Construction and Research of Computer Financial Comprehensive Analysis and Evaluation System

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Abstract: This article combines data warehouse technology with the construction of a financial analysis and evaluation system. Through demand analysis, system design, system implementation, research and testing, etc., a practical implementation plan is designed and planned to rebuild the enterprise's financial analysis and evaluation system. The comprehensive study of technology and management theory has further important implications for further deepening and refining data warehouse theory and financial analysis theory. This paper implements technical functions such as decision support, flexible query analysis, and dynamic adjustment of indicators for financial management by the financial analysis and evaluation system through the data warehouse, and proposes to further improve the management framework in the future to enhance the correlation between financial indicators and business indicators, and result indicators and process indicators. It can promote the new system and financial evaluation system to be more coordinated and synchronized.

1. Introduction

The main goal of modern enterprise financial management is to maximize enterprise value. The gradual improvement of my country's market economy system, accession to the WTO and the revolution in information technology will change the current development pattern of Chinese enterprises. Facing the global financial crisis, enhancing the enterprise's own value and improving its competitiveness have become the central tasks of my country's enterprise development. Due to the crisis spillover effect caused by the interconnection between foreign economic trade and capital markets, the deterioration of the US economy, the European economy and the Asia-Pacific economy will strongly impact the economic fundamentals of my country's international markets. This is a rather unfavorable economic environment facing the development of Chinese enterprises, but at the same time, the financial crisis is also an opportunity for Chinese enterprises to accelerate reforms and improve their competitiveness. Enterprises that survived the crisis will seize the opportunity in future market competition.

To enhance the competitiveness of enterprises, we must first improve the management level of enterprises, and improving the level of financial management is one of the most important links. In enterprise financial management, scientific evaluation of the degree of achievement of financial management goals and analysis of factors affecting the achievement of financial management goals are indispensable. The establishment of an evaluation index system for corporate financial management objectives, especially the establishment of a computer-aided evaluation system, can to a certain extent avoid the misjudgment of empirical evaluation and one-sided evaluation. Restrictive factors for the improvement of strength, continuously improve the company's own value [1].

