

Application of Data Mining Technology in Poverty Alleviation Prediction in Ethnic Areas

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Abstract: In order to understand the application of poverty alleviation prediction in ethnic areas, an application research based on data mining technology in poverty alleviation prediction in ethnic areas is put forward. Firstly, this paper analyzes that the wide application of big data technology has opened the curtain of a new era, promoted profound changes in all walks of life, and made China society step into an information economy society, which has become an important driving force for China's economic transformation. Secondly, it briefly describes the methods in the prediction of poverty alleviation in ethnic areas, and uses the resources of big data to provide fast, convenient and efficient services to the society and people through various platforms such as the Internet, local area network and government network, so as to realize the resource utilization of big data. Finally, it is summarized that big data platforms such as "precise poverty alleviation cloud", "e-commerce cloud", "smart agriculture Internet of Things cloud", "education cloud" and "medical health cloud" should be developed and applied. The big data platform is helpful to change the thinking and path of poverty alleviation and promote the healthy, intelligent and sustainable development of rural society in ethnic areas.

Keywords: Data mining, Big data, Poverty alleviation

1 Introduction

Since China's reform and opening up, the main form of poverty alleviation in the first stage is regional poverty alleviation, and the goal of poverty alleviation is poor regions rather than poor people and poor households. The weakness of this poverty model is that China's economy has developed rapidly, and due to the uncertainty of people's incomes in recent years, it is difficult for the poor people with low incomes to enjoy the rapid economic benefits. Those. Therefore, from the point of view of the need to support the poor families of the country, the previous poverty reduction models have been insufficient to reduce poverty. After that, General Secretary Xi insisted that poverty alleviation must be real. Poverty alleviation is not the standard of land poverty alleviation in the past, but poverty must be reduced, that is, the minimum unit of poverty reduction. Poverty alleviation is one of the necessary measures to contribute to the reduction of poverty through economic growth, which is an important recognition of China's goal of achieving a healthy life in all respects and eradicating poverty by 2020. Poor people are always a big problem in our country. Many remote areas have become impoverished due to overpopulation and uneven distribution of goods. At the same time, poverty has greatly affected China's economic development. In order to build a healthy society as soon as possible, China must fundamentally solve the problem of poverty. The first step in solving the problem of

poverty is to remove the poor from their homes by finding the real poor households and providing assistance to the real poor households. At present, the fact-finding research in China is not complete, but with the rapid development of Internet technology and big data technology in recent years, the use of big data technology and data mining algorithms for poverty alleviation can identify real poor families. fast and accurate. Compared to traditional machine learning algorithms, due to technology and storage limitations, it can only be used for small data and depends on the data model. The emergence of big data technology can inspire us to achieve big data machine learning models[1-2].

2 Construction of evaluation indicators for precise poverty alleviation process

Targeted poverty alleviation is an important part of building a moderately prosperous society in all respects, and is the direct goal of targeted poverty alleviation, whose essence is to ensure that by 2020, "the stable realization of poverty alleviation targets do not worry about food and clothing, and ensure their compulsory education, basic medical care and housing." The precision poverty alleviation process takes 2020 as the cut-off time, and judging the progress of poverty alleviation targets reflects the distance between the poverty situation of poverty alleviation targets and the poverty alleviation goal. Based on the understanding of precision poverty alleviation and the process of poverty alleviation, this paper believes that the principles of constructing the evaluation index of precision poverty alleviation process are as follows: First, the combination of commonness and specific facts. Second, the combination of comprehensiveness and operability. According to these two principles, the main theoretical and practical basis for constructing the evaluation index of the precision poverty alleviation process in ethnic minority areas is as follows:

