

Research Article

Design and Implement of Food Enterprise Finance System Based on Big Data

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Abstract: As the application of the information system, the complicated financial business was firstly embedded in the OA system to support the whole food enterprise. The cash flow and financial management of one company has a seriously fluency in the competition when the modern social economy is developing. One single financial system which integrates the complexity financial business and its calculation can produce a visible and simplistic food enterprise management and provides the explicit data for the business. In the big data era, the food enterprise management faces many challenges, in this study we use the related data of finance sales that the ESL system collects and import it into SQL Server 2008 R2 database. Using the integration services, analysis services, reporting services integrated in SQL Server 2008 R2 database to transformation, analysis and display the retail data. Through this work it can help the food enterprise finance s to improve the use value of business data and achieve the efficient conversion of data into information, which can help food enterprise managers to make decisions about marketing.

Keywords: Big data, business intelligence, food enterprise management

INTRODUCTION

With the rapid development of computer network technology, the information resources in the industry has been developing and application, the improvement of information networks, the application of information technology to promote industrial development, information technology, these are displayed by the information technology in modern society in the increasingly important role, becomes more and more prominent (Bughin *et al.*, 2010; Zhu, 2007). At the same time, higher college education dimensions expands ceaselessly, form diversified. In the external environment changed greatly under the background of financial management, reduce cost, improve financial management level and quality, further causes the food enterprise finance management informatization, science is changed, become the development direction of food enterprise financial management system (Milton, 2010).

The rapid development of modern era of world economy, the wave of change in science and technology continue to impact everyone daily lives, modern information transmission is no longer restricted by time and space and economic globalization makes businesses more intensified competition, risk also growing wider, traditional food enterprise finance management has been unable to meet the requirements of social development (Laberge, 2012). Therefore, food enterprise finance management information emerged, along with making our food enterprise finance management work has undergone enormous changes. As an integral part of the national strategy, food enterprise finance management information occupies an

important position in the national economy (Hilbert and Lopez, 2011). The competition of modern food enterprise is not among the single food enterprise with a single food enterprise, but a competition between the food enterprise supply chain and others (Wang and Wang, 2008). The finance as a blood and lifeline of food enterprise was always the basis for a means of corporate strategic planning. With the development of food enterprises, the vast amount of data was generated by the huge financial system and complex corporate business as well as the complex accounting calculations. Those are the important problem of business development that is focused to be solved. The financial management system will be designed better along with the development and application of information technology improvement (Laahs *et al.*, 2005).

Our country has a large number of small and medium food enterprises (Seliger *et al.*, 2007). As a national economy basic unit of the food enterprise, its information level influence national information construction (Lu, 2010). They are playing an increasingly important role in China's economic development, the small and medium food enterprises are facing an era full of opportunities, but they are also facing significant competitive challenges at home and abroad, they need modern IT tools for business food enterprise finance management information, such as purchasing, decision making and so on. The applications sales process management activities inventory, operations, finance is the future trend. According to the corporate life cycle theory, these small and medium food enterprises are in urgent need

of food enterprise information, the food enterprise finance management information is the core. However, due to lack of funds for small and medium food enterprises, brain drain, the scarcity of resources, management loose and other factors, food enterprise finance management information technology development has been relatively slow. Small and medium environment and experience constantly financial food enterprises face a tough survival difficulties. How to raise the overall level of small medium food enterprises food enterprise finance management information is a long way to go. food enterprise finance management information technology development has not only limited account turned from a hand-made changes in food enterprise finance management software applications in fact, has been the transition to cloud computing to new applications implemented in the new period. Cloud computing platform provides a powerful computing capability with App engine, users take advantage of various types of engines to achieve the required financial applications, adapt to the needs of different types of small and medium food enterprises food enterprise finance management facile, food enterprise finance management information technology reduce the food enterprise finance management threshold for small and medium food enterprises, cloud computing provides technical support for enhancing the level of small and medium food enterprises food enterprise finance management information effectively. Food enterprise finance has been one of the world's largest industries, not only the retail business' rise and fall will directly affect the development of the national economy, but also it is closely related to the life of us (Morris, 2000). Today the informatization degree of food enterprise finance is high and most of the food enterprises of retail industry has established the food enterprise management system to manage the daily operations such as sales, storage management, financial and other business. As the business data in the food enterprise management system accumulated, how to make good use of these data to effectively analyze and monitor the food enterprise operation, has become the focus of the business' further informatization, so the big data business intelligence system will play an important role.

