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Structure Of Customer Relationship Management Systems In Data Mining

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ABSTRACT

As a young research field, data mining has made broad and significant progress. Today, data mining is used in a vast array of areas, and numerous commercial data mining systems are available. On the basis of detailed analysis of the existing CRM structure, a new design scheme of customer relationship management systems based on data mining is presented and the design details of which are illustrated in detail.

Keywords –Customer Relationship Management, Data Mining.

I. INTRODUCTION

Customer Relationship Management (CRM), is favored by more and more enterprises under the impact of modern information technology. There is a growth of understanding of that market competition is the competition for customer resources. Enterprises must rely on customers to achieve profitable. In the fierce market competition, in order to maintain superiority and long-term and stable development, we must attach importance to customer relationship management. And only continued to gain and maintain valuable customers and achieve customer demand for personalized, in-depth excavation in order to achieve the corporation-customer win-win.

In the market environment with high degree of disturbance, the intensified competition intensity, the highly refined products, the increasingly saturated market, the increasingly convergence of the product quality and service characteristic, and the short product life cycles make the customer choose more ample, the buyer market increasingly growing, the customer transfer costs declined and the customer life cycle shortened. Under such circumstances, how to improve the customer transfer costs, extend the customer life cycle and maximize the customer profits become problems the enterprises need to solve. At the same time, the uncertain increase of customer demand, the growing trend of individuality and diversification, and the intensified changes make the operational risks of enterprise increased significantly. The high market disturbance makes that the business concept which regards product management as the centre faces enormous challenges and leads to that the relationship management with The center of customer becomes the inevitable choice of enterprise management strategy. Therefore, the profits from customer relationship has become the blood of all enterprises, and the three basic ways to increase profits which are obtaining new customers, increasing the profitability of existing customers and extending customer relationships have gained wide attention.

II. CRM AND DATA MINING

Since 80s of 20th century, the applications of various high technologies make it's difficult to cut down vast majority of products' cost. At the same time, the tendency of economic globalization makes the competition in market more intense. In such double pressure, more and more enterprises turn their gaze to customers. Customer relationship management generate in this context. Gartner Group put forward a complete CRM concept in 1993. The group think that "CRM is organizing businesses by focusing on customer segmentation, it encourages acts of meeting customers' needs and achieve the link between customers and suppliers and using other means to increase profits, revenue and customer satisfaction. It's a business strategy across the entire enterprise."

This kind of customer relationship management, customer-centric business strategy, is based on information technology. It restructures the work processes in order to give businesses better customer communication skills, maximize customer profitability. Customer relationship management typically includes the whole processes that determine, select, seek, develop and maintain their clients to implement. The main objective of its management is to increase efficiency, expand markets and retain customers.

And data mining, also known as Knowledge Discovery in Database, KDD, is from a large database or data warehouse to extract people are interested in knowledge that is implicit in advance unknown, the potential useful information. Data mining is data processing in a high-level process, which from the data sets to identify in order to model to represent knowledge. The so-called high-level process is a multi-step processing, multi-step interaction between the repeated adjustments, to form

a spiral process. The knowledge of mining expresses as Concepts, Rules, Regularities and other forms. CRM Data mining is from a large number of relevant customer data in the excavated implicit, previously unknown; the right business decisions have the potential value of knowledge and rules. Technically, customer relationship management data mining system using infiltrated the way; you can automatically produce some of the required information. Deeper mining are also needed enterprises statistics, decision sciences and computer science professionals to achieve.

Clustering Analysis is a widely used data mining analytical tools. After clustering, the same types of data together as much as possible, while the separation of different types of data as possible. Will be a collection of objects divided into several categories, each category of objects is similar, but other categories of objects are not similar. Adoption of clustering people can identify dense and sparse regions, and thus found that the overall distribution patterns and data among the interesting properties of mutual relations. Such as the enterprise customer classification, through the customer's buying behavior, consumption habits, and the background to identify the major clients, customers, and tap potential customers. There are many clustering algorithms, this means using K-means algorithm. K-means algorithm is a specific means: for a given number of classes K, the n objects assigned to a class K to go, making within-class similarity between objects the most, while the similarity between the smallest class.

III. DATA MINING IN CRM SYSTEM

Data mining uses some mature algorithms and technologies in artificial intelligence, such as artificial neural networks, genetic algorithms, decision tree, neighboring search methods, rule-based reasoning and fuzzy logic. According to the different functions, the analyzed methods of data mining can be divided into the following types: classification, valuation, correlated analysis and clustering.

Data mining technology is not only the simple retrieval, query and transfer faced to special database, it also should do microcosmic and macroscopically statistics, analysis, synthesis and reasoning to guide the solving of practical problems, find the relationship between events, and even use the existing data to predict future activities.

