

## **Data Mining and Customer Relationship Management**

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*Abstract: In recent years, the application of data mining technology in customer relationship management is a research hotspot. Successful customer relationship management enables companies to obtain good customer relationships and gain competitive advantage. Through the integration of business practices and data mining technologies, potential and useful information is explored to increase customer value, loyalty, and satisfaction, reduce business costs, and maximize corporate profits.*

*Keywords: Data Mining, Customer Relationship Management.*

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### **1. INTRODUCTION**

With the continuous development of the economy and the intensification of market competition, companies have also actively changed their business management models. They have changed from traditional products and scales to customer-centered ones, and realized customer value while pursuing maximization of corporate profits. Fostering customer loyalty and building a good customer relationship is a way for a company to survive and survive in the long term. In order to obtain a satisfactory customer relationship, companies implement customer relationship management programs by identifying customers, customer differentiation, customer interactions, and customer personalized services, to increase customer delivery value and customer loyalty, and maximize corporate profits.

The enterprise development CRM project helps the marketing staff to develop the business, thereby optimizing the sales process of the marketing staff [1]. On the other hand, it uses the data mining technology in customer relationship management to extract valuable data from a large number of customer data. Information, thereby formulating policies and directions for service development after the company. The data warehouse established by CRM stores a large amount of customer data. Most of these data are data acquired by daily business operations. Therefore, data mining technology is required to extract, clean, process and process massive customer data, and to mine potential information. , Understand the industry development trend, sum up the existing facts and experiences, analyze the key factors affecting the business development of the company, and coordinate the resources and relationships of all aspects of the company to achieve the purpose of reducing costs and increasing revenue.

## **2. RELATED WORK**

### **2.1 Customer Relationship Management**

In 1999, Gartner Group first put forward the concept of CRM [2]. It believes that customer relationship management can have a new management perspective, which helps enterprises to conduct all-round management, more perfect their customer communication capabilities, and maximize customer profitability. Carlson Marketing Group believes that customer relationship management is to maintain the company's performance by retaining customers through the understanding and preference of customers, distributors, and company employees [3]. The Hurwitz Group believes that the focus of CRM is on customer relationships and the business processes associated with them. Customer relationship management not only represents a set of theory or principle system, but also a set of software and technology. Through advanced technology and software, customer-centric, reduce costs, increase revenue, improve customer satisfaction and loyalty [4]. IBM believes that customer relationship management encompasses an entire business process, from business identification, selection to acquisition, development, and retention. Based on this, IBM divided CRM into three categories: relationship management, access management, and process management.

There are different opinions about the definition of customer relationship management. Different institutional scholars have different representations and comprehensively define all customer relationship management. Shao Bingjia believes that we can integrate customer relationship management into three levels: concept, technology, and implementation. Among them, concept is the key to the success of customer relationship management. It is the basis for implementation of specific customer relationship management applications. Information technology is a method and means for successful implementation of customer relationship management, and implementation is the direct result of whether customer relationship management can achieve the expected results. Factors, ideas, technologies, and implementation constitute the "triangles" of customer relationship management. The core idea can be summarized as "Organization to provide products or services, find, retain, and enhance value customers, thereby increasing the profitability of the organization, including the economy. Benefits and social benefits, and strengthen competitive advantage."

### **2.2 Data Mining**

Data mining is the process of extracting from the large number of incomplete, noisy, ambiguous, and random practical application data the hidden information that people do not know in advance but is potentially useful information and knowledge [5]. From a business point of view, data mining is a new type of business information processing technology. It extracts, converts, and analyzes massive data in databases, extracts potential knowledge and useful information, and forecasts future trends. Information that is conducive to the operation of the company and improves its competitiveness will promote the development of the company.

Data mining methods include regression analysis, cluster analysis, fuzzy sets, machine learning, neural networks, decision trees, and genetic algorithms. Many methods are involved

in practical applications, and corresponding data mining methods can be adopted according to actual application needs [6]. To get the target information. Data mining firstly selects the target data that needs to be mined, preprocesses the data, and then converts and analyzes the extracted and cleaned data, extracts related information, and builds a model through cluster analysis, regression analysis, and so on. After the model evaluation, the actual data can be analyzed to reach a conclusion.

Data mining can discover a large amount of useful information hidden in data. It has a wide range of applications in practical applications, especially in the commercial fields such as banking, telecommunications, insurance, transportation, and retailing. It can solve typical business problems and help companies make Strategic decision-making, ultimately achieving a win-win situation between the company and its customers.

### **3. APPLICATION OF DATA MINING IN CRM ---- ANALYSIS FROM CUSTOMER LIFE CYCLE**

#### **3.1 Customer Life Cycle**

Customer life cycle begins with a customer starting to understand the company, or starting from the company wants to develop a customer, the company establishes customer relationship with the customer until the customer relationship is completely terminated, and the relevant period of time after all the related matters are processed belongs to a customer. Life cycle. The customer life cycle is actually the evolution of the product life cycle, depicting changes in the customer relationship over time. It is generally divided into five phases: potential acquisition period, growth period, maturity period, recession period and termination period.