2. Technical analysis

2.1 Data warehouse technology

Data warehouse is a collection developed on the basis of traditional database technology. It has the characteristics of relatively stable data, integration, accurate response and time relationship. It can provide an important basis for enterprise management to make decisions. It can extract extremely valuable data from a large number of daily transactional data, and then sort, convert and refine the value data to solve possible conflicts and inconsistent expressions in the data, and finally convert these data into a kind of The specified target data model is also integrated with the original data in the warehouse to provide decision makers with various types of effective data analysis and play a role in decision support. From the definition, it can be seen that the data warehouse is a method of integrating and integrating data resources. It is different from the database in the general sense. The data warehouse extracts and transforms data from various original heterogeneous databases. And use these data as the warehouse's own data, the purpose is to face decision support, to ensure the timeliness of data query and analysis. Compared with the characteristics of OLTP for data organization in traditional databases, the four basic characteristics of data in the data warehouse are: stability, integration, time invariance and subject-oriented. The data warehouse system mainly includes four levels of architecture, as shown in Figure 1.
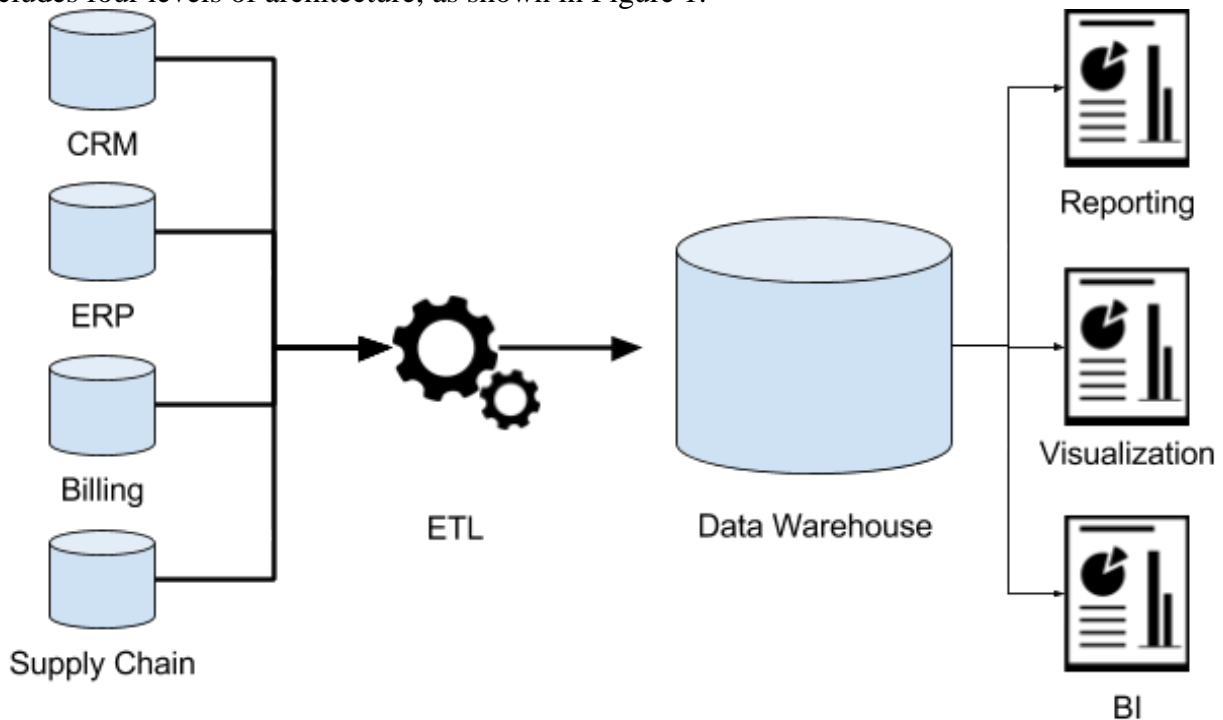

Figure 1. Data warehouse system.

2.2 OLAP technology

In order to be able to make correct and important decisions, users' demands for analyzing and querying large amounts of data are becoming higher and higher. The existing online transaction processing (OLTP) can no longer meet the growth of this demand. OLAP technology integrates and analyzes the data in the data warehouse, organizes and summarizes the data according to the mostly array model method, and then realizes multi-level and multi-angle analysis of the data, and online analysis and visualization tools realize the data The rapid evaluation of, and then the possible development trend of things, users can receive the results of analysis and query in time. Obviously, compared with the feature that the data warehouse is mainly used to store and manage data for decision-making topics, the online analytical processing technology OLAP can analyze and manage multi-dimensional data, which is precisely combined with the multi-dimensional data organization in the data warehouse. Supplement. The goal of OLAP technology is to meet specific query and report

