediction of the impact on the sustainable growth of crops, and the prediction of the impact of flood and drought disasters in China, and provides scientific reference basis for the research of comprehensive agricultural management and agricultural decision-making in China [6-7].
(2) Characteristics and mechanism of agricultural big data analysis

Firstly, due to the limitation of professional knowledge and scientific technology, the research object of traditional data analysis is often some important representative sample quasi-modular data. Big data analysis is the overall analysis based on the whole data sample, that is, a sample whole is equal to a whole, so that it can more truly and objectively reflect the actual situation behind the phenomenon of big data analysis. In addition, big data can also make it possible to collect and analyze data with short-term high-frequency frequency changes [8]. Secondly, big data analysis is more direct and time-efficient in the analysis and use of enterprise data, which is also an important technical feature different from the current research on measurement management of traditional enterprises. Collected through the enterprise access to the information data to solve all kinds of enterprises and processing, not only can real-time data for enterprises to manual retrieval and data analysis, use of enterprise network information system and artificial intelligence technology but also can realize intelligent machines even real-time access to enterprise data, retrieve, and data analysis, thus greatly improve work efficiency. Third, big data analysis is different from our traditional big data analysis workflow in that it requires the post-centralized identification of data information [9-10].

3. Experiments

3.1. Experimental Background

With the increasingly mature of modern information processing technology, the Internet has carried a large number of mass information data and provided it to every user at any time. In the face of increasingly powerful mass data, how to analyze the data, screen and find out the specific information with value has become an important research direction. Big data, a new term, is becoming familiar to us. Big data applications need to adopt new data processors and pattern applications to enable them to have stronger business decision-making power, insight and optimization processing ability in business processes. At present, in the field of agricultural production in China, crops are diverse and information is very large. There are a lot of agricultural information resources feedback in the whole process of crop cultivation, growth, harvesting, processing, packaging, marketing and consumption. How to accurately analyze in the current mass of agricultural data and realize the sharing of agricultural data, so that this kind of big data analysis technology in the field of modern agricultural production has shown more than huge commercial application value.

3.2. Experimental Design

The site of this experiment is three farms in county A that have used big data technology. Data acquisition analysis used in this instance level hardware environment is based on the cloud computing Infrastructure as a Service (IaaS) Infrastructure as a Service, mode of virtualization platforms, including distributed computer cluster, cluster control management tools, operation management and resource scheduling, provide for the computation, storage and unified supervision and automatic allocation, improve the system availability, resource utilization.

On system instance validation process, the need to use specific including YARN global resource configuration manager, BI data analysis platform, and use the graphs tools, Spark computing framework and experiment simulation tool of MATLAB simulation experiment, and USES the
framework of ontology language integrated development environment Protege iot about agricultural scientific production system of the ontology, enumerated type classification systems of a class, the instantiation of the methods and properties are more easy to understand, its experimental results are shown in Table 1.

Table 1. Experimental results

| The region | The contribution of system construction to agricultural production economy(%) |
|------------|--------------------------------------------------------------------------------|
|            | Very high | Relatively high | High | Relatively low | Low  |
| A farm     | 31.22     | 49.13           | 16.16| 2.29           | 0.00 |
| B farm     | 36.75     | 46.05           | 14.49| 1.77           | 0.00 |
| C farm     | 31.89     | 44.19           | 19.76| 2.77           | 0.17 |

4. Discussion

4.1. Input-output Analysis of Economic Benefits of Agricultural Industry Based on Big Data and Artificial Intelligence

As shown in Figure 1, there is a comparison of the efficiency of three farms evaluated by the model under different indicators. The intermediate process of agricultural industry economy mainly refers to the processing, logistics and other links from crop harvesting to sales. Because of the widely used in the manufacturing process of agricultural products on the basis of computer technology, data mining and the use of mechanization and assembly line work, greatly improving the production efficiency, and in the process of production and processing of real-time data monitoring and analysis, such as in fermented food, beverage production this kind of need special and precise technology to complete machining process, the data of the monitoring can effectively control the quality of the product, provide support for product standardization and scale; The information collection equipment set up in the circulation link of agricultural products can record the information such as the source, transportation route, destination and transportation quantity of agricultural products, so as to make the traceability mechanism of agricultural product food safety based on GPS technology possible. The record and analysis of the transportation route can find the best transportation route and promote the saving of fuel and transportation time. By recording and analyzing the data related to the transportation volume of agricultural products and the destination, the information of demand preference for specific products in specific regions can be obtained, thus providing a basis for the targeted supply of enterprises.
Figure 1. Efficiency of three farms under different indicators

4.2. Suggestions on the Economic Benefits of Agricultural Industry Based on Big Data and Artificial Intelligence

At present, in the field of agricultural production and operation, the awareness of big data mining and utilization and the popularization of information education are insufficient, professional talents are scarce, and the demand and gap of professional analysts coexist. The current big data analysis, the vast majority of the business case is the outsourcing business to a third party will be in the form of data analysis, the model at the same time of saving the cost of enterprise may appear two questions: first, the external use of sensitive data may cause commercial secrets and personal privacy, ethical and moral aspects of the external risks; Secondly, due to the limitation of third-party data analysts' professional knowledge and insufficient knowledge of specific fields, data information may not be fully mined and utilized, resulting in data "devaluation". To make effective use of the big data generated in the process of agricultural production, operation and management, it is necessary to analyze and utilize the data on the basis of mastering certain agricultural knowledge, economic knowledge and management knowledge, which puts forward higher requirements for agricultural big data analysts.

5. Conclusion

Today is an era of extremely large data and rapid technological development. No matter in the commercial field, the industrial field or the agricultural field, it is inseparable from the development of big data and artificial intelligence integration technology. With the emergence of advanced integration technology, people have to face the problem of larger scale and more complex structure, and it is urgent to find the optimal solution. This paper makes a comprehensive summary and introduction of the research on artificial intelligence technology in agriculture under the background of big data at home and abroad in recent years. This paper expounds the current situation of the application of big data technology in agricultural development, and combines the development direction of artificial intelligence to build an evaluation model for the agricultural industry and economic field, and studies
its economic benefits, output and input. Finally, it gives in-depth thinking and trend prospect for the agricultural development in the era of big data.

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