First, the multidimensional poverty theory proposed by Amartya Sen and Alkire et al. Amartya Sen believes that poverty is the deprivation of people's basic feasible ability. Alkire expanded Amartya Sen's theory and formed a multidimensional poverty index, which mainly covers three aspects: health, education and life. Second, the HDI proposed by the United Nations Development Program (UNDP), which evaluates health, knowledge acquisition and living standards. Third, the index of building a moderately prosperous society in all respects and the poverty alleviation target of China's Rural Poverty Alleviation and Development Program. The "Statistical Monitoring Index System for Building a moderately prosperous Society in All Respects" formulated by the National Bureau of Statistics (hereinafter referred to as the "moderately prosperous Index") sets evaluation indicators from the aspects of economic development, culture and education, quality of life, resources and environment. The Outline of Poverty Alleviation and Development in Rural Areas of China (hereinafter referred to as the Outline) sets the goal of "ensuring that poverty alleviation targets do not have to worry about food and clothing, and ensure their compulsory education, basic medical care and housing" by 2020. Fourthly, the poverty situation in China's minority areas. The poor people in China's minority areas not only suffer from poverty in education, health and living standards, but also need to be strengthened in ecological environment construction and infrastructure construction. The main constraints of poverty alleviation in ethnic minority areas are: "marginal" geographical location, poor natural environment, low level of human capital, low level of economic development, backward infrastructure and so on. Poverty alleviation in ethnic

minority areas should focus on the improvement of transportation, safe drinking water, safe housing, and ecological environment.

3 Analysis of the degree of realization of the evaluation of the process of precision poverty alleviation

In this paper, 40 poor counties in ethnic minority areas (including key counties and regional counties in the national poverty alleviation work) are selected for analysis using the national poverty alleviation file and card data. After analysis, it is found that from the perspective of economic development level, the realization level of farmers' per capita net income index is low, and 65% of the poor counties have achieved the level below 45%. In terms of urbanization rate, 7 counties have achieved 55% or more, and only 4 counties have achieved 70% or more. Seventy percent of poor counties have achieved less than 45 percent.

From the perspective of poverty level, due to the high incidence of poverty, the degree of realization is generally less than 20%, and it is still difficult to achieve precise poverty alleviation. In 20 poor counties, the poverty rate has been less than 25%. There are 24 counties where poverty rates have been achieved between 25 and 35 percent.

From the perspective of public service level, the realization degree of the basic pension insurance participation rate index is generally lower than that of other public service level indicators, and 80% of poor counties have achieved less than 40%. The comprehensive coverage rate of radio and television population is generally better, and 60% of poor counties have reached the standard ahead of schedule. The coverage rate of rural clinics varies greatly among counties, with 15% of poor counties achieving less than 40%, the lowest of which is only 5% in Seda County. The average retention rate of nine-year compulsory education has been achieved to a good degree, 50% of poor counties have achieved ahead of schedule, and 90% of poor counties have achieved 55% or more.

From the perspective of infrastructure level, 70% of the administrative villages in poor counties have achieved less than 60% of the road access rate; 80% of the poverty-stricken counties have access to passenger bus administrative villages, accounting for less than 60%; There is a great difference in the degree of realization of the proportion of electrified villages, 39% of the poor counties have achieved the goal ahead of time, and 19% of the poor counties have achieved less than 50%. The proportion of poor counties with access to safe drinking water is less than 60%, 15%, and 50% of poor counties with access to safe drinking water is between 55% and 85%. 69% of the poor counties have achieved the safe housing rate between 90% and 100%, and 25% of the poor counties have achieved the safe housing rate between 56% and 85%, of which Jiulong County and Puge County have achieved the lower level, 60% and 70% respectively. The percentage of users with mobile Internet access is low, and 45% of poor counties have achieved less than 60%.As shown in Table 1:

Table 1: Precision poverty alleviation evaluation indicators

Index class	Index name	Pointer code	unit	Standard value
Positive development	Per capita net income of farmers	1	yuan	>16000
	Urbanization rate	2	%	>65

Poverty level	Incidence of poverty	3	%	<4
	Participation rate of basic endowment insurance	4	%	>100
Public service	Comprehensive coverage of radio and television population	5	%	>90
	Coverage of rural clinics	6	%	>60
	Nine-year compulsory education period average	7	%	>60
	Sclerotic ratio			
Infrastructure	Rate of hardening roads in administrative villages	8	%	>100
	The proportion of administrative villages with passenger shuttles	9	%	>100
	The proportion of natural villages with electricity	10	%	>100
	Population access to safe drinking water	11	%	>100
	Safe occupancy rate	12	%	>100
	Percentage of households with mobile Internet access	13	%	>60
	Forest coverage rate	14	%	>20
Ecological environment	Harmless treatment rate of household garbage	15	%	>90

From the perspective of ecological environment, the forest coverage rate index is generally achieved well, most of the poor counties have achieved it ahead of schedule, and only 15% of the poor counties have not reached the standard. Of the harmless treatment rate of domestic waste, 25% of the poor counties have reached the standard in advance, and 50% of the poor counties have achieved less than 60%.

