Application Analysis of Data Mining Technology in Administration

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Abstract. Since the data mining technology came into being in the early 1980s, with the development and popularization of computer technology, it has promoted its application in the business field. It is helpful for enterprises to mine information and knowledge related to business decision-making from the explosive growth of data, and improves the pertinence and effectiveness of decision-making. It has been paid more and more attention by enterprises. This paper expounds the basic concepts, methods and tools of data mining, analyzes the important role and significance of data mining technology in improving the competitiveness of enterprises, and probes into the application of data mining technology in enterprise management.

Keywords: Application analysis, Data Mining Technology, Administration

1. Introduction
Data mining technology is based on the high development of data mining, and is also a hot topic for people to discuss and study. Data mining is not complicated in terms of language. It involves constantly filtering and analyzing the accumulated amount of data, discarding the wrong and negative data information, collecting the useful information, finding out the relationships hidden in the logical level of information[1], and exploiting these relationships. It analyzes the data of enterprises highly automatically, makes inductive reasoning, excavates potential patterns from it, helps decision makers adjust market strategies, reduce risks, and make correct decisions.

From the time point of view, data mining technology was born not long ago, belongs to the new information processing technology, but from the function, the data mining technology has already had the certain depth application in many industries[2]. Using data mining technology, enterprise operators and product developers can extract, analyze and organize a large number of cluttered information from customers, and form a valuable information base conducive to enterprise operation or product development.

Data query is to find meaningful facts from the database. Different from simple data query, data mining is to find useful trends and patterns from data. Why is data mining so popular? There is no doubt that the correct and ingenious application of data mining technology can bring great returns to
enterprises, society and individuals, whether it is for enterprises or society. This is the main reason for the popularity of data mining[3].

After a lot of research and exploration, data mining tools can be roughly divided into: association, evolution, clustering, outlier, classification, etc.

2. Application Scenarios of Data Mining

Information is the basis of enterprise production and service. Like capital, raw materials and human resources, it has become an indispensable resource for enterprise production. The analysis of the collected information using data mining technology is helpful for enterprises to establish unique competitive advantage in key areas, which is the key to obtain core competitive advantage. Data mining technology mainly improves the core competitiveness of enterprises from the following aspects as figure 1.

![Figure 1. Data Relationship between Administrative Software](image_url)

2.1. Analyze internal business information (ERP, Enterprise Resource Planning)

Through data mining technology, data warehouse technology and on-line analysis technology, managers or managers can collect data information drawn from experience or surveys, as well as from other similar projects, and build a database of their own to facilitate the analysis of the work performed. Analysis is multi-faceted, multi-functional, can analyze the subject, can also analyze the object, can analyze the appearance, can also analyze the essence. These analyses, if used flexibly, can emit heat in all industries. For example, in the traditional enterprise management, the accumulation of internal contradictions will eventually lead to the break of the balance system within the enterprise,
and the company will suffer internal wear and tear in all aspects of production and operation, these losses will become as big as snowball, and then reach the unconscious erosion of a company, resulting in a huge loss and failure of the company. After applying the data mining technology, the internal problems will be presented at any time and solved properly.

2.2. Collect external environment information (NMS, Network Monitoring System)
Data mining technology collects, arranges, analyzes and processes the information related to the development of the enterprise on the external environment information of the enterprise, including political, economic, technological, financial and other markets. And it can predict the opportunity or crisis in the course of the company's operation, so that the management of the company can make timely and significant adjustments to seize the opportunity or avoid the loss caused by the crisis, enables the enterprise to seize the fleeting market opportunity, and timely adjusts the business model Business strategy, to promote the healthy and sustainable development of enterprises.

2.3. Provide quality products and services (SCM, Supply Chain Management)
By using data mining technology to process, analyze and infer a large number of data in enterprise data warehouse, we can find those patterns, associations, rules and trends hidden in the data. Using these patterns, associations, rules and trends can help enterprises create unique new products and services, and avoid cost competition with similar enterprises.

2.4. Improve customer relationship management (CRM, Customer Relationship Management)
Using data mining technology can make enterprises understand and influence customer behavior, make communication with customers more meaningful, and ultimately achieve the purpose of improving customer acquisition, customer retention, customer loyalty and customer profitability, which is helpful to improve the relationship between enterprises and customers.

2.5. Optimization of Supply Chain Management System
By using the data mining technology to analyze the information of enterprise database, managers can master the situation of production and inventory at any time, integrate demand planning, forecasting, purchase processing, inventory allocation, ordering, transportation service, receiving, bill and payment, form a complete supply chain and manage it effectively, reduce the integration

2.6. Conduct credit risk analysis and fraud identification (RCS, Risk Control System)
Data mining technology can be used to analyze and process the massive data in the enterprise data warehouse, to find out which unfair transactions, false business data and accounting statements, to analyze the credit risk of customers and predict the possible fraud crisis. We should forewarn and control credit risk and fraud crisis before it happens. We should do a good job in preventing credit risk and fraud crisis, so as to improve the competitivity of enterprises.

2.7. Pre-control risks and prevent crises (EWS, Early Warning System)
When the crisis of business operation and management occurs, managers can use advanced data mining technology to control, Release relevant crisis information and response methods, and release the progress of the development in real time. In this way, senior managers, public relations personnel, crisis management personnel and all employees of the enterprise can be ready to deal with the pressure of any complex and critical situation at any time, respond to the crisis in time, and take effective measures to minimize the loss of the crisis.

