EFFICIENT IMPLEMENTATION OF DATA MINING: IMPROVE CUSTOMER'S BEHAVIOUR

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Abstract— **Evaluating the performance of any organization is an essential part for overcoming their weaknesses. Customer is always on prior for finding and assessing the company's performance. They are always respectable for every organization. In this paper we first examine the Customer Relationship Management (CRM), especially customer behaviour and customer profiling. Then we describe the general overview of most common data mining techniques. The main purpose of this paper is how data mining techniques can extract respectable knowledge from the large customer's database and how to analyze customer behaviour to improve business performance. Therefore, we proposed a model for CRM with the efficient implementation of data mining, for improving customer behaviour. For this, we evaluate and analyze the customer understanding by using rule induction process on clustered data from customer's database with reference to the customer query.**

Key Words

Customer Relationship Management (CRM), Data Mining, Customer Behaviour.

1. Introduction

CRM stands for Customer Relationship Management. It is a strategy used to learn more about customers' needs and behaviours in order to develop stronger relationships with them [1, 6, 9].

The concepts of Customer Relationship Management (CRM) and Data Mining (DM) have recently growing extensive attention in business and academic world. Both approaches focus on deal out resources to encourage business activities in order to increase competitive advantages. Although these concepts are currently mostly regarded as separate research areas, we see a high synergy potential in an integrated approach.

To strengthen customer behavior on a day-to-day basis most of the companies choosing customer satisfaction as main performance indicator. Customers regularly visit organization and leave behind their behavior. Customer behavior analysis is ultimately targets us to improve business performance though an understanding previous and current customers to determine and identify the future customer and their behavior. Therefore, it is necessary to mine the customer's feedback or behavior database for understanding behavior history of customer and extracting knowledge or new rules may be apply for future if meeting the same criteria. Furthermore, after analysis an organization can revise their attributes and aspects with the customer's requirements and can be handle for future customer.

1.1 Customer Relationship Management (CRM)

The maximization of lifetime values of the (entire) customer base in the context of a company's strategy is a key objective of CRM. More specifically customer understanding is the core of CRM. Proper customer understanding and action ability lead to increased customer lifetime value. Figure 1 show an idealized CRM cycle[3]. Customer profiling is describing customers by their attributes, such as age, income, and lifestyle. This is done by building a customer's behaviour model and estimating its parameters. Depending on data available, they can be used to prospect new customers or to "drop out" existing customers[14].

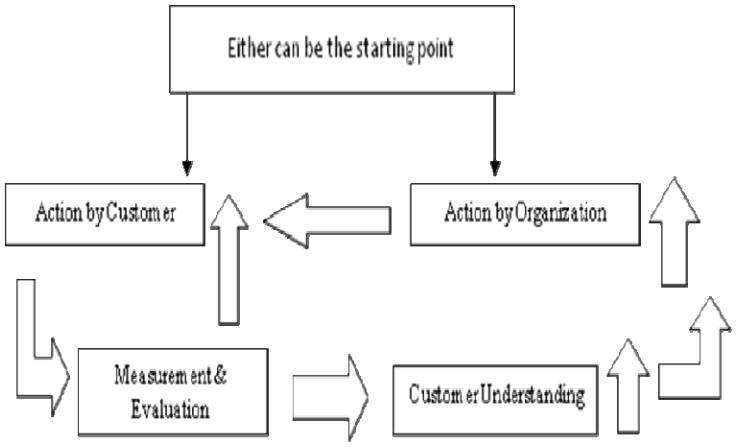

Fig. 1 The Basic CRM Cycle

1.2 Customer Satisfaction and Complaining

Relationship marketing aims at building long-term, mutually satisfying relations with customers, suppliers and distributors with the objective to earn and retain their long-term preference and businesses. According to relationship marketing theories, social and structural bonds between businesses and customers can be developed and leveraged with the objective of mutually beneficial economic exchanges. A basic theoretical approach guiding relationship marketing research stems from social psychology. More specifically, the social exchange theory and the theories of power and dependence emphasize processes that lead to satisfaction for the exchange parties as well as techniques for managing dependence and uncertainty. [4]

1.3 Data Mining and CRM

Data mining is the umbrella term for processes designed to identify and interpret data for the purpose of discerning actionable trends and formulating strategies based on those trends. As firms scrutinize their spending on marketing activities, they begin to focus on their data mining capability[11]. How can they learn more about customers, use that information to make appropriate offers to customers, and understand which offers succeed? [5]. We can understand our customer by evaluating customer behaviour, customer segmentation, customer profile, loyalty and profitability. In this paper we proposed extended model for CRM with efficient implementation of Data Mining Techniques to improve customer behaviour. Data Mining helps users to identify valuable patterns contained in diverse data and their relations so as to help the major decisions.[12]

2. Related Work

Substantial efforts have been taken for a an efficient CRM over the past several years to improve the customer behaviours and satisfaction.

