DATA MINING STRATEGIES AND TECHNIQUES FOR CRM SYSTEMS

Dr. Abdullah S. Al-Mudimigh, Zahid Ullah , Farrukh Saleem
Department of Information System
College of Computer and Information Sciences
King Saud University ,Riyadh
Kingdom of Saudi Arabia
mudimigh@ksu.edu.sa, zahid@ksu.edu.sa, farrukh800@ksu.edu.sa,

Abstract –**Whenever millions of data is being stored in database regularly, data mining is responsible to discover the hidden knowledge, rules and patterns from it. Data mining is going to be involved in every organization for extracting extra information which are not visible for everyone. Organizations always planning to get useful information from it. Though, study on customer relationship management (CRM) is reaching more practical and attractive factor for the growth of every organization in the same way, discovery the hidden gold is also supporting to achieve the goal and for the success of organization. The main critical success factor for any (CRM) includes, Marketing Management, Customer Support Management, Sales Management and Facilities Management, etc. In this paper we proposed, analyzed and validated that data mining is also a major success factor in the success of CRM. We first presented the CRM model and then explained the main role of each feature, then we add data mining feature in the CRM model. Further more, we applied data mining strategies and techniques for the generation of new rules and patterns. We talk about that within the boundaries of CRM strategies the data mining tool also play an affective and valuable role for the establishment and growth of the organization.**

Key Words – Customer Relationship Management, Critical Success Factor of CRM, Data Mining Techniques

1. INTRODUCTION

Customer Relationship Management (CRM) is very important for any organization through which the companies wanted to know the relationship between customers and their organization. A good companies need to identify the problems of customers and enhance the cohesion between customers and their organization. In the past years the CRM has become the successful part for every organization.

CRM is the utilization of customer related information or knowledge to deliver relevant products or services

to customers [1,2]. Customer satisfaction provides bottom-line business results in the form of increased purchased volumes, repetitive purchases, and generation of new business in the form of references and prospect identification [3].

CRM, is specially for the change of business process to making remarkable growth in an organization, but reaching on the required goal; depends on the leadership, which is going to implement the CRM. Because we know that, Leaders do not command excellence, they build excellence. Excellence is "being all you can be" within the bounds of doing what is right for your organization [4].

For implementing best CRM, different success factors are available in which most popular includes, sales management, marketing management and technology management etc. But we proposed in this paper that data mining can also play a successful part in CRM. Different data mining tools are available to extract the information from the customer database and analyse the problem of customer to enhance by the organization for attracting more customers for buying and selling of products to their organization.

The first and simplest analytical step in data mining is to describe the data, i.e. summarize its statistical attributes, (such as means and standard deviations), visually review it, using charts and graph, and look at the distribution of values of the field in your data[5].

Using the association rules in data mining techniques to analyze in detail customer transactions can learn which products might be purchased by customers at the same time, and based on the rules for combining popular products, marketing personnel or corporate decision makers can formulate more appealing marketing plan or operational rules and actively offer products that might interest the customers[6].

In Fig. 1 S.C. Hui, G. Jha, presented the scenario of traditional hot line service center, in which

whenever a customer call to the service center for any query, the call will be forwarded to the service engineer. The service engineer then suggest and ask the series of questions for finding the solution by using previous experiences from the database[7].
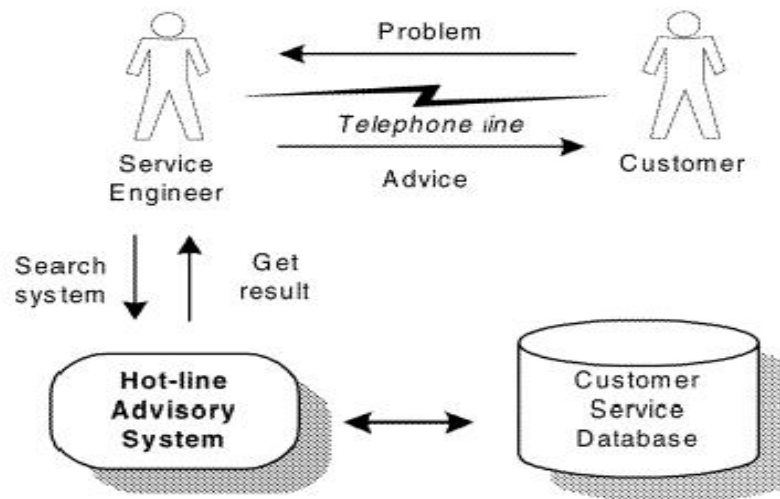

Fig. 1. Traditional hot-line service centre.

