Increasing the Efficiency of CRM Process Using Data Mining Practices

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Abstract: In recent times the customer relationship management (CRM) has been achieved an increasing fame in business administration. CRM comprises all the steps which an organization utilizes to create and establish valuable relationships with the customers/clients. Using technologies such as data warehousing and data mining (DWDM) CRM can be launched as a new area where organizations can increase the competitive benefit. Via CRM system a company can improve its processes to deliver better service at a lower cost. By use of data mining techniques, organizations can mine unknown information of the customers from large relational databases. So, organizations can conclude the value of customers and forecast their future actions and requirements. Data mining (DM) tools can reply business questions which were time-consuming to track in the earlier period. It is possible to improve CRM efficiency, to have an efficient and rapid response to customer requirements, by integrating or combining CRM and DM techniques. In this study, the main concepts of CRM and DM techniques are investigated and employed in CRM. This study show that using of DM techniques in CRM will progress CRM's efficiency and provide a better forecast capability to industries, companies and organizations to achieve more productivity.

Keywords: customers; data mining; CRM; efficiency; organizations

I. INTRODUCTION

In modern days, mass production and new advertising techniques has changed the concept of conventional contest in the marketplace. Today, customer's ability to access the products is being increased. In this competitive condition of the market, one of the most significant principles for organizations is to maintain in good relationship with their customers/consumers, in order to guard their long term association. Currently, only the companies which alter their perspective about marketing can achieve more importance and high level of success and reputation. In today's competitive advertising, the organizations must modify the theories which were only based on generating and selling. They should focus on new marketing strategies which are based on new marketing techniques and customer privileges. CRM is one of the systems which may have an important authority on organizational decision making process. CRM assists companies to collect information based on present and future customer requirements and demands.

With CRM coordination a company can progress its processes to distribute better services at a lesser cost. Definitely, in today's international financial system, CRM issues have inspired organizations to rethink in their old policy to communicate with customers and capture a wide range of facts. The procedure of data collecting and processing grows quickly. So, in order to stay alive in today's competitive marketing world, companies considerably require analyzing huge amounts of customer's data. The company's most valuable asset is the information which is related to customer buying prototypes. Ability to progress knowledge about customers and marketplace will enable the business vendors to better offer their services and products. DM is one of the recent advances in database management knowledge. DM techniques are used in search of consistent models. The DM method is used to discover and trends concealed in large quantities of data into database format and data storage. DM is a technique that can help companies to progress towards customer-oriented marketing (COM). The aim of this study is to show

that it is possible to develop CRM efficiency and to have an effective and rapid response to customer requirements, by integrating CRM and DM techniques **[1, 2]**. So, to do this, we will examine major concepts of CRM and DM in this study. Using DM techniques in CRM can improve CRM's effectiveness. So, it can provide better forecast ability to organizations, companies, and industries to attain more prosperity.

A. Customer Relationship Management:

CRM consists of a set of methods and systems that supports business tactic to support long-term and profitable relationships with customers. Customer's data and information technology (IT) tools are the crucial factors for any successful CRM. In addition, rapid internet is increasing and its related technologies have changed relationship and communication ways among companies and their consumers. So the opportunities for marketing/advertising have been increasing today. Although the CRM has been widely known as a significant technique for business growth. CRM can be defined as enterprise approach to understand and influence on customers' needs through significant communications, in order to attract customers, customer faithfulness, customer's retention and customer productivity. This definition highlights the significance of CRM as a complete process to attract and retain customers, to increase customer value relationship for organizations. In closed-loop for CRM, there are customer's recognition, customer's attraction and customer's growth.

B. Customers recognition:

CRM begin with the recognition of customers. This phase includes finding the indented population, the population which may be favorite and commercial for any organizations. This stage includes the customer analysis and customer categorization steps. Analysis of customers includes searching for profitable customers via their essential characteristics. The customer classification includes isolating customers into smaller groups. In this step moderately related customers will classified in a same group.

C. Customers attraction:

After identifying the budding customers, the organizations can straightforwardly attracts the customers. A component to attract customers in direct marketing is defining a procedure that encourages customers to order their desired products through various channels. Direct E-mails or coupons are good examples of the direct marketing.

D. Customer growth:

This stage includes growing number of communications, transaction value and customer productivity. The components of customer growth are: study of customer's life-time value and promotion activities which their objective is to boost the number of services a customer will get in the business. Market analysis objective is to maximize customer's transactions and expose trends in customer's performances.

II. APPROACHES OF CRM

The first condition for successful execution of the CRM is clarity about the idea of the CRM. Among the diverse approaches which exist in this area, the following three areas are separate:

Operational CRM: This technique maintains face to face business and activities with customers. For e.g., answering centers (Staff of phone).