Customer behaviour analysis is based on consumer buying behaviour, with the customer playing the three distinct roles of user, payer and buyer. Relationship marketing is an influential asset for customer behaviour analysis as it has a keen interest in the re-discovery of the true meaning of marketing through the re-affirmation of the importance of the customer or buyer. A greater importance is also placed on consumer retention, customer relationship management, personalization, customization and one-to-one marketing [10]. Customer understanding is the core of CRM. It is the basis for maximizing customer lifetime value, which in turn encompasses customer segmentation and actions to maximize customer conversion, retention, loyalty and profitability. Proper customer understanding and action ability lead to increased customer lifetime value. Incorrect customer understanding can lead to hazardous actions [3]. S. C. Hui [13] investigate in his paper that how to apply data mining techniques to extract knowledge from the database to support two kinds of customer service activities: decision support and machine fault diagnosis.

3. Methodology

3.1 Rule Based Data Mining Techniques

The objective of data mining is to extract valuable information from one's data, to discover the 'hidden gold'. In decision support management terminology, data mining can be defined as 'a decision support process in which one search for patterns of information in data. Data mining techniques are based on data retention and data distillation. Rule induction models belong to the logical pattern distillation based approaches of data mining. These technologies extract patterns from data set and use them for various purposes, such as prediction of the value of a dependent field. By automatically exploring the data set, the induction system forms hypothesis that lead to patterns. Theses patterns may be logic, equation or cross-tabulations. Logic can deal with both numeric and non numeric data. The central operator in a logical language is usually a variation on the 'if-then' statement[7].

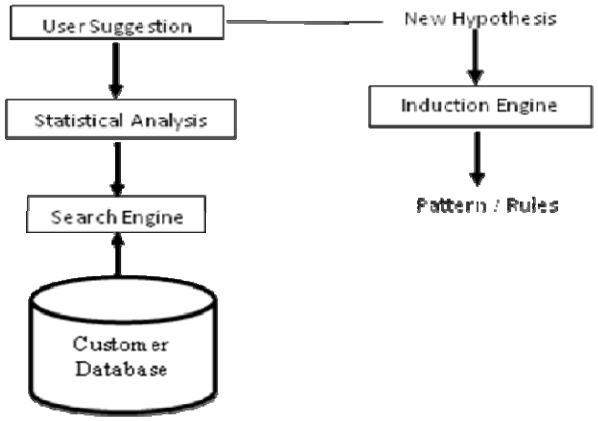

Fig. 2 Rule Induction Process

3.2 Proposed Model for CRM with Efficient Implantation of Data Mining

3.2.1 Explanation of Fig. 3

The methodology presented in this paper, combines the CRM and Data Mining techniques. The main steps of the methodology are described below (Fig. 3).

a. Customer Inquiry

This is not always obvious since there are many actors involved in the purchase and use of a certain product or service. Yet five main roles can be identified that exist in

many purchasing situations[8]. Often several, sometimes all of these roles might be conducted by the same individual but recognizing the needs and requirements of each separately leads to potential areas for service design. A customer can be a user, purchaser, influencer etc. Therefore the query may be have different types of inquiries, which includes, suggestions, queries, requisitions, questionnaires, sales inquiries, and reclamations. In the "Evaluation of Customer's Inquiry" step, we can analyze which type of query has been raised by the customer and where it will be forwarded.

b. Clusters of Customers:

Customer's Database is an essential part of any organization. In this type of database we have all related information about the customer includes; customer profile, background, and the history of inquiries, purchasing, reclamation, payments of bills etc. We clustered the data for having similar characteristic's customers in one cluster from the customer's database.

c. Rule Induction Engine

In this paper we examine rule induction based on clustered data. For extracting rules or pattern we used clusters of customer based on customer database in connection of the particular query. The data can be in numerical or non-numerical format. The proposed model is taken out outline from data set and after it applies them for several purposes, such as increasing for sale, action against customer enquiry, or some new instructions or marketing campaign for their employment. This induction system generates also some hypothesis or suggestions that can take the organization to the ideal place. Those patterns can be equations, reasons or logic. Which can be deal with both numeric and non numeric data? For logical languages we can find out our problem by "if-then" or case statements. To work on customer enquiry the rule induction process also using customer's clustered data for finding new rules or patterns for customer understanding and for the growth of organization.