MATERIALS AND METHODS

Electronic Shelf Label (referred ESL) is an electronic display device which is placed on the shelf and can replace the traditional paper price tag. The electronic shelf labels are connected with the shopping malls computer database through wired or wireless networks and display the latest commodity price. The ESL system can help collect data that is associated with the sale of goods and we can import these data into the SQL Server 2008 R2 database, through the integrated Business Intelligence tools (BIDS) we can transform

these data into useful information which can help food enterprise finance managers to make business decisions to improve profits.

SQL Server 2008 R2 is a comprehensive database platform, the integrated Business Intelligence tools (BIDS) can provide data management solutions for food enterprise effectively. SQL Server 2008 R2 provides data Integration Service (SSIS), data Analysis Service (SSAS), Reporting Service (SSRS) and other services in business intelligence, SSIS can integrate the business data needed by BI from a variety of heterogeneous data sources and SSAS can construct cube, then OLAP realize data mining. The SSRS can make the data analysis result meet various users' needs in the form of a report or graph. Share Point 2010 provides various technology to display the report in the Web interface. The Reporting Services Web Part of Share Point 2010 can directly integrate and show the reports in the portal, the Business Data Catalog (BDC) can extract and display the background application data.

The overall architecture: The informatization of food enterprise finance relates to food Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Customer Relationship Management (CRM) and Sales Management System (SMS) systems. Basing on the business process of food enterprise finance we integrate the system data of ERP, CRM, SCM and SMS as business data sources and use the SQL Server 2008 R2 to clean, extract, transform and create data warehouse. Using OLAP online analytical processing technology to realize the data mining. Further we take use of the existing information resources and visual display technology to realize the display and analysis of relevant business model, which can provide scientific decision for sales, finance, inventory, purchasing and other business units.

The overall architecture shown in Fig. 1.

We need to build a cloud storage environment, records from food enterprise, pictures captured by the collection boxes and clients information records in the personal cell phone are transmitted over the network. After data pre-processing, information is integrated into a unified comprehensive database of information. Resource storage virtualization enables data storage can be dynamically extended to achieve information synchronization and sharing. What's more, information security is one of the most important consideration in our design. All operational behavior of the document can be recorded and log in authentication mechanism is necessary and file data stored in the platform has high strength encryption. Taking these needs, build a private cloud storage platform to meet these requirements.

RESULTS AND DISCUSSION

Data analysis: After the process of ETL a data warehouse is established and we can analyze the data according to the demand. SSAS is the tool of SQL Server 2008 R2 for data analysis, in this study we can