requirements in a multi-dimensional environment, or to provide decision support. In this sense, OLAP is also a collection of multi-dimensional data analysis tools. Therefore, the core of OLAP technology is the concept of "dimension". OLAP technology finally displays the results of analysis and processing in front of users through multi-dimensional views, as shown in Figure 2 is the principle of OLAP technology.
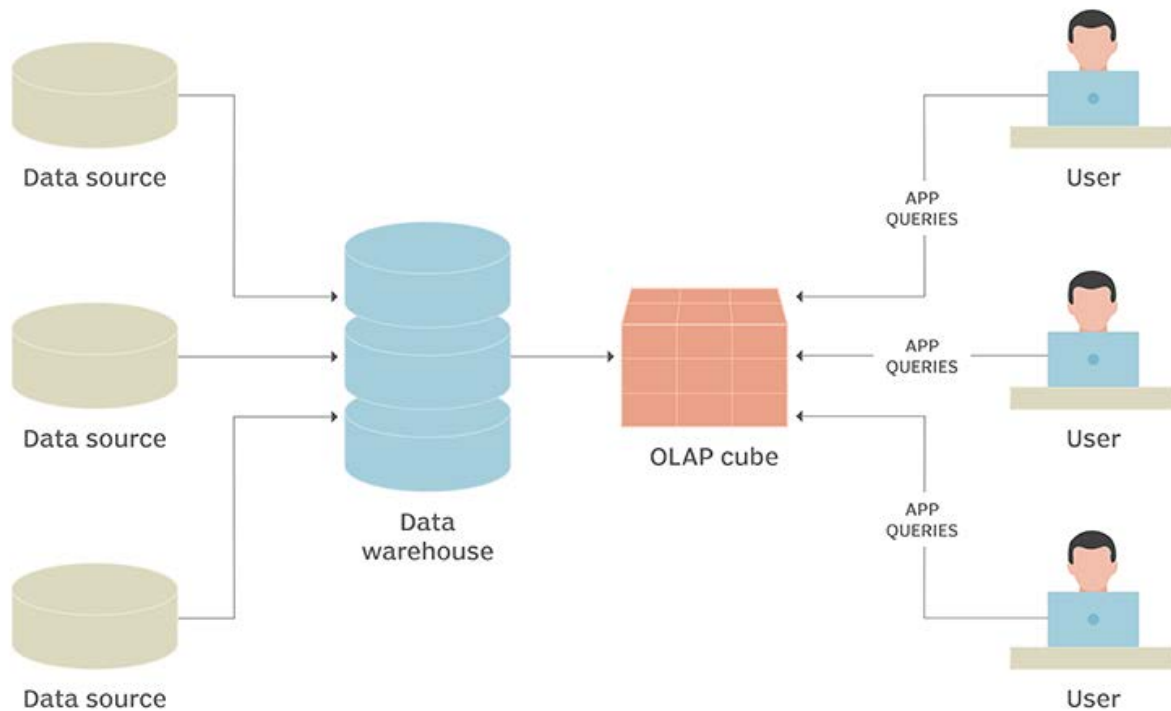

Figure 2. OLAP technology principle.

2.3 Financial Analysis System

Enterprise financial statements are collected, processed, and summarized by the company based on daily accounting data, reflecting the company's assets, liabilities, owner's equity status at a certain time, and business results and cash flow information during a certain operating period. Comprehensive written documents. To achieve good economic benefits, an enterprise must not only organize all financial activities seriously, but also make full use of the information provided by financial analysis to timely understand and understand its own financial situation, development trends, and potential problems. Financial analysis is the use of financial reports and scientific analysis methods by report analysts to analyze the financial situation and business results of a company for a certain period of time in order to comprehensively and objectively evaluate the performance of the company's business activities and correctly predict the future of the company's development, thereby effectively To make corresponding financial decisions. Through the analysis of financial statements, the profitability of the enterprise can be evaluated; the solvency of the enterprise can be analyzed; the asset operating capacity of the enterprise can be evaluated; and the development trend of the enterprise can be predicted, which provides the basis for the correct financial decision-making.

3. Demand analysis of computer financial comprehensive analysis system

The full name of CAE is comprehensive analysis and evaluation, which mainly refers to people through different aspects, different angles, and different indicators combined with different

evaluations, to transform certain self-evaluation data to reflect the characteristics and information of the evaluation object. Comprehensive analysis and evaluation systems are mostly used for complex objects, such as economy, society, technology, education, etc. The comprehensive analysis and evaluation system can effectively and quickly integrate planning, reducing the misunderstandings and errors produced by a single evaluation. In order to avoid the unity and one-sidedness of the evaluation, establish a corresponding model for comprehensive analysis and evaluation, so that an objective and accurate evaluation can be obtained. Nowadays, people's understanding of economic laws continues to expand and deepen, and more and more target evaluations have emerged, along with the increase in evaluation methods, evaluation objectives, etc. If these cumbersome data rely on human statistics alone, Unreachable. As we all know, China's computer technology has progressed with the continuous development of the Internet information era. Therefore, this cumbersome and complex data sorting problem can be solved completely by the existing computer application technology. First, an accurate and suitable for the enterprise must be designed. After the system is established, details, analysis models, analysis evaluation criteria, etc. must be added continuously. A complete system with perfect details, through the current advanced computer technology, can manage the evaluation system in an orderly manner. With the aid of computer technology, the original complex data also seems much simpler. Such a simple and user-friendly computer operating system can bring some convenience to non-computer professionals and management personnel in all walks of life. Since the programmer has set up the system, it is easy to operate. Such a system is indispensable for each enterprise, each evaluation object, and research object.