The basic data mining process is composed by the following steps

Fig. 1 Data Mining Basic Process

1.1 Data mining in CRM system

Data mining technology is not only the simple retrieval, query and transfer faced to special database, it also should do microcosmic and macroscopically statistics, analysis, synthesis and reasoning to guide the solving of practical problems, find the relationship between events, and even use the existing data to predict future activities. In order to achieve data mining, now a number of software tools have been developed and formed many aspects of a number of products in the customer relationship management, such as customer evaluation and subdivision, customer behavior analysis, customer communication and personalized services. The action of data mining in CRM is represented as the following aspects:

1.1.1 Customer characteristics multi-dimensional analysis

It refers to analyzing the customer characteristic demand. The customer attribute description should include address, age, sex, income, occupation, education level, and many other fields, and can be carried multi-dimensional combination analysis and quickly presented with the list and the number of customers which accord with the conditions. For example: customer subdivision model is an effective tool of typical customer identification and analysis and the compendia data provides the basis for customer categorization and subdivision.

The course, a subdivision standard must be defined firstly, for example, according to the profit

contribution of the customers they can be subdivided into high-profit customer groups, the profitable customer groups, profit margin customer groups, non-profit customer groups and deficit customer groups, which separately corresponding to gold customer, emphasis customer, hypo-emphasis customer, common customer and deficit customer.

1.1.2 Customer behavior analysis

It refers to analyzing the consuming behavior of certain customer group combining customer information. And according to different consuming behaviors changes, individuation marketing strategies will be established and the emphasis customer or the customer with the trend of loss will be selected.

For example: through the setting of standards users automatically monitor some basic indicators and data of operation run and timely compare them with conventional, standard data, when more than a certain percentage the abnormal warning will be advanced. Many customer behavior changes may mean that customers have "left" tendency, therefore, their behaviors should be identified in time and the efforts should be made before the customer decision.

1.1.3 Customer structure analysis

Through the statistical analysis (a particular unit time interval for statistics) of the various types of It refers to the analysis of customer contact and customer service. According to the analyzing result of customer concerns and customer tendency, understanding and mastering their needs and providing the communication content they interested in the most appropriate time through their preferred channels, which can enhance the attractiveness of the customers.

At the same time it can improve the subordinate institution capacity of differentiated services, achieve the customer-focused product development and optimization, distribution channel management and customer relationship optimization, and improve the overall marketing and customer service levels.

1.1.4 Sales analysis and sales forecast

It includes the analysis according to products, sales promotions effect, sales channels and methods. At the same time, it also analyzes the different effects of different customers to business benefit, analyzes the effects of customer behavior to business benefit, this makes the relationship between business and customer.

1.2 CRM system design based on data mining

1.2.1 CRM system structure

Based on the analysis of existing CRM structure and according to the analysis of CRM core idea, here a CRM structure based on data mining is built, as shown in Figure 2

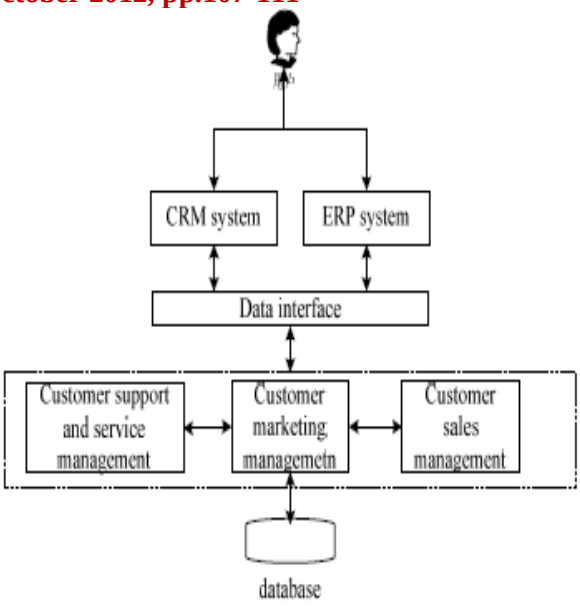

Fig. 2 CRM Structure Based on Data Mining

The whole system can be divided into three layers: the interfacial layer, the functional layer and the layer of support. The interfacial layer is the interface to interact with users, access or transmit information, and it provides intuitive, easy-to-use interface for users to access to the necessary information conveniently; the functional layer is composed by the subsystem with basic function in CRM, each subsystem as well as includes a number of operations which form a operational layer; and the layer of support includes database management system and operating system.

