Research on the Development of an Intelligent Financial Management System Based on Data Mining Technology

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Abstract. With the in-depth development of enterprise information construction, enterprises accumulate more and more business data, at the same time, the constantly changing market environment and fierce competition, have prompted managers to more in-depth information desire. An intelligent financial decision support system is a specific application in the financial field after the integration of traditional decision support system and expert system in artificial intelligence. The application of an intelligent financial decision support system can help enterprises to classify, sort, process and analyze data, and transform historical data that cannot be further used into knowledge base information for senior decision makers. However, in most of the existing researches on an intelligent financial decision support system, the application of data mining technology is not specific enough, and only gives the construction of a model library and knowledge base in a general way. At the same time, it is seldom combined with the actual situation of enterprises, so the operability is not strong.

Keywords: Intelligent Decision, Data Mining, Financial Decision, Association Rule

1. Introduction

With the deepening of the marketization of China's economic development, the enterprise will face the international competition in the market, at the same time, enterprise management intensive, large-scale, internationalization are inevitably increases the enterprise operation and the pressure of survival, in such a new operating environment, scientific financial projections for the enterprise, analysis, control and decision becomes especially important[1]. With the rapid development of information technology and the development of global economy, the survival and development environment of enterprises has been greatly changed, and the original theories and methods of enterprise financial management are difficult to adapt to the rapid development. To meet this challenge, Chinese enterprises must improve the management level of financial control,
decision-making and analysis. However, the continuous development of artificial intelligence technology, computer, technology and financial knowledge model makes the realization of many financial models or analytical forecasting methods which are too complex to be started before simple and feasible. All financial decisions for enterprise innovation provides a powerful technical support, to make the function of the accounting information system from accounting development into the management decision-making model, even using modern computer technology to establish effective intelligent finance decision support system is an effective way, also is an inevitable trend of development of financial informatization[2].

2. Overview of an intelligent financial decision support system and data mining

2.1. Overview of decision support system

Since the production and operation activities of modern enterprises involve many influencing factors, the decision-making behavior is often accompanied by great uncertainty, so it is not easy to make the right decision in the current fiercely competitive market environment. Decision support is precisely to help managers make the right decisions in such a rapidly changing and uncertain environment so that managers can work effectively. For example, we can build a project-specific decision support system:

![Diagram](image)

**Figure 1.** Sales volume as a function of product, month and region

A large number of practices have shown that, in the decision-making process, a set of decision support system which can not only complete the quantitative problem calculation, but also realize the qualitative problem analysis can be established by using the theories and advanced management ideas of management, science and computer technology, which can effectively improve the accuracy and credibility of enterprise decision-making[3]. Decision support system is a very powerful tool.

2.1.1. Concept of decision support system

Before the emergence of decision support system, it is necessary to rely on traditional management information system or applied quantitative model to solve the daily operation and strategic decision problems faced by enterprises. On this basis, we develop a new information processing system,
namely decision support system[4]. The function of decision support system is based on a daily basis business deal with the accumulation of historical data, the use of mathematics, statistics or other intelligent technology and method of evaluation and analysis of business data, estimate and predict the development trend of the future business situation, the enterprise strategic choice, strategy on such major issues for policy makers to provide auxiliary, support and help of the computer system. Based on the above and the concept of Figure 1, we can build a cube diagram of data mining technology in detail:

![Figure 2. Cube example of a decision support system](image)

2.1.2. Concept of an intelligent decision support system

Like many things, the development of artificial intelligence since its inception in 1956 has been tortuous and uneven. It is in the contradiction between ideal and practice, exploring the effective way and technology of artificial intelligence development. Artificial intelligence is the study of machine intelligence and intelligent machines of high and new technology subject, is to simulate, extend and expand the function of person, to realize the automation of some mental work technical foundation, is to develop computer application technology, research on the forefront of a new generation of computers is an important scientific way to explore the mysteries of the human brain and computer application in the wide areas. Artificial intelligence, atomic energy technology and space technology are known as the three most advanced technologies of the 20th century. Artificial intelligence is widely used in industry, agriculture, science and technology, national defense and various sectors of the national economy, computer control, computer management, computer-aided design, manufacturing, production process automation and other fields, promoting the development of a variety of intelligent new technologies, new methods, and new products. For example: intelligent control, intelligent management, intelligent agent communication, intelligent CAD, intelligent CAM, intelligent instrument, intelligent automation, intelligent retrieval, etc[5].