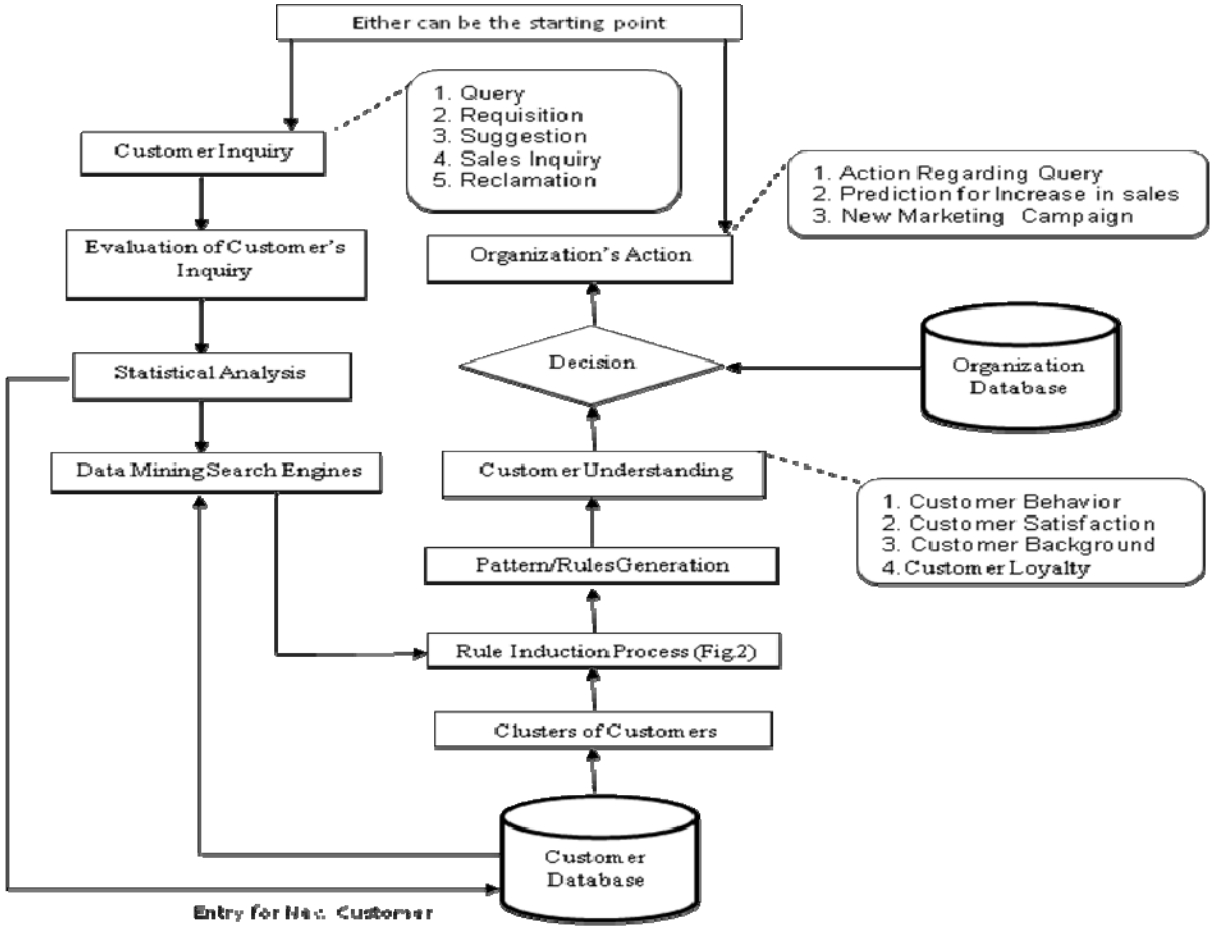

Fig. 3 CRM Model for Improving Customer Behavior

d. Customer Understanding

By using data mining techniques, understanding the customer is the main part of our proposed model. Customer's understanding require close contact and a formal process designed to extract the maximum amount of relevant information. We use rule induction engine and also applied clustering techniques for understanding the customers more appropriately. By applying rule induction process on clustered data we can find out customer behavior, customer satisfaction, and loyalty or background of the customer. After evaluation and measurement this model can increase customer behavior and loyalty for respected organization. By the positive action of the organization customer would be satisfied under the company's policy and limitations.

e. Action by Organization

After complete analysis and evaluation organization's action may be included for positive response regarding particular customer query, prediction for sale escalation, some new marketing plan, new strategies for advertisement and instructions for their respected employees.

Future Work

The model presented in this paper will be updated through the customer survey or questionnaire. This will enhance our model for customer relationship management (CRM). We can improve our model structure by surveying customers and generating new rules and patterns that will give some fruit full results to the company. By using different data mining methodologies and some more statistical analysis the model can lead to more enhanced.

Conclusion

This type of model is already existed for the customer satisfaction, where as the model presented in this paper is for the improving customer behaviour and understanding. New rules are defined to improve the customer behaviour.
Beside the monitory benefits to the company, it will understand the customer's problem and will enhance the customer satisfaction. More and more customer will interact easily to the company. Our approach will use those companies which have problems with the customers understanding. Rule induction on customer's clustered data is key factor enhancement for the improvement of CRM for any organization.

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