2. RELATED WORK

Vince Killen [8] used data mining tools and find out that these tools are very helpful and faster in data extraction of information for the company. These tools serve as the backbone driving CRM systems and have enabled the measurement frameworks in place today. *James et-al* [9] used the online approach for extracting the data of the customers by using automated software and scripts to download the relevant web pages and extracted the appropriate information from the web pages.

Herbert Edelstein [10] described that, data mining makes it possible to achieve this goal, by making sense of large amounts of complex data on customers and transactions. CRM applications that use data mining are called analytic CRM. Analytic CRM makes it easier to select the right prospects from a large list of potential customers. Data mining can help companies offer the most appealing array of products to existing customers or identify customers the company is at risk of losing. The result is improved revenue because of a greatly improved ability to respond to each individual contact in the best way, and reduced costs due to properly allocating resources.

3. THE CRITICAL SUCCESS FACTORS OF CRM

The business strategy, process, culture and technology that enable organizations to optimize revenue and increase value through a more complete understanding and fulfillment of customer needs. CRM involves all of your organizations "Customer Touch Points" and includes every part of your company that has direct or indirect interaction with your customers and prospects [11].

Finding the key to success for a CRM solution is no different than finding the key to success for the deployment of a technical enabler to any other business problem. You begin by defining what the business wants to improve, what it takes to realize this improvement, and how the results will be measured[12].

4. METHODOLOGY

The main purpose of this paper is to analyze that data mining is the part of CRM. For the implementation of CRM most of the

organization is put emphasis on marketing and business strategies only, but we proposed that data mining is also a successful factor of CRM. We applied data mining techniques on each and every part of CRM, which give us more suitable and steadfast result for the growing organization. We proposed Rule Based data mining technique for this model to generate new rules and patterns by using sales, marketing, IT and customer's data. We clustered the customer's data by using several characteristics of customer to recognize and understand the customers. Every customer need satisfaction within the organization boundaries and limitations as well as every company need that every customer should be deal under the excellent and agreeable environment, for this the respective company implement good tactics and procedures for the customer's satisfaction. We proposed here in this model the association mining techniques for finding loyalty and background of the customer, and making some prediction for the contacting customer.

4.1 Description of CRM Critical Success Factors:

The description of critical success factors of CRM are given in Table 1, below:

Table 1

Success Factors of CRM	Brief Descriptions
Technology management	• New technologies are significantly important for companies to publicize new products to market as quickly as possible. • Must be easy, trouble-free and understandable to the customers. • The payment procedure must be easy and simple in case of credit cards transaction. • No complexity to the customer in online transaction of products and services.
Sales Management	• The sales team planned in such a manner to attract the customer to their products and increase the sale for the corporation. • By their hard work the organization will grow extensively. • Expanding of business is through sales management hard work. • Software are use to improve the sales management performance.
Marketing management	• Marketing managers are in charge for making the level, Timing and composition of customer. • This is a practical and useful department to planned marketing techniques for their novel products. Identify • It is the combination of Customer analysis, Company analysis, and Competitor analysis. • Marketing manager make out the desire position they want the company, product to keep in the customer's mind.
Customer Support Management	• The assessment of customer's complaints for the enhancement and betterment of the organization. • A good and well-mannered support to the customer complaints well and customers are satisfied. • A manager or receiver must have the endurance to listen the customer's query. • The customer's complaints will be recorded through the software for future up gradation and evaluations.
Supply Chain Management	• Network of interconnected department for fulfilling the material required by the other departments or by the customers. • All association and storage of raw materials, work-in-process record, and finished goods from point-of-origin to point-of-consumption.
Facilities Management	• Responsible for support all the staff and employees to provide their necessities. • To coordinate in secure, safe and effective manners. • Facilities includes goods, furniture, crockery and systems etc.

Knowledge management	• The forecast of products is based on previous data. • Can attract the customers for their products and ideas. • Employees can improve their future in the organization. • The organization can compete in the market on dependable and consistent Predictability.
Retail Management	• Its about sharing of the manufactured goods from the producer to the customers through short and convenient channels. • See all the retail stores running under the supervision of any organization. • Keep and update regular supply to the general stores to fulfill the requirements of the customers.