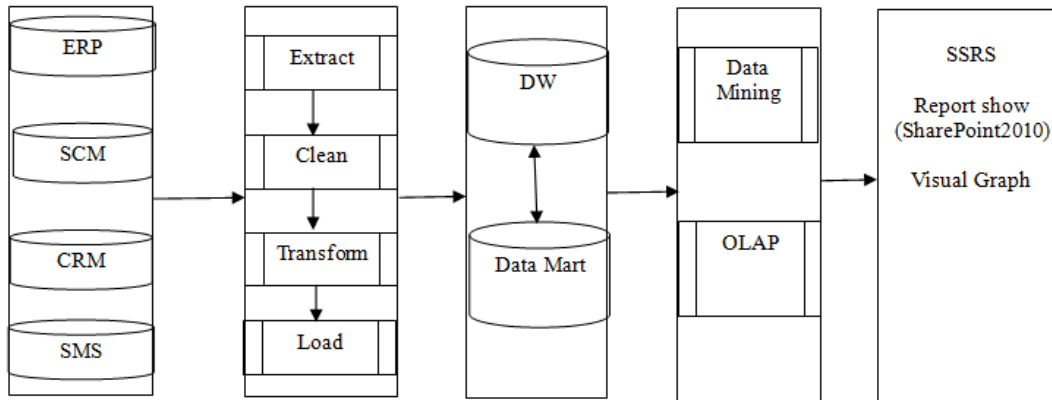


Fig. 1: The overall architecture

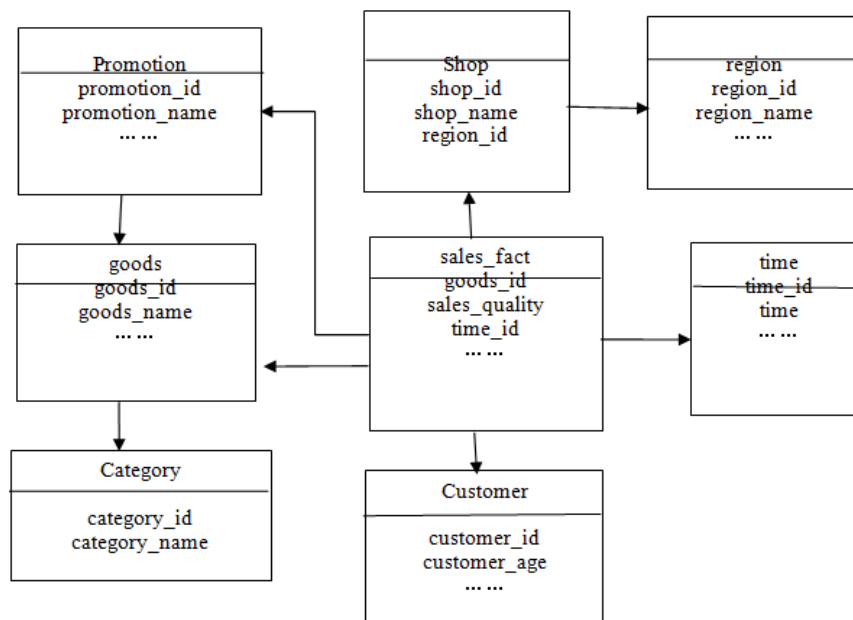


Fig. 2: The structure of tables in the data warehouses

regard customers' consumption as main line to analyze the customers' age, gender, spending habits and correlate consumption.

The structure of tables in the data warehouse is shown in Fig. 2.

In this study we use Apriori association rules algorithm to analyze the data in the data warehouse, Apriori is the most representative association rules algorithm. By iteration we can find the frequent item sets in the data warehouse and we take use of the frequent item sets to construct the rule of minimum confidence:

- Step 1:** Find the 1-item sets and regard it as L_1 , if it can't find the 1-item sets, it will stop the algorithm.
- Step 2:** Use the L_1 to find the candidate item sets C_2 then make judgment to each component of C_2 and find 2-item sets namely L_2 .

- Step 3:** By loop operation it will find more k-item sets, then it will count k-item sets.
- Step 4:** Judge whether all the rule is suit to the minimum confidence, if it is suit the rule is right.

In generally association rules are large databases or data system, the expression of the association rule is $A_1 \wedge A_2 \wedge \dots \wedge A_m = > B_1 \wedge B_2 \wedge \dots \wedge B_n$ and the A_k ($k = 1, 2, \dots, m$), B_j ($j = 1, 2, \dots, n$) are the support of data item in the database, namely the percentage that one transaction includes A, B, the formula is $Support(A = > B) = P(A \cup B)$. Confidence is the percentage that one transaction contains A and it also contains B, that's the conditional probability $Confidence(A = > B) = P(A|B)$. Association between data items is called data association, according to some items appear in one transaction we can deduce some other items will appear in the same transaction. Dig out the association between

Table 1: The original data

Date	Ticket id	Goods id	Goods name
2014-5-6	9900000984	06001	Shampoo
2014-5-6	9900000984	10002	Toilet paper
...

Table 2: The result of association analysis

Consequent	Antecedent	Support (%)	Confidence
Shampoo	Toilet paper	8.845	21.631
Toilet paper	Shampoo	9.207	30.012

Table 3: The original data

Sale date	Product name	Sales	Amount
2010-01-04	Electric car	1800	18
2010-01-04	Electric car	6000	80
2010-01-04	Basketball	1800	6
2010-01-04	Basketball	2700	9
...

the data is the purpose of association analysis. By association analysis it can help the food enterprise finance look for the potential users to adjust the sales decisions.

For example, according to the original data Table 1, use the Apriori algorithm integrated in the SSAS to analyze the data we can know the probability of each commodity in the sales record and we can also know the probability that when a commodity appears in

one sale record another commodity appears in the same sale record. Therefore we can know what categories of goods can be regarded as bundling-sale. Take the shampoo and toilet paper for example, we can see the result in Table 2.

According to these results the following conclusions can be drawn: 8.854% of the total customers buy toilet paper and the customers who purchased the shampoo accounted for 21.631%. (9.207%) of the total customers buy shampoo and the customers who purchased the toilet paper account for 30.012%. It can be concluded that shampoo and toilet paper can be bundling-sale.