When a customer starts to understand the business, or the company develops certain customers in a certain area, the customer enters the potential acquisition period. All customers in the specific area belong to the company's potential customers. The input costs of the company it is to investigate these potential customers. Companies invest a lot of resources to understand potential customers and identify target customers.

In the customer growth period, the customer relationship develops rapidly, and the company's resource investment will be much less than the potential acquisition period. At the same time, the company has successfully developed the target customers, and the customers also have certain business contacts with the company. The company's investment is mainly to develop existing customer relationships with a view to increasing customer loyalty and satisfaction. In fact, in this period of the transaction, the company's income has exceeded the investment and began to obtain profits.

In the mature period of customer, the customer relationship between the enterprise and the customer has reached maturity. At this time, most of the business or even all the business of the enterprise have business contacts with the customer, the transaction volume is further expanded, the investment of the enterprise has been greatly reduced compared with the initial period, and The customer gains a high profit in a large number of transactions, and the customer makes great contributions to the company during this period.

When the customer relationship is reversed, it is the customer's recession period. Although the customer's own total business volume has not declined, the transaction volume with the company has gradually declined or even declined sharply. Customers or companies have begun to consider the termination of existing customers. The relationship seeks new partners at the same time, of course, companies can also increase investment to retain customers, different measures taken by the company will bring different input and output efficiency.

When there is no longer any transaction between the customer and the company, there is no longer any business transaction. This means that the current customer relationship is completely over and the customer life cycle is completely terminated. Even if the enterprise reinvests certain resources, it will not be able to recover the lost. Customer relationship, so that only investment and no revenue.

In different periods of customer relationship, the factors influencing the customer's decision-making are different. The customer's satisfaction and loyalty to the company also changes to some extent with each business transaction. Enterprises should fully consider all aspects of factors, grasp the characteristics of customer relationships at different times, adjust supply strategies in a timely manner according to customer needs, provide corresponding personalized services, and carry out different strategic inputs to reduce business costs as much as possible. Businesses benefit from achieving a win-win situation for customers and businesses.

### **3.2 Data Mining in Different Customer Life Cycle Stages**

When acquiring potential customers, despite the lack of customer data of the target group, these data can be excavated according to past customer reactions to similar activities that will be taken, and different corresponding feature populations can be concluded if they are based on high-value customers [7]. Responsive to the conditions for excavation, then the final target of the target population is likely to be the target customers to be acquired. At this time, it is usually through mass media such as advertisements, newspapers, and social media that the activities developed by the company allow as many people as possible to understand, and then compare the results of collecting potential customers with the results obtained by data mining. To identify potential customers.

Once these potential customers respond to corporate publicity by logging in to corporate websites, filling out forms, and other means, we get the corresponding information of potential customers. Although these customers have not really purchased the products and services of the company, they have very It is likely that it will conduct further business contacts with the company and develop from potential customers to corporate customers. Data mining can deal with these response information, filter out respondents who are likely to become corporate customers, lock down and track potential customers, and at the right time, through appropriate means such as SMS, notifications, and telephone calls. The customer communicates business-related business information to attract this part of the customer to purchase company-related products or services.

When potential customers purchase the company's products or services, they are transformed from potential customers to corporate customers. Whether or not this part of the customer promotes the purchase of the company's products due to price incentives or sales promotion, their purchasing behavior will generate corresponding data. Through the processing and excavation of these data, it is determined which of the customer's Business activities are attracted to judge what kind of business they are interested in. In a large number of customer transaction data, through data mining technology to discover the valuable information hidden in it, analyze the customer's buying behavior and consumption patterns, and maintain a good customer relationship according to each customer's specific provision of specific services.

There are mainly two kinds of customer loss, one is to leave actively, and the other is to leave passively. Before the customer leaves, he can find out the trend of leaving before he can excavate the data of the consumption situation in the recent period. At this time, the company can take measures to retain the customer or let the customer leave. In the database has left a large number of customer transaction data, companies can use data mining to analyze the circumstances under which customers will leave, or what measures can be taken to retain customers, or how to regain lost customers.

#### **4. CONCLUSION**

In the practice of customer relationship management, it is usually necessary to make an in-depth analysis of customer behavior to understand the characteristics of the customer, and to take corresponding measures to maintain customer satisfaction and loyalty, and to achieve the goal of maximizing corporate profits. For example, many related businesses in the banking industry, insurance companies, and government agencies need to make in-depth understanding of customers before they can make appropriate decisions. Data mining can fully realize the extraction and mining of large amounts of data or reports and extract potential usefulness. Information helps companies make the right decisions. Beer and diapers are the most typical examples of the combination of the two.

With the extensive application of CRM and the continuous development of data mining technology, people can use data mining technology in CRM to extract useful information hidden from massive data, establish and maintain good customer relationships, and realize customers and businesses. Win-win situation.

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