1.3 Functional Design of CRM System

The functional structure of the system is designed in accordance with the top-down principle, which is gradually target system decomposition process; it divides the whole system into several subsystems and enables them to complete the functions of the various subsystems, the system functional modules are shown in Figure 3

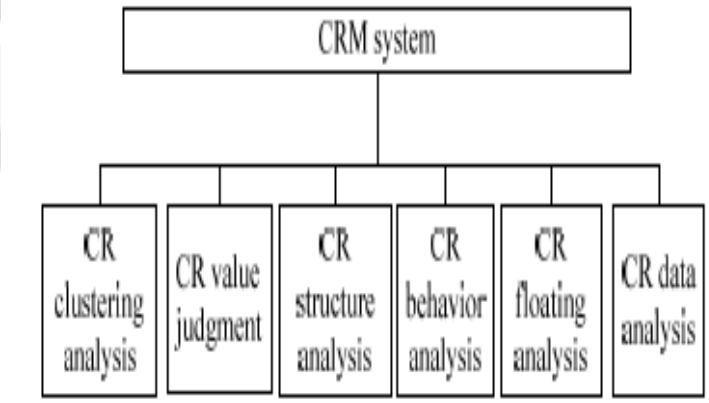

Fig. 3 Functional Design of CRM System

1.3.1 CR Clustering Analysis

CR clustering analysis module subdivides the customers according to customer values. Because that for each enterprise the customer values standards are different, so it is needed to carry out customer clustering subdivision for the existing customers of the enterprises, set the corresponding customer level and give class marker for the customers according to the customer value by using the clustering result.

There area total of five category markers, that is, high-value customers, customers with the most growth, ordinary customers, negative value customers and new customers.

1.3.2 CR value judgment

According to the result of the customer clustering analysis, the CR value judgment uses C4.5 decision tree algorithm to establish classification model and describe the specific characteristics of various types of customers. And in accordance with the different characteristics of various types of customers it also may adopt corresponding processing means, which guides enterprises to allocate resources to the valuable customers in the aspects of marketing, sales, services, gives special sales promotions for the valuable customers, provides more personalized service to enable enterprises to obtain the maximum return on minimum investment.

1.3.3 Customer structure analysis

Through the statistical analysis (a particular unit time interval for statistics) of the various types of customer characteristics, customer structure analysis helps the marketing manager to make marketing decisions; and through the vertical comparison of the customer structure, it provides an important basis for the management work of the customer relationship evaluation and adjustment.

The activities the customer relationship management concerned are four: access to new customers, keep old customers, customer structure upgrading and the overall customer profitability improvement. And according to these, the customer structure analysis regards the rate of new customers, customer retention, customer promotion rates and customer profitability as the four analyzing goals

1.3.4 Customer behavior analysis module

Customer behavior analysis module mainly analyzes the customer satisfaction, customer loyalty, customer responsiveness and the cross-selling. Maintaining long-term customer satisfaction and customer loyalty contributes to the establishment of customer relations and ultimately improve the company long-term profitability. Customer responsiveness analysis can effectively guide the sales and marketing behavior, improve the past sales without goal and reduce the cost of sales.

It also can do correlation analysis for the existing customer purchasing behavior data, find the cross-selling opportunities, provide more comprehensive services to customers and consequently bring greater benefits to enterprises.

1.3.5 Customer loss analysis

Through the observation and analysis of the customer historical transactions, enterprise endows customer relationship management modules the function of customer warning abnormal behaviors. The system makes the warning signs to the potential loss of customers through automatically checking the customer transaction data. And the customer loss prediction analysis can help enterprises to find the lost customers and then adopt measures to retain them

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1.3.6 Data management

The data management is to maintain and manage the customer information, transaction information, rule information and other related data, and it enables operators to quickly find or modify the required relevant information.

1.4 DATA MINING IMPLEMENTATION

The mining can be implemented in two steps: the first step, selecting the average customer purchase sum and purchase number, and using the method of clustering for the classification of customers, thus each customer has an affirmed category; second step, using decision tree model to build decision tree for customers, to do further classification analysis on the customer characteristics.

IV. CONCLUSION

Many companies increasingly use data mining for customer relationship management. It helps provide more customized, personal service addressing individual customer's needs, in lieu of mass marketing. As a chain reaction, this will result in substantial cost savings for companies. The customers also will benefit to be notified of offers that are actually of interest, resulting in less waste of personal time and greater satisfaction.

To enterprises, CRM is not technology, but a management style, but also a business strategy. It is difficult for enterprise to meet the customer specific needs if it only implements a generic CRM solution. This will require that the enterprises can implement different solutions step-by-step and ultimately form an overall CRM solution, and can achieve personalized management and implementation. At the same time enterprises also need to continuously improve the CRM system to better manage the customers. It can be believed that the CRM system will become the essential system for enterprise survival and development, and the CRM system will be further mature with the development of technology and management thinking to play a more

significant effect role in the whole development of the community.

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BIOGRAPHY

S.Thiripura Sundari, a very enthusiastic and energetic scholar in M.Phil degree in Computer Science. Her research interest is in the field of data mining. It will further be enhanced in future. She is equipping herself to that by attending National Conferences and by publishing papers in International Journals.

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