3. Data mining steps
Before the implementation of data mining, it is necessary to decide what steps to take, what to do in each step, and what kind of goal to achieve. Only with a good plan can we ensure the orderly
implementation and success of data mining. Many software suppliers and data mining consulting companies provide some data mining process models to guide their users to carry out data mining step by step. For example, 5A from SPSS and semma from SAS. As figure 2.

![Data Mining Process Model](image)

**Figure 2. Operation Flow Chart**

The steps of data mining process model include defining problem, building data mining database, analyzing data, preparing data, building model, evaluating model and implementing. Let's take a look at the details of each step:

1. **Define the problem.** The first and most important requirement before knowledge discovery is to understand data and business problems. There must be a clear definition of the goal, which is to decide what you want to do. For example, when you want to improve the utilization rate of e-mail, you may want to "improve the utilization rate of users" or "improve the value of one-time user use". To solve these two problems, the established model is almost completely different, and a decision must be made.

2. **Establish data mining database.** Building a data mining database includes the following steps: data collection, data description, selection, data quality assessment and data cleaning, merging and integration, building metadata, loading data mining database, and maintaining data mining database.

3. **Analyze the data.** Analysis is an essential step in establishing a data mining model. Precision analysis is of great significance, through which we can find the parts that have the greatest impact on the establishment of the model, and choose these parts. Of course, a lot of data and information part of the browsing and review cannot be done manually, that is both time-consuming and labor-intensive, relying on the powerful functions of the computer is a good choice.

4. **Prepare the data.** So far, all the preparations for modeling the data mining technology are ready.

5. **Build the model.** Modeling is a repetitive process. Different models need to be examined carefully to choose the best model which is suit for the business problems they face. Before this step, we need to do some preparation work. Firstly, two parts of authentic and reliable data information are prepared, and only some of them are used to build the data mining model. After the model has been established successfully, the model has been tested using some of the data not yet used. If the model is correct, we can also get another database, which is to verify the data. We need to select as much data as possible to verify the model, because the more data we use, the closer the weighted average is to the
real.

(6) Evaluation mechanism. Once the model is established, we can use the model to evaluate the results after the application of data mining, and then evaluate the value of the model and optimize the structure. In the actual enterprise administration and operation, we must pay great attention to the accuracy of the data mining model, and understand the number of possible errors and errors will cause additional losses. The direct reason for this is the implicit assumptions in model building, so it is very important to test the accurate of the model directly in the real work. First, it is applied in a small area, and test data is obtained, and then it is popularized in a large area.

(7) Put into effect. Since the model is established and verified, we can use it mainly in two ways. One is to provide reference for analysts, the other is to analyses of other types of data information.

4. Application analysis of data mining technology

Data mining technology itself does not directly create value for enterprises. Only by transforming the information and knowledge discovered by data mining into the competitive advantage of enterprises can it reflect its actual value. It must be considered in the big cycle of business management decision-making. This cycle includes the following steps: target determination, data set selection, data mining, knowledge application, plan execution, result feedback, etc. The following describes the process of applying data mining technology in the process of enterprise management: As figure 3

![General Pattern of Data Mining](image)

Figure 3. General Pattern of Data Mining

4.1. Mining Target

The goal of data mining is to identify high-value customer groups from basic customers, predict how to retain these customers, and predict how to cross sell these customers. Data mining model provides an effective way to understand the characteristics of high-value customers and predict their consumption intention. This kind of model can help enterprises find out the signs of possible loss of customers as early as possible, so as to retain these customers with more attractive products.

4.2. Select Data Source

It needs to eliminate noise and non-generated data through data processing. Data integration is used to integrate multi-source data. Data filtering is used to extract task related data and transform the data into an appropriate form.

4.3. Data Mining Plan

The next step is to apply data mining tools and software, select the appropriate mining function /
algorithm, and extract the hidden patterns and knowledge from the data. Data mining tools often evaluate the mining patterns according to certain value standards, and use visualization technology to express knowledge.

4.4. Data Association
After identifying the information about high-value users, we can make a series of cross selling marketing plans to achieve the corporate goals. In order to retain high-value users with special needs, it is necessary to formulate a new marketing plan. There are many kinds of new products for users. Data mining is very important to determine which products are most suitable for high-value users. It can effectively improve the pertinence of marketing plan.[4]

4.5. Mining Execution
After making the right decisions and making the corresponding plans according to the found trends and patterns, these plans should be put into action. When high-value users contact with enterprises, the integrated system will display every promotion suggestion that can be put forward to customers, and business personnel can take active promotion actions to recommend new products and services of enterprises to users.

4.6. Return Result
The final step is to check the effectiveness of the implementation of the plan. Furthermore, we can introduce "dynamic learning" mechanism in the process of data mining, so that the data mining model can make dynamic adjustment according to customers' acceptance of promotional suggestions. By using this method, not only the effectiveness of the implementation of the promotion plan can be fed back in time, but also the plan can be revised constantly.

5. Summary
Through the application of data mining technology, from the perspective of scientific enterprise management decision-making system, enterprises extract the relationship between data and the information and knowledge hidden in the data, which are not known in advance but very useful for the management and development of enterprises, and provide strong data support for the decision-making of enterprises, so as to realize a "from the number" method It is estimated that the improvement of the quality from information support to knowledge prediction is of great significance in improving the effectiveness of business decision-making and business activities, and improving the competitiveness of enterprises.

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