2.2. Overview of data warehouse

Applying large amounts of enterprise business data to statistics and analysis was originally a very simple and straightforward idea for managers. But in the actual operation process, it was found that to
get useful information in the data ocean is not as easy as think: first of all, do not have a unified data source, a large number of business data is often scattered in multiple heterogeneous environment, want to undertake unity query access is not easy, and there are a lot of historical data in business and not in the system, but in the offline state, fundamental useless; Secondly, the pattern of business data is designed for a specific transaction processing system, and the way of describing the data and its format are difficult for non-computer professionals to understand, and even more difficult for business statistics and analysis. Just because of these problems, and people began to set up a business specifically for statistical analysis of data center, the data center is the data warehouse, its data from heterogeneous external data sources, the practice of the on-line processing system, and other business data of offline, to support decision support and online analytical applications[6].

2.3. Data mining

In recent years, data mining caused extensive concern of the information industry, the main reason is the enterprise of large amounts of data can be widely used, there is no powerful tool, the data is just data "tomb" - can't reasonable use of data files, so the urgent need to find a way to transform these data into usable information or knowledge, convert data tomb into knowledge bullion. The information or knowledge acquired can be applied to a variety of fields, such as production control, market analysis, business management, engineering design, and scientific and technological exploration.

3. Construction of intelligent financial management system based on data mining technology

3.1. Investment decision-making system

Investment decision-making is in enterprise investment decision theory knowledge in the field of application, is the enterprise to achieve its economic benefit, using the relevant decision theory and method, a systematic analysis of internal conditions and external conditions, from can adopt multiple investment alternatives to select one or more of the best or the most satisfied with the solution process. This system is used for the practical analysis of association mining:

| Transaction ID | Items Bought | Min. support 50% | Min. confidence 50% |
|---------------|-------------|-----------------|----------------------|
| 2000          | A,B,C       |                 |                      |
| 1000          | A,C         |                 |                      |
| 4000          | A,D         |                 |                      |
| 5000          | B,E,F       |                 |                      |

| Frequent Itemset | Support |
|------------------|---------|
| {A}              | 75%     |
| {B}              | 50%     |
| {C}              | 50%     |
| {A,C}            | 50%     |

**Figure 3.** Analysis of an example of association mining

For rule A = C

Support = support (\{a-c\}) = 50%
Confidence = support ({a-c})/support ({A}) = 66.6%

For C = A (50%, 100%)

The Apriority principle: Any subset of a frequent itemed must be frequent.

In other words, the production and operation effect of enterprises is related to the survival of enterprises in the fierce competition in the modern market, and the effect of investment and economic benefits are crucial to the development of enterprises. Managers must combine their own enterprises' economic ability and technical ability to plan and plan the scale of project investment, industry direction and investment benefits, and finally make scientific decisions[7]. The enterprise investment decision making and the choice of investment plan, the project risk management and avoidance is directly determines the success or failure of the investment project, and then affects the success or failure of the enterprise's overall strategic objectives.

The fundamental purpose of investment is to obtain income, and income is often accompanied by risk. Therefore, whether a specific investment can successfully recover the investment and obtain the expected return depends on whether the manager has conducted enough analysis and control of the risk. Only in the decision-making stage of investment, the risk must be identified actively, the risk must be comprehensively analyzed because of the control analysis, and can the investment risk be reduced from the source. At present, the data mining models used in investment decision mainly include decision tree, fuzzy mathematics and association rules.

3.2. Construction of financial management system

From the above analysis, we can see that evaluation and prediction before actual investment is a strategic move for business development and has great practical significance. Therefore, how to apply intelligent data mining technology to investment decision is an important problem in the development of enterprises. In the enterprise's intelligent financial management, Microsoft's data warehouse development suite and tools are widely used in the construction of intelligent financial decision support system. Tools used in this system include:

- Data warehouse model design: SQL Server 2005 enterprise manager;
- Knowledge base management of metadata: SQL Server 2005 Meta data Services;
- Data conversion service: SQL Server 2005 Integration Services;
- Data Analysis tool: SQL server 2005 Analysis Services;
- Enterprise report management: SQL Server 2005 Reporting Services.

According to economic principles, money needs to be in circulation to produce benefits. For the purpose of profit for the enterprise, whether the profit or capital rose, it is impossible to idle. In addition to the part used to maintain normal production operations, there is a large part of the need to achieve value-added through investment. In order to achieve a high return on investment, enterprises need to find good investment projects, which is the investment decision.
4. Conclusion

Intelligent decision support system (IDSS) is a combination of artificial intelligence, expert system, knowledge base, the method base and other decision support technologies. On the basis of the intelligent decision support system, the data warehouse is built and the data in the data warehouse is processed and analyzed by combining with data mining tools, so as to provide support for the decision process of the decision-maker, which forms the intelligent decision support system based on data mining. In this paper, the author discusses the application of the data warehouse and an intelligent decision support system in the financial decision system, and puts forward a new decision support system solution. In recent years, object-oriented software development technology has made great progress, there are many ideas such as software system structure, design patterns, and to form a new train of thought and technology method, the emergence of these technologies for the development of the intelligent decision support system provides a more convenient tool.

Acknowledgments

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