Analytical CRM: It provides logical information about customer segmentation, customer's performance and customer's worth.

Collaborative CRM: This technique focuses on relationship incorporation with customers using the appropriate communication channels. For e.g., telephone answering centers.

CRM is familiar as a central customer management (CCM) approaches, so that information system provides necessary data to support CRM developments in the above three categories: Operational CRM, Analytical CRM and Collaborative CRM. Companies can increase customer productivity and customer retention using CRM.

Customer retention is a very significant issue in all business, especially in small and medium businesses. Because in these businesses the resources are partial. In addition to that, disappointed customers make the organization weak. Because they harm organization's rivalry, also they try to encourage other customers to avoid deal with the organization. It is clear that CRM is a significant issue in the business world. The key investigators of CRM believed interests and advantages of CRM can be searched based on each businesses structure separately. But the results of the recent examinations in several countries and industries show that the interest of CRM in different industries and countries does not change very much. The main benefits of CRM can be stated as below:

- » Improve capabilities in aiming money-making customers.
- » Practical incorporation of communication with customers.
- » Improve sale forces efficiency and value.
- » Personalized advertising communication.
- » Make products and services Proportional.
- » Improve competence and effectiveness in customer services.
- » Improve pricing capabilities.

III. DATA MINING

DM is one of the current developments in line with database management technologies [3]. In truth we could say that DM is a relatively new technical research area in the field of statistics and machine learning. The purpose of DM is to discover the knowledge from raw data. Extracting unknown knowledge form stored data and information in databases can be essential and important in business and direct marketing. This extracted knowledge can help and support companies to make better and more intelligence decisions. So, in this way powerful decision support systems (DSS) is developed, which help organizations to progress their business and direct marketing processes. Figure 1 shows the process of knowledge discovery from data warehouse (DW) DM in modern decades has been developed very fast with the support of the technologies and sciences such as statistics, artificial intelligence and machine learning. Table 1 shows some of the application and methods of DM.

Database management techniques have significant role in the increased use of information and reduced storage space costs. The quantity of collected and stored data rapidly increased during the past decade. With this rapid and remarkable growth of data which are collected and stored in various databases, we need some powerful tools for analysis. Without these tools collected and stored in databases are not competent and useful. One other hand, decision making based on information stored in the database may be more valuable and more intelligent. Amount of existing data are doubling every 4 years. So organizations must be able to supervise their data. DM is a very vital and powerful technique which can help organizations and business to manage this huge amount of data. Via DM organizations are able to extract useful knowledge about customer's behaviors to expand and make better their business and direct marketing.

A. Integration of Data Mining with CRM

The CRM is a main theory with multiple layers and DM can be considered as an important layer of CRM [4]. DM assist companies to move toward customer oriented techniques. Customer's life term refers to different levels of communication among customer's and business. Accepting the customer's lifetime is a significant issue, because it is directly in association with incomes and the customer's expected value. Vendors believe that there are three ways to boost customer's value:
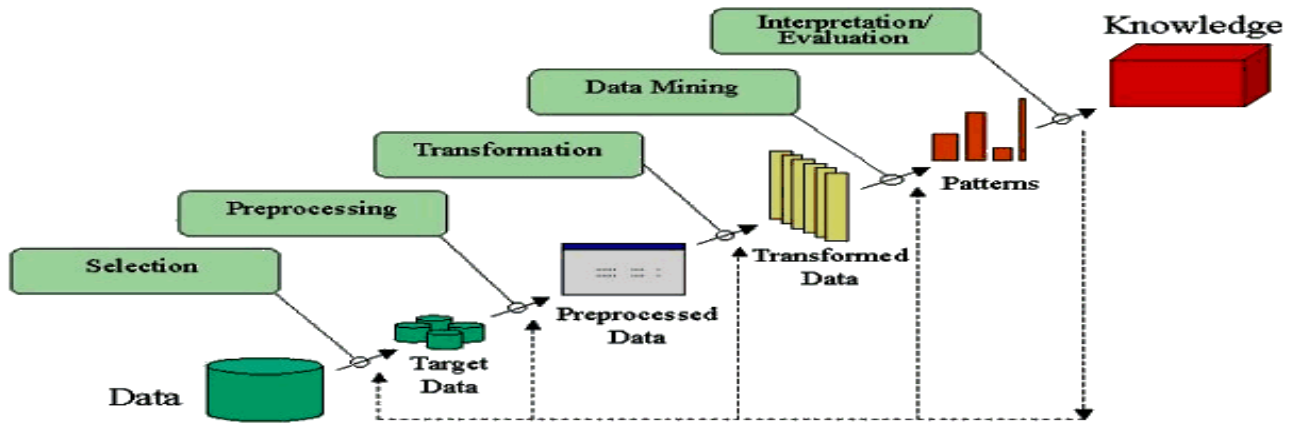
Dr. C. Sunil Kumar et al.,

