

Research on comprehensive evaluation of government economic management performance based on multidimensional data mining

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Abstract: The comprehensive evaluation of government economic management performance is of great help to the planning of government economic activities. However, a large amount of data is involved in the comprehensive evaluation, and the data has multidimensional characteristics, so it is suggested to use multidimensional data mining to help the evaluation. This paper first introduces the basic concept of multidimensional data mining technology, and then analyzes the practical application of this technology, hoping to provide reference help.

1. Introduction

At present, there are two methods of comprehensive evaluation of government economic management performance: one is based on original data, the other is based on empirical data. Due to the large amount of data involved in the comprehensive evaluation of economic management performance, advanced data mining technology is needed to improve the accuracy and reliability of the evaluation. Multidimensional data mining is a new technology, which mainly combines computer technology and data mining technology, and applies association rules, anomaly detection and other technologies to data analysis to obtain useful information. The use of multidimensional data mining technology can effectively help the government to plan economic activities and improve the performance of government economic management. Therefore, in order to achieve this goal, it is necessary to carry out relevant research.

2. Basic concepts of multidimensional data mining

Multidimensional data mining technology is the development of traditional data mining technology. Based on traditional data mining technology, advanced data mining methods are used to analyze multi-dimensional data and discover hidden knowledge. Multidimensional data mining is to dig out the hidden knowledge through the data of multiple dimensions, usually converting multiple different dimensions into one-dimensional data and transforming it into a data model. The data model is to analyze the data and extract useful information[1-3].

In general, data models are divided into two types: one is a multidimensional model and the other

is a two-dimensional model. In the comprehensive evaluation of government economic management performance, a large amount of information needs to be processed and analyzed, so the use of multidimensional data mining technology can effectively solve this problem.

The traditional comprehensive evaluation of government economic management performance has many drawbacks: firstly, a large amount of information needs to be collected and sorted out during the evaluation. However, due to the great difficulty of information collection and sorting, it takes a lot of time and energy to make the evaluation. Secondly, due to the large amount of information collected, there will be inaccurate evaluation results in the evaluation. The use of multidimensional data mining technology can effectively solve this problem. Multidimensional data mining is to dig out the hidden knowledge in multidimensional models, and then use the knowledge to analyze and evaluate. This method can help the government to plan and manage economic activities effectively and improve the performance of government economic management. Therefore, in order to improve the performance of government economic management, multidimensional data mining technology should be adopted[4].

There are many algorithms involved in multidimensional data mining, among which the main mining algorithms are shown in Table 1.

Table 1: Common classification algorithms in multidimensional data mining

Common classification algorithm	Decision tree
	Support vector machine
	Artificial neural network
	Cluster analysis
	Factor analysis
	Linear discriminant analysis

Decision tree is one of the most common classification algorithms, its principle is to first divide the data set into multiple subsets, and then classify these subsets. Support vector machine (SVM) is a kind of machine learning algorithm based on statistical learning theory. It is strong in processing sample data and modeling nonlinear system. Artificial neural network is a kind of nonlinear system, which can self-learn and self-adapt to data, so it has great application value in multidimensional data mining. This paper mainly suggests the use of decision tree algorithm, the algorithm model is shown in Figure 1.

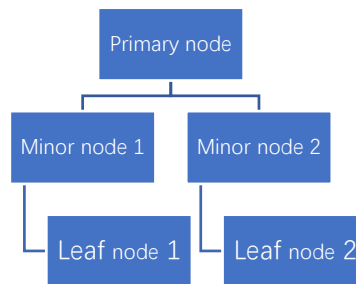


Figure 1: Decision tree algorithm model

In addition, if there is a clustering problem in multidimensional data mining, various clustering algorithms can usually be used to deal with it. Common clustering algorithms are shown in Table 2.

Table 2: Common clustering algorithms in multidimensional data mining

Common clustering algorithms	Fuzzy C-means Algorithm (FCM)
	K-means algorithm
	Hierarchical cluster analysis algorithm

In combination with Table 2, it is generally recommended to use the K-Means algorithm, which is a clustering analysis algorithm that can determine the number of clusters according to the distance function, and the choice of the distance function will directly affect the quality of the clustering results. Generally, the greater the distance function, the better the clustering results. Formula (1) is the expression of the K-Means algorithm, and Figure 2 is the model of the algorithm[5-7].

$$d_{ij} = \|x_i - \mu_j\|_2^2 \quad (1)$$

Where d is the distance between the clustering factors, ij is the two clustering factors, and x is the cluster.

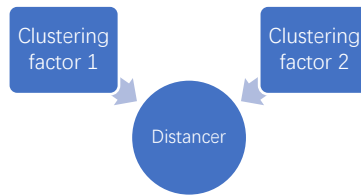


Figure 2: K-Means algorithm model

In general, multidimensional data mining technology can transform multi-dimensional data into one-dimensional data model, making information extraction more accurate and fast. However, in multidimensional data mining, other methods need to be used and combined, such as factor analysis, factor score and so on. The comprehensive evaluation of government economic management performance is a process of evaluating government economic activities, which contains multiple dimensions of data information. Therefore, it is very necessary to use multidimensional data mining technology in the comprehensive evaluation of government economic management performance[8-10].

