Optimal Customer Tracker using Behaviour Analysis

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***Abstract*—Owing to increasing competition between organizations, securing the support of customers has become a must for every company to survive in the world of business. Customer satisfaction has become the prime objective of organizations. In order to ensure this, an expert system is required to identify beneficial customers. In this way the company can provide them lucrative offers in order to retain their fellowship with the company for a longer period of time and in due course also earn extra profits. Providing offers to some selected customers is a better alternative to declare reduced prices for everyone as the revenue of the company can be spent efficiently. This strategy will also encourage other customers to buy more products and increase the company's profits. We propose a system that has been developed with the sole objective of identifying such beneficial customers based on the frequency of their visits and the profits that they help the company to attain.**

Keywords-Expert System, Beneficial Customers, lucrative offers.

I. INTRODUCTION

Customer Relationship Management (CRM) and Data Mining are two distinct areas whose use by both private and public organisations has risen dramatically [i][vi]. The possible competitive advantages of using these technologies are well documented, with examples in most markets. Organisations such as the Bank of America, Tesco, Walmart, AT&T BT have benefited from adopting Data Mining to better inform and execute their CRM operations [iv]. The aim of our system is to analyse the current CRM and Data Mining operations of Organisations and formulate innovative domain specific strategies that harness the power of these technologies to create real business value. Many literature studies are available to preserve the customer relationship but small drawbacks occur in the existing methods. One method to maintain the customer relationship is frequency based method i.e., the company will give declination to the customer based on the historical data i.e. the number of times the customer visits the company. These methods are not effective because the revenue generated by these customers is less. So the company revenue is affected. We propose a framework for analysing customer value and segmenting customers based on their value.

II. LITERATURE REVIEW

Han & Kamber (2006) suggest that a main driver behind the evolution of data mining is "the wide availability of huge amounts of data and the imminent need for turning such data into useful information and knowledge" [iii]. The development of Data Mining techniques has therefore been motivated by the need to overcome this challenge, and is a direct consequence of the continual development of the information storage paradigm. Data Mining is an important component of the Customer Portfolio Analysis (CPA) and Customer Intimacy phases of his CRM model [ii]. CPA is essentially about identifying significant or profitable customers which the organisations should look to continue its relationship with [ii]. For this to occur, Data Mining techniques such as Classification are used to identify which customers these are with Buttle providing an industrial example from Natwest Corporate Banking Services[ii]. Natwest used classification on attributes such as Lifetime Value and Credit Rating to sort its client base into a number of segments ranging in significance and importance. From this Natwest developed a CRM strategy that varied its assignment of staff to each client, with the top most significant receiving an individual relationship manager, while the least significant had access to a business advisor.

2.1 Existing Systems

Most data mining tools resulted in customer models and visualization results. It means the calculation results were analysed and represented as graphs [iv]. So the human experts have to take the actions according to the results of ROC [viii][vi] (receiver operating characteristic) curve. The actions taken by the human experts may vary. As a result it is difficult to find a set of analysis to process customer relations. The actions will be taken as per the experts own idea. When data mining techniques are applied to CRM it resulted in finding out customer models and behaviours as graphical representations.

III. PROBLEM STATEMENT

The current Globalization of commerce, also denoted as "Globalization 3.0" has created an increasingly competitive market, where competition is no longer set by geographic constraints [ix]. Within this global market place, and with a vast choice of suppliers for consumers, Organisations have had to tailor their value proposition in order to remain competitive. CRM has therefore become a central focus of any organisation, and has coincided with the commercialisation of Data Mining, which has provided meaningful intelligence on the customers an Organisation serves [ii]. Data Mining and CRM strategy are common place in most large organisations, and this project aims to evaluate their current adoption, while also

identifying potential opportunities that could be obtained. However, the use of Data Mining to influence CRM in small and medium sized companies is unclear, and this project also aims to provide actionable advice to such organisations that allows them to harness the potential advantages that adoption could provide.

IV. PROPOSED SYSTEM

The main aim of our proposed technique is to maintain a good relationship between customers and companies through monetary offers that are based on the revenues provided by those customers. This offer does not affect the company revenues as well as satisfies the customers. This process will make a best relationship between the customers and organization and to satisfy the customers forever with company's rules. The proposed system aims at suggesting a new Life Time Value (LTV)[ii] model and customer segmentation considering customer defection and cross-selling opportunity. Customer segmentation methods using LTV can be classified into three categories: (1) segmentation by using frequency of visits, (2) segmentation by using profits generated for the organization and (3) segmentation by considering quantity of products purchased. Here the decision tree algorithm is taken into account as the data mining tool. The decision tree algorithm can also find out the optimal actions [viii][vii][v]. Optimal actions then will be considered by the human experts. It means this enhanced decision tree algorithm can find out the actions according to the input of the customers as well as producing graphical response[v]. Enhanced Decision Tree Algorithm implementation provides the easy way to find out exact optimal actions that can change the customer from undesired status to desired status while maximizing the net profit [viii].