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Figure. 1: Process of knowledge discovery from data warehouse

Table 1: Applications and methods of DM

Functions	Applications	Techniques
Classification	Customers classification	Neural Networks
Forecasting	Customers retention	Decision tree
Clustering	Identify violations	Nearest neighbors
Determining relationship of variables	Data Analysis in Marketing Analyze and predict of Stock market	Conclusion of law
…	trends	Genetic Algorithm

Refers to different levels of communication among customer's and business. Accepting the customer's lifetime is a significant issue, because it is directly in association with incomes and the customer's expected value. Vendors believe that there are three ways to boost customer's value:

» Increase customer's purchase of products.

» Customer's profits are based on higher sales of products.

» Customer retention is vital for very long time.

Customer's existence is a general structure to know customer's activities and include the subsequent four basic steps:

» **Vision:** Customers who are not among our customers now, but they are located in the target market.

» **Dynamic Customer:** People who have recently used our products or services.

» **Past Customer**: Bad customers who have unpaid their bill, which creates a high cost.

Customer's lifetime offers a suitable structure to use DM for CRM. From internal aspects, this series tells what information is available and from outside aspects tells what is most likely attractive for customers. DM can forecast study productivity in some cases, such as customer's activation, the time they were active and how they are depart products. DM can be used over a period of time to exactly predict changes. DM assists organizations to classify the customer's data patterns or knowledge. For e.g., a company can use DM to expect a specific incident in customer's life span. DM plays a vital role in the overall procedure of CRM that interacts with data center and also has communication with the management software. There was manual relationship between DM software and management software in the past. It often involves the physical record from data models and transforms them into databases. This weak association among DM and software wad caused underlying inefficiencies and human mistakes. Currently there are more inclinations to include these two components to achieve competitive gain.

B. Advantages of Using Data Mining in CRM

Some advantages of using DM in CRM are as follows:

» Fast and precise access to information for easy answering to customer queries.

> » Refining data to remove duplicated data.

> » Mining, administration and top-down access to data for customer's productivity analysis and to achieve customer retention representations.

> » Integrated data and sophisticated tools for data analysis and reporting.

> » Response to quickly changing business settings and customer requirements.

> » Increase customer's satisfaction and faithfulness.

> » Attract new customers and boost market share.

As cited in earlier sections, CRM is one of the most practical areas of DM. In general, DM has been entered in all fields of CRM, particularly in customer retention field. This point of the CRM is considered as central module of CRM cycle and has great significance. Customer happiness which refers to the difference among the customer's present condition and his hopes are considered as a necessary requirement for customer retention. Customer's faithfulness programs, which are located in this phase as one of the major components, include efforts and supportive activities with the objective of retention the long term associations with customers. Customers perform mechanical analysis; quality of services (QOSs) and customer satisfaction are considered as customer loyalty programs [5]. According to investigations, almost all DM tools have been used in CRM area.

Figure. 2: Cycle of CRM

C. Data Mining and Analytical CRM

DM is the method of extracting earlier unknown information, clear and potentially useful knowledge from stored raw data in DWs using pattern recognition (PR) techniques, numerical and statistical methods. Two main goals of the DM are forecasting and description. Predictive DM provides a model from system where this model can be forecasted by a set of particular data. Its overall objective is to provide a model for classification, prediction and assessment of data. Descriptive DM offers new information based on a set of data. Its overall purposes are accepting and analysis systems by using of knowledge and relationships. CRM is one of the most essential applications of DM. CRM has played a vital role in formulating the strategies related to project customers [6]. Basically the aim of CRM is establishing a deep and strong connection with customers to increase their value and lifetime in the society. The analytical CRM can be a good background for the DM techniques. Figure 2 shows the CRM cycle. It shows how to realize the customer via customer's behavior analysis. DM techniques can be used in this section by CRM, deal to the rules and patterns of customer's indefinite behavior.

IV. CONCLUSION

Today, growing access to information and recent changes in demand and supply process has altered the power from suppliers to customers. Consequently, importance can be achieved through understanding customer's requirements and making personal contact with customers. These days, institutions try to employ the CRM systems to decrease their weakness in

communication with customers. To select a suitable technology for the CRM, organizations must recognize applications and software's which are related to DM. The key of success in CRM is having an efficient strategy to manage the data of DW and also have essential capabilities to analysis customer's communication with business data. DM can help the companies to move in the direction of customer oriented methods. Using DM organizations can recognize the customer's data patterns. So, it enables the business vendors to better recommend of their services and products. Generally, integration of CRM and DM can provide an efficient response to customer's requirements; improve the QOSs and eventually fast response to environmental changes.

Acknowledgment

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