3.1 System functional requirements

According to the company's financial work requirements and financial management functions, combined with the actual situation of the current financial system, the goal of the company's new financial analysis and evaluation system is to enrich and improve the enterprise's financial evaluation index system and establish a new financial analysis based on data warehouse and OLAP technology The evaluation system has formed a set of closed-loop financial evaluation operation mechanisms, including four aspects of goal setting, monitoring analysis, evaluation and continuous improvement, which has effectively improved the efficiency of financial evaluation, reduced human intervention in the evaluation process, and enhanced users The ability to explore data has comprehensively improved the visualization of reports, making data presentation more intuitive and the system more operable [2].

3.2 Analysis of system performance requirements

In recent years, with the continuous acceleration of changes in the company's external environment and the continuous adjustment of internal business and the continuous adjustment of the company's business objectives, the performance of the past financial analysis and evaluation system has been unable to meet the company's development needs. To this end, based on the past financial analysis and evaluation system, the company still has a lot of work to be done, and the system performance needs to be improved. The performance requirement analysis of the system is shown in Table 1:

Table 1. System performance requirements analysis table.

System performance requirements	The authenticity of financial data is very important. To ensure the authenticity of financial data, we must strive for accurate data processing. In addition to possible human factors, the normal business data processing and calculation results of indicators require a 100% accuracy rate
Accuracy	The financial analysis and evaluation system are ultimately to serve the company's financial management work, which needs to be mastered by the company's management and financial personnel. This requires the system's friendly interface, simple operation, easy to learn and use, and beginners only need to carry out Simple training or no training
Ease of use	Financial data is of great significance to the company, and some even involve some business secrets, which requires the financial analysis and evaluation system to have high security, and the permissions of each user are strictly set to ensure that the information is not illegal. Tampering and illegal viewing
Safety	As an enterprise's financial analysis management system, it is necessary to ensure the smooth flow of financial data processing, and no data transmission congestion
Fluency	The authenticity of financial data is very important. To ensure the authenticity of financial data, we must strive for accurate data processing. In addition to possible human factors, the normal business data processing and calculation results of indicators require a 100% accuracy rate
Compatibility	Compatible with some commonly used software, such as: excel, IE. At the same time, it can support cross-platform transplantation, and can support UNIX series and Windows series platforms.
Adaptability	The system should be able to adapt to the continuous development of financial management, constantly improve statistical accounting methods, survey methods and indicator systems, so that the system has a wide range of adaptability

3.3 System operating environment requirements

The operating environment requirements of the system mainly include software and hardware environment requirements. Generally speaking, the software and hardware requirements of the system should not be too high. Appropriate software and hardware requirements can not only ensure the powerful functions and smooth operation of the system, but also enable the company's current equipment and software to meet the needs of the system.

Table 2. The software and hardware requirements of the system are shown.

Requirement name	specific requirement
Server-side hardware	CPUPIV2GHIGHER, 2-3GRAM, 80GHDISKHIGHER
Client hardware	500 and above CPU, 32M and above memory, available space 100M and above hard disk, 10/100M network card, display resolution 800X600 and above
Server software	XP/WIN2000, Tomcat, Oracle
Client software	IE5.0 or above, WIN98/XP/2000/LINUX, EXCEL