4.1 Modules

There are a lot of factors to be considered before a customer is declared beneficial. It is essential to distinguish a person who uses the e commerce site for browsing purposes and a person who delivers genuine profits to the organization. This can be done by tracking the various activities of customers on the site. These activities can be classified into the following modules:-

i. *Registration:* This will help the customer to gain membership in the e commerce site and also provide him the privilege to browse or buy products

ii. *Login:* Login Module can be used to authenticate the identity of the customer and grant access to the site

iii. *Buy products*: The customer can search for desired items and purchase them. A number of recommendations will also be provided to the customer based on his previous visits

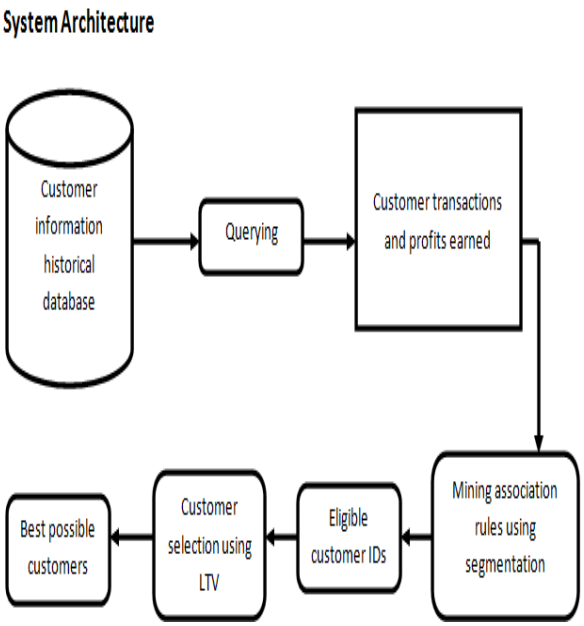
iv. *Record Transaction:* This module will record every transaction that the customer makes. Every customer will have a dedicated database that records his visits, purchases and the time of visit

v. *Calculation of Profits:* Using the list of articles purchased and number of visits, the amount of profits generated will be calculated for each customer

vi. *LTV based customer selection:* Using the frequency of the customer's visits and profits generated a threshold value is set and customers with LTV higher than the threshold value are selected for benefits. If a customer has high frequency of visits but generates less revenue for the organization then he will be entitled to lesser benefits than a customer who generates higher profits.

vii. *Optimal customers:* Monetary benefits will be provided to customers according to their LTV values.

V. DESIGN



VI. PROJECT SCOPE

The project aims the requirements that need to be satisfied in order for the project to be deemed successful. These will guide the progress of the project and also form the evaluation of the deliverable. The aim of this project is to analyse the current CRM and Data Mining operations of the Organisations involved and to formulate innovative domain specific strategies that harness the power of these technologies to create real business value. This high level statement can be divided into individual requirements that must be met.

i. To collect Organisational data regarding current CRM and Data Mining operations.
ii. To collect a wide range of data from different Market sectors.
iii. To evaluate data collected.
iv. To understand the market challenges faced by the Organisations used and possible opportunities that may be available.

v. To provide actionable solutions that addresses the Organisational needs and attempt to service possible opportunities in the market.
vi. To provide innovative and realistic recommendations.

6.1 Functional Requirements

User Interfaces: The interface used in GUI must be easy to understand. This interface serves as a bridge between the user and the software. It also makes the user interaction with the system easy. The user interface includes:

i. *Screen formats / Organizations:* The introductory screen will be the first to be displayed which allows the user to log in using their id and password.
ii. *Windows formats / Organizations*: When the user chooses a particular topic then the information pertaining to that topic will be displayed in a new window, which will allow multiple windows to be available on the screen, and the user can switch between them.
iii. *Data Format:* The data entered by the user will be alphanumeric.
iv. *End Message:* When there are some exceptions, error messages will be displayed promptly by the user to re-enter the details when an event has taken place successfully.

Communication interfaces

CRM application keeps the record of every customer dealing with the company. The communication is established with the enormous customer database available with the company. With appropriate algorithm, optimal customers are provided with beneficial offers.

6.2 Non-Functional Requirements

Performance requirements:

Some Performance requirements identified are listed below:

i. The database shall be able to accommodate a minimum of 10,000 records of customers.
ii. The software shall support use of multiple users at a time.
iii. There are no other specific performance requirements that will affect development

Safety requirement:

The database may get crashed at any certain time due to virus or operating system failure. Therefore, it is required to take the database backup.

Security requirement:

Application will allow only valid users to access the system. Access to any application resource will depend upon user's designation. There are three types of users namely Administrator, Clients and Customers. Security is based upon the individual user ID and Password. Some of the factors that are identified to protect the software from accidental or malicious access, use, modification, destruction, or disclosure are described below. Keep specific log or history data sets

i. Check data integrity for critical variables
ii. Assign certain functions to different modules
iii. Restrict communications between some areas of the program
iv. Check data integrity for critical variables
v. Communication needs to be restricted when the application is validating the user or license.

VII. CONCLUSION

In this study, we have studied an efficient CRM system using the data mining and artificial intelligence techniques for maintaining the customer relationship. Based on the customer's information in the historical database, the CRM system will provide attractive offers to the customers who frequently visit and also have provided high revenue to the company. Using this method, companies or organizations can maintain and improve the relationship with customers.

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