3. Practical application of multidimensional data mining technology

3.1. Application Overview

The application of multidimensional data mining technology can make the performance evaluation of economic management more targeted and practical, and can fully grasp the overall operation of the government. With the application of multidimensional data mining technology, data can be divided into different dimensions for analysis and mining, and combined with different dimensions to build a government performance evaluation index system. In practical application, according to the actual situation of the government, the appropriate multidimensional data mining technology can be selected to analyze the government. The application of multidimensional data mining technology in the comprehensive evaluation of economic management performance mainly includes three aspects: First, it is to use multidimensional data to analyze the economic management situation of the government, and combine the actual situation of the government to build the performance evaluation index system; Second, the use of multidimensional data to forecast the development prospects of the government; The third is to use multidimensional data to find the problems existing in the performance evaluation of economic management.

The application of multidimensional data mining technology in the comprehensive evaluation of economic management performance needs to integrate relevant data according to certain rules and build the corresponding index system. When constructing the index system, it is necessary to analyze from the aspects of the history of government economic management, operation and management, and financial status. At the same time, it is necessary to analyze in combination with various aspects to better improve the application of multidimensional data mining technology in the comprehensive

evaluation of economic management performance, so that it can play a greater role in government economic management.

3.2. Application Mode

The first is to use multidimensional data to analyze the development of the government. In the comprehensive evaluation of economic management performance, multi-dimensional data is an important basis for analyzing the government's economic management status, and the government's development status can be reflected through multi-dimensional data. In the comprehensive evaluation of economic management performance, multidimensional data can be divided into two aspects: development history data and operation and management data. Through the analysis of these two aspects, we can better grasp the development status of the government. In the comprehensive evaluation of economic management performance, the analysis of historical development data can be carried out from the time when the government was established, the scale of development, and the scope of the government's business. Through the analysis of historical development data, we can comprehensively understand the development situation since the establishment of the government. The analysis of operational management data can be carried out in terms of the proportion of government in various industries, revenues and costs. Through the analysis of operation and management data, we can better understand the proportion of the government in various industries and make better predictions for the future development of the government. Through the analysis of these multidimensional data, the performance evaluation of economic management can be more targeted and practical. In the comprehensive evaluation of economic management performance, multi-dimensional data mining technology can also understand the government operation situation by analyzing multiple dimensions. For example, multiple dimensions such as sales revenue, asset scale and return on total assets can be used to understand government operations. Through the analysis of these multidimensional data, we can better grasp the overall operation of the government. At the same time, through the analysis of different dimensions, we can understand the problems and shortcomings in the government operation. In practical applications, multidimensional data needs to be analyzed according to different dimensions to better understand the development of the government in different dimensions. This is also an important way to apply multidimensional data mining technology in the comprehensive evaluation of economic management performance.

Secondly, the performance evaluation index system should be constructed according to the actual situation of the government. The construction of economic management performance evaluation index system should be combined with the actual situation of the government and fully consider all aspects of factors. In the construction of economic management performance evaluation index system, it is necessary to analyze the government's internal operating conditions, determine the indicators that match the government's economic management, and carry out a detailed analysis of each indicator. When constructing the performance evaluation index system, it is necessary to determine the corresponding index according to the current development situation of the government and historical management data. When determining the performance evaluation index system, we should pay attention to the following aspects: First, we should accurately position the evaluation object; Second, it is necessary to take the relevant data as the basis to ensure that the performance evaluation index system constructed has a strong scientific; Third, it is necessary to clarify the relationship between the various dimensions in the index system. In the construction of economic management performance evaluation index system, it is necessary to determine the relationship between various dimensions according to multidimensional data mining technology, so as to better reflect the overall operation of the government. In addition, it is also necessary to integrate multidimensional data with other data to build a more comprehensive, scientific and accurate performance evaluation indicator

system to promote the future development of the government.

Finally, it is to use multidimensional data to forecast the development prospect of the government. Multidimensional data can be used to predict the future development trend of the government and analyze its future development trend, which can better promote the long-term development of the government. In the application of multidimensional data mining technology, it is necessary to analyze the relevant factors affecting government economic management. In this process, the future development prospects of the government can be predicted by means of index system, data collection and multidimensional data analysis. In the index system, different index contents can be determined according to the different factors affecting the government's economic management. When data collection is carried out, it can be achieved by analyzing the existing data.

4. Conclusion

To sum up, with the rapid development of China's economy, management performance evaluation has attracted more and more attention. The purpose of government management performance evaluation is to find out the problems through the evaluation of the state of government economic operation, so as to better promote the development of government economy. In the process of actual activities, due to the influence of various factors, the performance evaluation of government management is often greatly affected, so it is necessary to actively change the evaluation method and adopt multidimensional data mining technology for evaluation.

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