4. System design

4.1 System function design

The financial comprehensive analysis system is used to assist financial analysts to perform financial comprehensive analysis. Therefore, the main functions of the software system include DuPont analysis, Wall specific gravity analysis and financial crisis early warning analysis. In addition, when conducting a comprehensive financial analysis, the relevant financial indicator data is required, so it should also include financial data input and financial indicator calculation functions. The functional modules of the financial comprehensive analysis system are shown in Figure 3. The functional modules are introduced as follows:
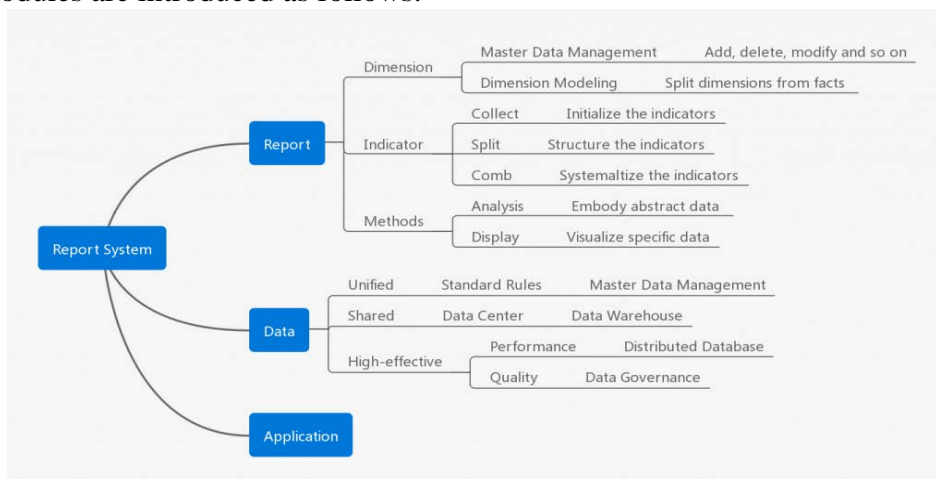

Figure 3. Functional module diagram of the comprehensive financial analysis system.

4.1.1 Data input module. Financial comprehensive analysis requires financial data. This module is to input the financial data required for financial comprehensive analysis, mainly to enter the data of the three major statements of the balance sheet, profit statement, and cash flow statement. In addition, you can also enter the internal report data required for the analysis (Such as variable costs and fixed costs). If the computerized accounting has been implemented inside the part, there is no need to input data, and financial data can be collected directly from the computerized accounting system [3].

4.1.2 Definition module of financial indicators. Comprehensive financial analysis is based on the analysis of a single financial indicator and requires multiple financial indicators. This module provides the function of defining financial indicators and provides a basis for the automatic calculation of financial indicators. Including the definition of financial indicator names, calculation formulas, data sources, etc.

4.1.3 Financial index calculation module. This module completes the data collection and index data calculation functions required for financial index calculation.

4.2 System overall architecture design

In order to meet the requirements of enterprise companies for the functional requirements of the financial analysis and evaluation system, we chose to use data warehouse and OLAP technology to store and calculate the data, and use B/S structure to structure and use the enterprise company's financial analysis and evaluation system. Application programming in ABAP language. In terms of application functions, it can be divided into the following three layers: customer display layer, business logic layer, and data layer. Different types of users require different graphical interfaces. The customer display layer can meet the needs of these users. Users submit access requests to the customer display layer through the Internet. The customer presentation layer and the user submit and