CRM Critical Success Factors

4.2 Description of Figure 2

In this model, we presented the whole scenario about the interaction between a customer-to-organization(one-to-many) and organization-to-customer(many-to-one). Whenever a customer or employee contact to the organization the query generator or moderator is here to transfer the query to the concerned department. We described here eight departments which are **physically** involved for making a role in the success of CRM and for giving support and maintain the level of the organization. But

virtually we presented that, behind all of these factors the data mining tools and applications are supporting them by creating rules and providing more extracted knowledge for the better solution of the query. The data mining application has its separated premises in connection with the organization's database, it is based on the data coming from every department or customers, which includes; cash memos, bills payment, penalties, purchasing history, requisitions, urgent requirements and salaries etc.
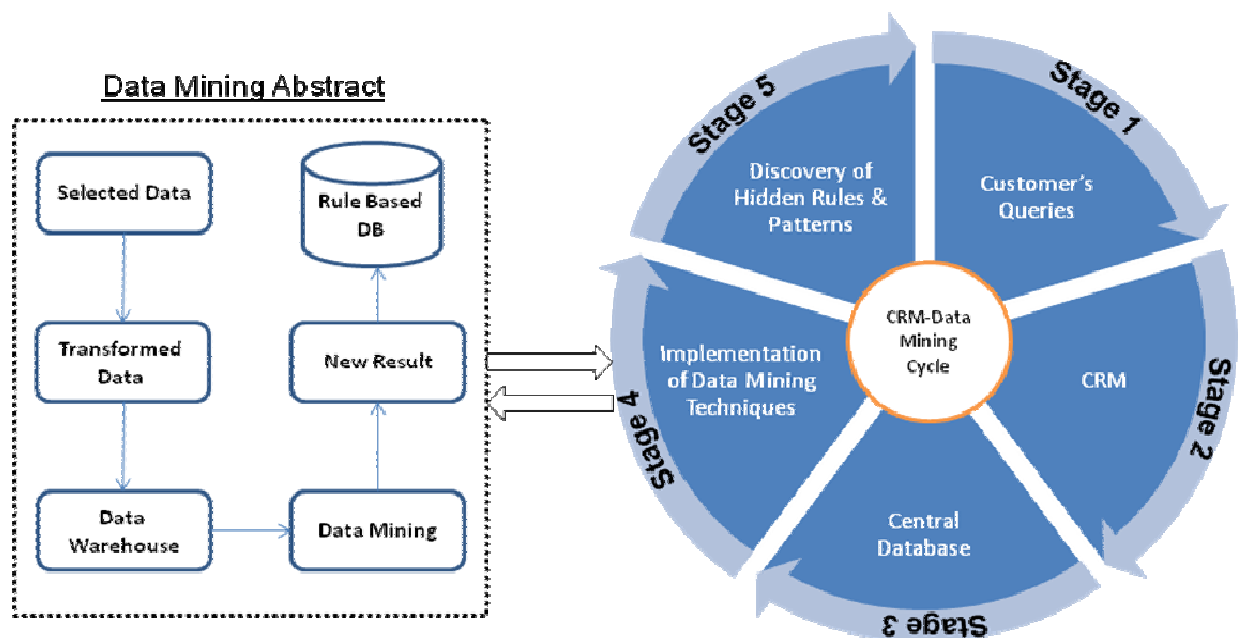

Fig. 2. CRM-Data Mining Cycle

Here we can see that, regularly huge amount of data is stored in the database, and ultimately we will have to execute and process this huge data. Fortunately, data mining is the solution to extract knowledge from these databases and which is evaluated for the future purposes. We applied association, clustering and classification techniques for making those data in manipulated form. Whenever a query reach to the appropriate department, the reply will be given with the support of database (mined data) to the corresponding person, and this experience of query will be saved in the databases for future augmentation.

This technique exposed that the knowledge discovery can play a significant and momentous role for the success of CRM. Sometimes organization can't overcome on some problems which are repeating time to time but after involvement of data mining into CRM we can resolve this type of problems.

5. FUTURE WORK

In this paper we presented a model (The role of data mining in CRM) is very descriptive and helpful for any organization. The same model will be updated in future by new data mining techniques and more CRM factors will be added according to the organization's need. New rules and patterns will be generated accordingly. This idea should be more manipulated and enhanced for more customer services, credit card users and for online purchaser which will help the customer to buy and sell the products and services online.

6. CONCLUSION

This approach will help to facilitate the customer to interact with the organization very easily and friendly. This will enhance the capability of CRM in three types of services: customer services, organization services and online services. All the queries from these three service centers will be evaluated from the concerned department. After finding solution the concerned department will reply to the particular service center and the reply will also be posted in the database for future purposes. The applications of data mining applied on the existing database is generating new rules and patterns from the experienced data. The conclusion is, data mining is the part of CRM.

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