On the whole, except for the index of forest coverage, Aba Prefecture achieved better than Ganzi Prefecture and Liangshan Prefecture in other indicators, as shown in Figure 1. In Figure 1, the vertical coordinate is the realization degree value (unit: %), and the horizontal coordinate of 1 to 15 respectively represents the corresponding index code from 1 to 15 in Table 1 above. In addition, it should be noted that due to space constraints, only the state-level analysis results are listed in Figure 1, not the county-level analysis results.

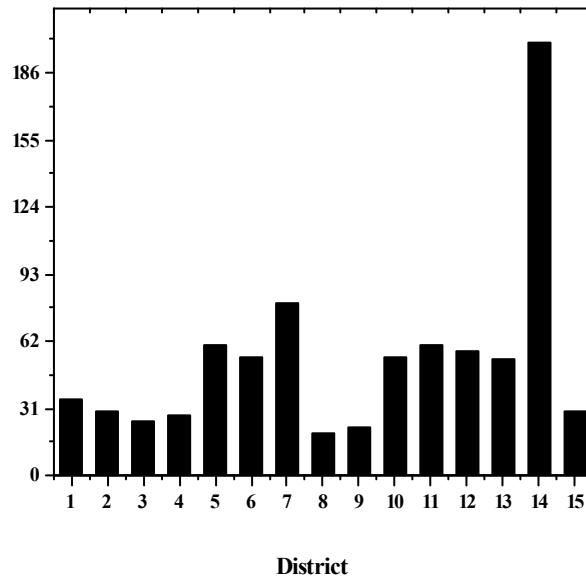


Figure 1: Degree of precision poverty alleviation.

3.1 Specific measures to use big data to get rid of poverty in ethnic areas

The necessity of big data poverty alleviation is obvious to all, but how to effectively apply it to practice and complete the task of poverty alleviation in rural areas in ethnic areas requires us to constantly explore and practice. Through practice, we have realized that big data resources can not only be used as a tool for the government to control poverty, but also directly help rural social development in ethnic areas in the form of resources. How to get rid of poverty from decisive achievements to all-round victory, especially in the special period when the task of epidemic prevention and control in COVID-19 is severe, is the focus of the party and the people.

3.1.1 "Precision Poverty Alleviation Cloud" Platform Construction

The platform construction of "Precision Poverty Alleviation Cloud" can effectively solve the first three problems in the poverty alleviation dilemma in the above-mentioned ethnic areas, namely, solving the problems of "the information construction of poverty alleviation is lagging behind, the work pressure of grassroots personnel is great", "the supervision of poverty alleviation projects is not in place, and the phenomenon of returning to poverty frequently appears" and "the construction of grassroots organizations is relatively weak and the service ability is poor". In September 2019, the National Development and Reform Commission published the Notice on Supporting and Promoting Poverty Alleviation Projects through the Internet, which laid out specific requirements for further implementing the Decision of the State Council, the Central Committee of the Communist Party of China on Winning the Fight against Poverty. In March, 2022, the Central Network Information Office, the National Development and Reform Commission, the the State Council Poverty Alleviation Office and the Ministry of

Industry and Information Technology jointly issued the Key Points of Network Poverty Alleviation in 2022, which emphasized that "we should concentrate our forces to fight the deep poverty annihilation war, complete the remaining poverty alleviation tasks in an all-round way, make up the shortcomings of the network more solid, lay a more solid information foundation, push the network poverty alleviation action to a new level, constantly stimulate the endogenous motivation of poverty-stricken areas, and resolutely win the tough battle against poverty". With the gradual progress of the Network Poverty Alleviation Action Plan, the network coverage and quality in ethnic areas have also been further improved. It is estimated that by the end of 2023, the promotion of administrative villages in China, including rural areas in poor ethnic areas, that can access broadband, optical fiber and 4g will reach 99%. Network poverty alleviation has started the "internet plus poverty alleviation" model, laying a solid foundation for the construction and operation of the "Precision Poverty Alleviation Cloud" platform[3-4].