submit an application via the Internet. The business logic layer can separate the database code from the user presentation layer by encapsulating the model associated with the system. As the bottom layer of these three layers, the data layer can define, maintain, access and update data on the one hand. On the one hand, the application can satisfy the data request. The technical architecture design of enterprise financial analysis and evaluation system based on B/S structure is shown in Figure 4.
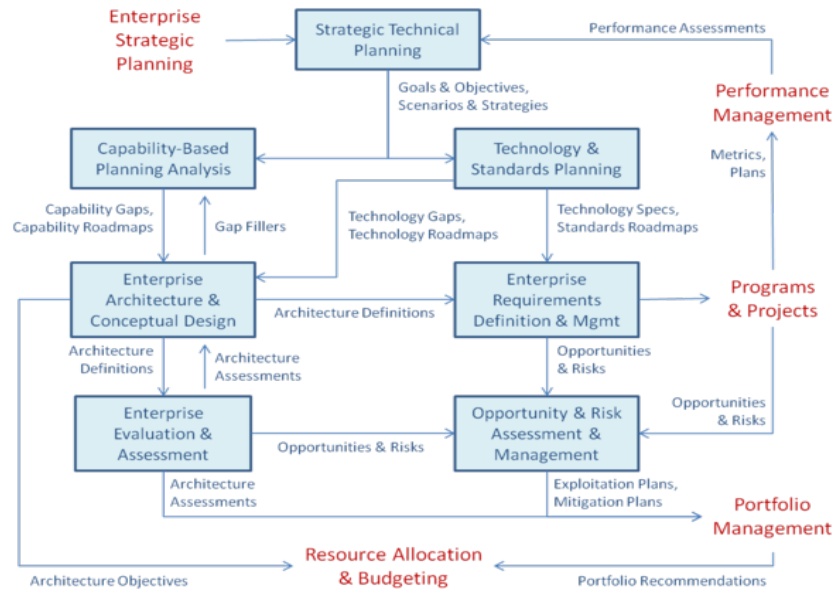

Figure 4. Roadmap of technical architecture of enterprise financial analysis and evaluation system.

In the structure shown in the figure, the system includes a three-layer structure: the user's working interface is realized through a browser, the front end of the logic of very few transactions is realized, and the server side of the main transaction logic is realized. Compared with the bloated client that requires the corresponding operating software to be installed on the user's computer for the C/S structure, the B/S structure client handles the main business on the server side, and all updates and maintenance are performed on the server side. The client's browser can be run, which greatly reduces the requirements on the client computer, and the maintenance and update costs and difficulties are greatly reduced.

4.3 Data warehouse implementation

The data warehouse can effectively meet the needs of the financial decision support system. It aggregates various types of summary and comprehensive information and financial details. In the enterprise financial analysis and evaluation system, the main role of the data warehouse is to provide data support for the analysis and evaluation of financial indicators to meet the needs of enterprises for management decisions. Data warehouse can be very effective in helping business leaders make analytical decisions. Through reasonable analysis, comprehensive data formed by using data from various parts of the organization. In the enterprise financial analysis and evaluation system, data sources, data query analysis and storage management, and front-end tools constitute a data warehouse. In this process, the data extraction system completed the extraction, loading and conversion of data. After planning the information resources and building the internal data source, this layer can convert and load data according to the established rules, and realize the inspection and organization of the data. The loading must be carried out under the control of two tools, which are

modeling and data management tools, and then follow the rules formed during the modeling process [4].

4.3.1 Data organization structure of enterprise data warehouse. The data warehouse must process the original data, further synthesize it according to the detailed data, and summarize it into summary data or even professional analysis data. This is exactly the function of the data warehouse: to help the daily data of scattered and difficult-to-access enterprises be processed and transformed into unified and usable information. The outdated data will exist as historical data. Therefore, after processing and processing the original data, you can get a four-layer data structure, they are: professional analysis data, summary data, current detailed data and historical detailed data. As shown in Figure 5.
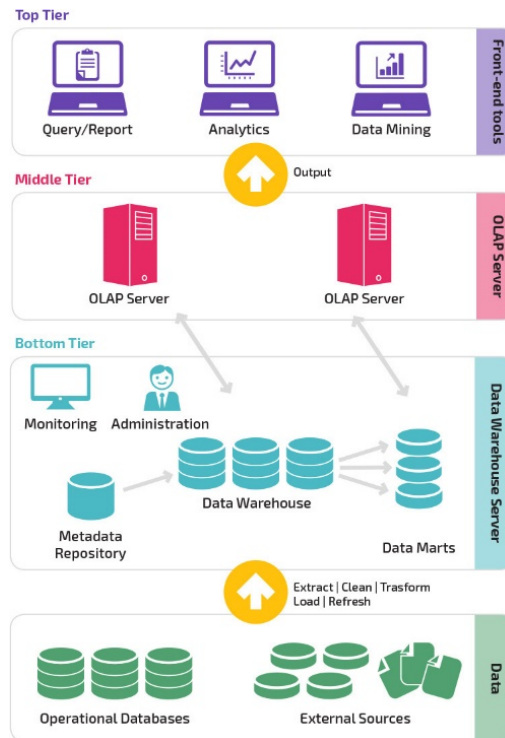

Figure 5. Data organization structure of the data warehouse.