The report generation: SQL Server 2008 R2 integrate the component SQL Server Reporting Service, make it possible that the right information can be passed to the right people in any commercial environment. Reporting Service is a complete platform that is deployed on the server, you can use Reporting Service to create, manage and deliver traditional and interactive reports. Meanwhile the standard modular design of the product and the API enable software developers, data providers and food enterprises to integrate legacy systems or third-party reports.

product_name	2010/1/4	2010/1/5	2010/1/6	2010/1/7	2010/1/8		total
electric car	¥21,900.00	¥8,250.00	¥11,700.00	¥2,550.00	¥11,100.00		¥55,500.00
basketball	¥12,300.00		¥12,180.00	¥16,200.00	¥21,900.00		¥62,580.00
bi ke	¥2,850.00	¥3,300.00	¥13,350.00		¥8,850.00		¥28,350.00
total	¥37,050.00	¥11,550.00	¥37,230.00	¥18,750.00	¥41,850.00		¥146,430.00

Fig. 3: The display of report result

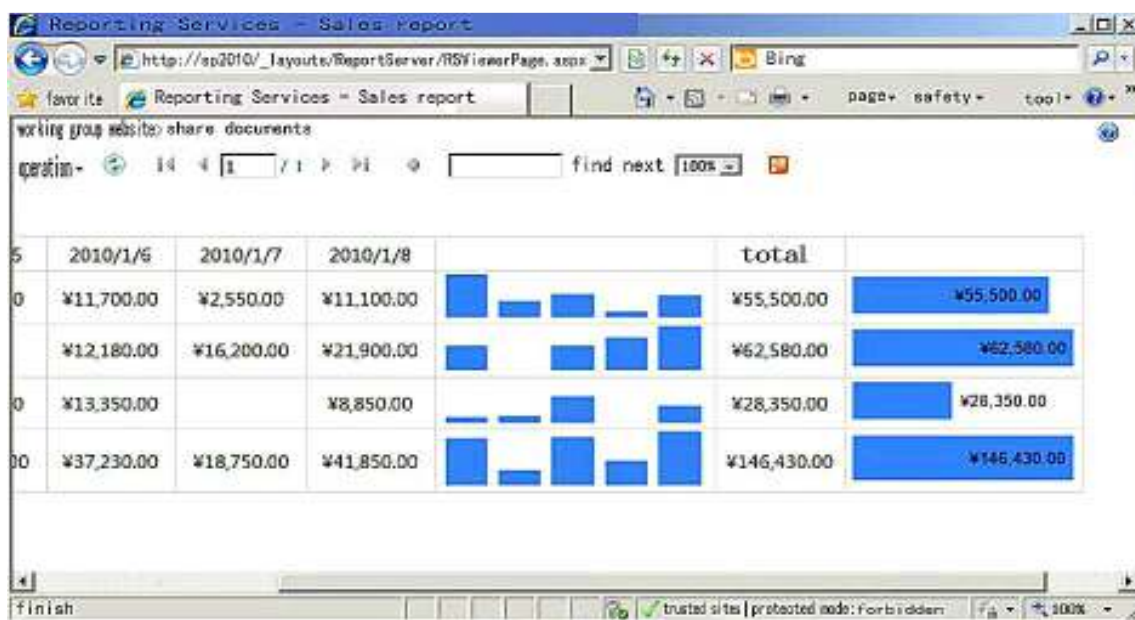


Fig. 4: Share point 2013 web parts

For example the original data table shown in Table 3 can be used to make Reporting Services reports shown in Fig. 3. The result of sale can be offered to the manager.

The report display: Share Point 2013 provides work flow extensions based on Microsoft Share Point platform for business users, users can quickly and easily design task forms and business processes without writing code. Therefore it can help business users to further expand the content management of SharePoint platform. That the report server integrate with the instance of Share Point 2013 can make report items stored in the content database of Share Point 2013. So we are able to view the reports in the content database of Share Point 2013 directly through Share Point 2013 web parts.

When opening the report from Share Point 2010 site, the report server endpoint will perform the following actions: connect to the report server, create a session, process the report, retrieve the data, show the report in the report viewer web parts. When the report is open, the report can be exported as different form. The report server and Share Point 2013 operate and synchronize the data and track the information that about the report server handle the file. If we modify the attribute of items or set of any server, it will be recorded in Share Point 2013 server.

For example, the result that we view the report through the Share Point 2013 web parts is shown in Fig. 4.

CONCLUSION

Under the background of big data, data has become the precious wealth. As the continuous accumulation of food enterprise finance data, how to make good use of the accumulated huge amounts of data is the key that ensure the food enterprise finance succeed in the market competition in the 21st century. In this study, a solution about business intelligence is put forward and it has been implemented. The solution can be as a reference for food enterprise finances to realize business intelligent management. This food enterprise finance system has a friendly interface, interactive, easy to use,

easy to find, high reliability, large memory capacity, security and good, long life and low cost, you can achieve school finance scientific, standardized management, which greatly improve the efficiency of financial management, the daily management of the Treasury, has important theoretical significance and application value.

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