The construction of "Precision Poverty Alleviation Cloud" platform is essentially a process of building a database for poverty alleviation in rural areas of ethnic areas. As shown in Table 2, the construction of poverty alleviation database in rural areas of ethnic minority areas can be divided into three stages. From accurately identifying poverty objects and causes to accurately implementing poverty alleviation policies, we need to build a scientific and complete big data system. The data source of "Accurate Poverty Alleviation Cloud" mainly consists of the following three parts: First, the basic information of poor households collected and verified by grassroots cadres, such as housing area, housing conditions, drinking water safety, medical security, education, labor ability, production conditions, income, poverty alleviation projects, assistance, and assistance accounts, is used to clarify the "helping objects"; Second, a large database of accurate poverty alleviation formed by the collection and integration of data resources of relevant departments and units, such as verifying and matching the information and situation of poor households collected from water conservancy bureau, education bureau, health and health commission, housing and construction bureau and other departments with the information collected at the grassroots level through digital automatic ports, filing and sorting, forming an accurate identification and verification database of "accurate poverty alleviation cloud" to clarify "how to help" and "who will help"; Third, through the use of network ports, the data compiled by the "Precision Poverty Alleviation Cloud" are matched with the data of the national poverty alleviation and development system to ensure the smooth implementation of the precision poverty alleviation policy[5].

Table 2: Database of Rural Poverty Alleviation in Ethnic Areas

Poverty object database	Database collection	Data warehousing	Accurately identify poor objects
Accurate identification and verification library	Accurate identification and verification library	Data classification	Accurately identify the causes of poverty
Information base of poverty alleviation measures	Information base of poverty alleviation measures	data sharing	Accurately implement poverty alleviation policies

3.2 "Smart Agriculture Internet of Things Cloud" and "Rural E-commerce Cloud" Platform Construction

The platform construction of "Smart Agriculture Internet of Things Cloud" and "Rural E-commerce Cloud" can help the industry to help the poor, and effectively solve the fourth problem of poverty alleviation in the above-mentioned ethnic areas, that is, to solve the problem of "weak rural economic foundation, single poverty alleviation method and low efficiency". As shown in Table 3, with the implementation of the strategy of tackling poverty, the incidence of poverty in the whole country and eight ethnic provinces has changed greatly, and the gap between them has also decreased year by year. Smart agriculture is the product of agricultural modernization and the advanced stage of agricultural production. Building a "Smart Agriculture Internet of Things Cloud" can give full play to the supporting role of big data in agricultural production, help the modernization of agricultural production and improve the efficiency of poverty alleviation in rural industries in ethnic areas. "Smart Agriculture Internet of Things Cloud" is also based on meteorological environment information detection system, soil monitoring and remote irrigation control and visual monitoring system, and takes the Internet of Things as the platform, which can break the geographical and temporal limitations of agricultural production and market and effectively solve the problem of agricultural information asymmetry. Many data resources in the "Agricultural Cloud" platform, such as planting and breeding database, agricultural products processing cold chain logistics database, agricultural products market and sales price database, and agricultural industry poverty alleviation database, can also be integrated and applied to the "Smart Agriculture Internet of Things Cloud" platform to form a unified platform for integrating cross-departmental data resources, providing poor households with effective information on agricultural production, processing, cold chain logistics, sales and market prices, and helping poor households realize the modernization of agriculture and animal husbandry[6].

Table 3: National incidence of ethnic poverty from 2018 to 2022

Age	National average poverty incidence rate
2018	10%
2019	9%
2020	6%
2021	3%
2022	1%

Achievements of the development of "big data+e-commerce poverty alleviation" model. The "e-commerce cloud" integrating "platform+service+data" should have a full chain e-commerce service system such as online trading platform, e-commerce comprehensive service platform, e-commerce big database, e-commerce internet big data platform and business system, and collect, track and grasp the market demand, transaction information and market price in real time through the functions of data filling and grabbing, fixed-point collection and statistical monitoring, so as to provide convenience for farmers' production, e-commerce procurement and sales, production and marketing cooperation, etc. "E-commerce Cloud" can send high-quality agricultural products from poor farmers to urban residents' homes, and can realize the sustainable development of farmers' honest farming and consumers' assured purchase[7-8].