4.3.2 Logistic model design of data warehouse. As an important concept of a data warehouse, the degree of integration and refinement of data is called granularity, and the data referred to her refers to the data units stored in the warehouse. Among them, the detail of the data is inversely proportional to the degree of comprehensiveness, and the degree of comprehensiveness, granularity, and level are directly proportional. As shown in Figure 6, we need to use a dual granularity storage granularity, because the amount of financial data that is loaded into the data warehouse every day is very large. It must be said that only the detailed data of the last six months can be saved in the data warehouse, and the detailed data of more than six months will be converted into comprehensive data and stored in the backup equipment.
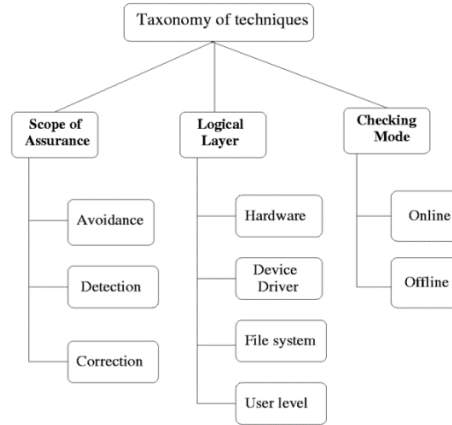
Figure 6. Double granularity storage data.

5. Neural network of enterprise financial evaluation algorithm design

In this study, the radial basis function (RBF) neural network, which is more advanced in theory and has stronger nonlinear mapping capabilities, is used as the evaluation model of corporate financial management goals. Radial basis function neural network is a new type of forward neural network with good quality. Its hidden layer unit is a local receptive unit taking radial basis function. Practice has proved that the RBF network can not only approximate any nonlinear function with arbitrary precision, but also does not have the local minimum problem. In recent years, RBF neural networks have attracted extensive attention from researchers in the fields of pattern recognition and data mining. The RBF neural network consists of three layers, and its structure is shown in Figure 7. The input layer nodes are passed to the hidden layer nodes, and the weight is fixed at 1. The hidden layer is composed of a group of the same radial basis functions. The output layer of the network is a simple linear representation of the hidden layer output. The radial basis function generally takes the form of Gaussian kernel function. Among them, x is the n-dimensional input vector, c_i is the center of the ith radial basis function, a vector with the same dimension as x, and σ_i represents the amount of a radius range, which determines the width of the symmetric hidden node response. M is the number of hidden layer sensing units. Euclidean $\|x-c_i\|^2$ represents the Euclidean norm of the vector $x-c_i$. From the form of the Gaussian kernel function, it can be seen that at c_i, the response value of the hidden layer node reaches the maximum, and as $\|x-c_i\|$ increases, $R_i(x)$ rapidly decays to zero. For a given input $x \in R_i$, only a small part of the input value close to c_i is activated. Therefore, RBF network has local approximation ability. The output of the network is:

$$y_k = \sum_{i=1}^{m} \omega_{ik} R_i(x) \tag{1}$$

Hidden Layer

Input

$3W_{11}^{(1)}$
$3W_{12}^{(1)}$
$3W_{13}^{(1)}$
$5W_{21}^{(1)}$
$5W_{22}^{(1)}$
$5W_{23}^{(1)}$

$a_{11} = f(Z_1^{(1)})$
$Z_1^{(1)} = 3W_{11}^{(1)} + 5W_{21}^{(1)}$

$a_{12} = f(Z_2^{(1)})$
$Z_2^{(1)} = 3W_{12}^{(1)} + 5W_{22}^{(1)}$

$a_{13} = f(Z_3^{(1)})$
$Z_3^{(1)} = 3W_{13}^{(1)} + 5W_{23}^{(1)}$

$a_{11}W_{11}^{(2)}$
$a_{12}W_{12}^{(2)}$
$a_{13}W_{13}^{(2)}$

Output

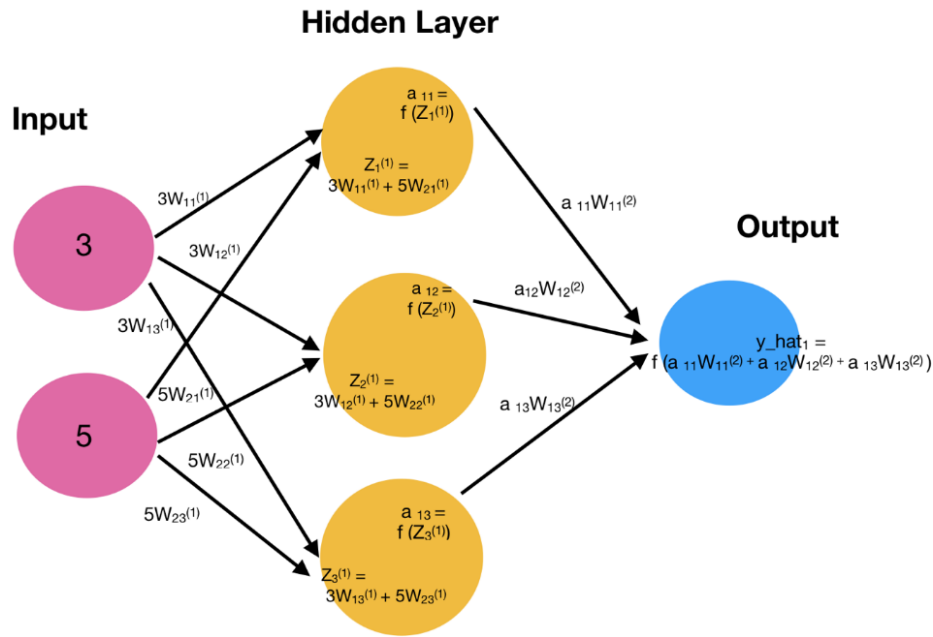$y\_hat_1 = f(a_{11}W_{11}^{(2)} + a_{12}W_{12}^{(2)} + a_{13}W_{13}^{(2)})$

Figure 7. Artificial neural network model diagram

Taking 11 indicators in 5 categories selected in the previous section as the input of the evaluation model, and RBF network as the evaluation model, we can learn and train the collected financial management samples of each enterprise. After the RBF network model converges, the learning process ends. At this time, in the center of the hidden layer node of the RBF network, the width of the radial basis function, and the connection weight between the hidden layer and the output layer, the "knowledge" of enterprise financial management objective evaluation is implied. The outstanding advantage of using this method is that as the collected corporate financial management samples increase, the evaluation model can continuously "update" its implicit "knowledge", so as to keep pace with the times. For example, the company's financial evaluation index system and strategic goals can be closely combined, and the company's financial evaluation index system can be selected according to the company's development strategic goal research, so that the company's financial evaluation management work can effectively promote the implementation of the company's strategic goals, in order to improve the management and management level of Chinese enterprises Lay the foundation [5].

6. Conclusion

It is necessary for enterprises from all walks of life to establish a complete financial comprehensive analysis and evaluation system. At the same time, the management personnel of the enterprise operator can summarize the data obtained through the financial comprehensive analysis and evaluation system accordingly, so that work problems and enterprise management problems in the recent period of time can be found, so that the first Time to make corrections, a good management system can not only help the enterprise to develop better, but also help the enterprise avoid unnecessary risks, which is beneficial to the enterprise.

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