3.3 "Education Cloud" and "Medical Health Cloud" Platform Construction

The platform construction of "education cloud" and "medical health cloud" can improve the effective supply of rural public services in ethnic minority areas, which is conducive to supporting wisdom, ambition and poverty alleviation, and can solve the fifth problem of poverty alleviation in the above-mentioned ethnic minority areas, that is, to solve the problem that "public services are still backward and the proportion of poverty is high due to the old, the weak and the sick". The construction of "education cloud" should be integrated with the construction of "precise poverty alleviation cloud", so that the platform of "education cloud" can automatically identify poor students, automatically generate data of poor students, and automatically handle education poverty alleviation subsidies, and realize the "three zeros" policy of tuition-free procedures for children of poor rural households in ethnic areas, that is, zero application, zero proof and zero errands. Through the "education cloud" platform, we will promote in-depth cooperation among universities, enterprises and social organizations, provide professional and technical training for the poor, and improve the education level of the poor. At the same time, according to the development needs of big data poverty alleviation model in ethnic areas, cloud computing and big data training courses will be opened; First of all, train poor rural college students in ethnic areas, so that poor college students in ethnic areas can master the skills of using cloud computing and the frontier technology of big data, and realize "intelligence"; Secondly, combined with the current difficulties in the development of big data, around the application, development, storage and other knowledge of big data, online training is provided for employees in ethnic areas to help the development of big data; Finally, provide and guarantee big data employment, such as Alibaba Cloud's "Cloud Employment Alliance", carry out Alibaba Cloud's talent support program in poverty-stricken areas and counties, directly train poor households who apply to join the talent support program, and connect thousands of partners to provide employment opportunities for poor students in ethnic areas and technical practitioners in poverty-stricken areas and counties. "Medical Health Cloud" is an "Internet medical health" service platform built on the big data platform, which is based on the three databases of poor population, health records and electronic medical records, and finally forms a large database of health care. The construction of the "medical health cloud" platform should focus on two aspects: First, do a good job in investigating the poverty caused by illness and returning to poverty due to illness in rural areas of ethnic areas, fully grasp the sick families, personnel, diseases and diagnosis and treatment, establish an electronic database, improve the "four medical guarantees" of basic medical insurance, serious illness insurance, medical assistance and medical assistance, and provide basic data and decision-making basis for the implementation of classified treatment and assistance; The second is to encourage commercial insurance institutions to join the "Internet medical health" service platform. The information construction and resource sharing of health care need the participation of commercial insurance institutions, and realize "one-stop" settlement services such as serious illness insurance, basic medical insurance and medical assistance in rural areas of ethnic areas, realize the "three screens" interaction of computers, televisions and mobile phones, and build a health care service platform integrating online appointment, consultation and health management[9-10].

4 Conclusion

To sum up, the difficulties faced by rural poverty alleviation in ethnic areas directly affect the realization of the grand goal of building a well-off society in an all-round way. Therefore, getting rid of poverty as soon as possible with the help of big data poverty alleviation model in rural areas in ethnic areas is the core issue to be grasped in China's poverty alleviation and even rural revitalization and building a well-off society in an all-round way. 2022 is a crucial year for tackling poverty, and rural areas in ethnic areas are the "short board in the short board" in the last year of tackling poverty. Big data is an innovative move to help rural areas in ethnic areas overcome poverty, which will promote the detailed content of poverty alleviation work, the diversification of poverty alleviation implementation, the implementation of poverty alleviation policies and the development of service supply network. This is in line with the development trend of the times in the evolution of innovation, and also meets the requirements of national big data strategic deployment. However, at present, China's poverty alleviation and utilization rate of big data can not meet the requirements of economic and social development, and needs to be improved and optimized. "Big data poverty alleviation" is not only a realistic and feasible strategy, but also an effective mode and path to provide more planned, purposeful and targeted services and technical support for rural helpers in ethnic areas.

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