

Role of Data Mining in CRM

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Abstract : *Data mining allows extracting valuable information from the historical data and predicting outcomes of future situations. CRM considers the customer as the centre point, which values the customers of the organization. This article explores the various data mining techniques and its impact on CRM to redefine business processes and strategies.*

Keywords-CRM, DM, Mining Model, BIS, CHAID

I. Introduction

Evolution of the IT field has enabled collection and storage of huge amount of data. Range of such collected data's varies in size (small to large), so it is difficult to analyse the collected data manually. CRM is one of the major concepts that is focused by almost all the organizations to maintain a good relationship with the customers. CRM is predicated in the business by tracking the patterns available within the collected customer data. The goal of the data mining is to extract meaningful patterns and relationships from the mass amount of data sets, by which data mining can define and improve customer relationship. Today "product oriented view" of the business has been changed into "customer oriented view", as customers are valuable assets for the organization. Traditional marketing focuses on mass (huge) marketing to expand the business but it also has been changed into one to one marketing due to tremendous growth of the information technology. All the above factors have favoured the organization to concentrate on the CRM. An organization must rely on customers to achieve profitable goal. CRM is a set of process which enables the business strategy to build long term and profitable relationship with the customers. For the building a successful

CRM strategy two things are essential one is customer data and another one is the information technology.

WHAT IS DATA MINING?

Data Mining is described as "the process of extracting knowledge data discovery of valid, authentic, and actionable information from large databases. Data mining also used to derive patterns and trends that exist in the collected data. These patterns and trends can be collected together and defined as a mining model, which can be applied to specific scenarios of the business.

Data mining typically involves the use of predictive modelling, forecasting and descriptive modelling techniques as its key element. Using these techniques, an organization can be able to manage customer retention (maintain), used to select the right prospects on whom to select, profile and segment customers (by identifying good customers), set optimal pricing policies, and objectively measure and rank which suppliers are best suited for their needs.

II. Material and Methodology

BASICS STEPS IN MINING MODEL:

Building a mining model is part of the process which includes everything from the beginning of the task like asking questions about the data, creating a model to answer the questions and finally to deploy the model into a workable environment. This process can be explained by the following six basic steps:

1. Define the Problem
2. Prepare the Data
3. Explore the Data

4. Build mining Models
5. Explore and Validate the Models
6. Deploy and Update the Models

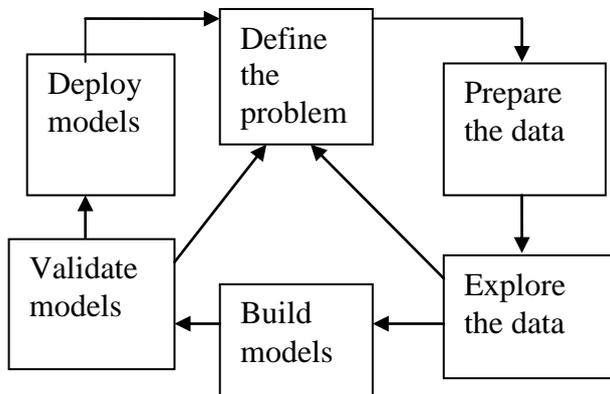


Fig1: Mining model

Data mining can be used to answer queries like:

- What product does the customer purchase? What are all the products that are sold together?
- How to predict risk customers those are ready to leave the product?
- Where is the marketplace of the organisation (current position) and where is it going?
- How business can analyze its patterns?

SCENARIOS APPLIED TO MINING MODEL:

Mining models can be applied to specific synopsis, such as:

- **Forecasting:** Estimate the sales rate, predict sales up (peak) and down (fall down) period.
- **Risk and probability:** Choosing the best customers for targeted product, determining the break-even point for risk scenarios, assign probabilities to diagnoses
- **Recommendations:** Identifying the products that are sold out together.
- **Finding sequences:** Have an idea about the product selection of the customer in the shopping cart, must have the prediction of next new item that may be selected by the customer.
- **Grouping:** Separate customers into cluster (group) of related items.

AREAS COVERED BY DATA MINING:

RISK MANAGEMENT:

Risk management is another area where data mining is used in the retail industry. Retail organisations use data mining to understand which products may be vulnerable to competitive offers or changing customer purchasing patterns. Previous purchasing patterns of customers are analysed

to identify those customers with low product or brand loyalty.

CUSTOMER ACQUISITION AND RETENTION:

Data mining can also help in acquiring and retaining customers in the retail industry. Since it deals with high levels of competition it can use data mining to better understand their customer's needs. Retailer can study customers' past purchasing histories and know with what kinds of promotions and incentives to target customers.

MARKETING:

One of the most widely used areas of data mining for the retail industry, is marketing. 'Market basket analysis' is a marketing method used by many retailers to determine optimal locations to promote products.

CRM OVERVIEW:

Maintaining a successful relationship with the customers for a long term is not the easiest one that is to be achieved by the organisation, since it deals with the interactions of the entire business with customers. Paul Greenberg defines CRM as:

"CRM is study of fundamental nature of knowledge, reality and a business strategy, supported by the system and technology, designed to improve human interactions to that of the business environment. It is a continuing business process which demands a dynamic, ongoing plan of action for customer agreement".

Customer oriented business concentrate mainly on their customers, since they knew about their customers and their needs. CRM refers to a collaborative philosophy or system of business practices implemented across an enterprise to organize the assets, aggregate, and analysis of customer profiles.

Information about the customers is gathered using N number of techniques. This information is used by the organization to know about their most benefited customers for their company. The methodology that is used for collecting the information about the customers is called as "Business Intelligence System(BIS)". Using BIS the targeted customers can be identified to maintain a long term relation. Using these method customers satisfaction is increased as well as revenue of the organisation will also be increased.

CRM COMPONENTS:

CRM tries to achieve a 'single integrated view of customers' and a 'customer centric approach. CRM consists of three components:

- Customer
- Relationship
- Management

COST GOALS OF CRM:

Major cost goals of CRM include:

- Increase the growth of revenue through customer satisfaction.
- Reduce sales cost and the distribution cost

Four basic tasks are required to achieve the basic goals of CRM.

1. Customer Identification

Identify the customer through web sites marketing channels, survey, and interactions overtime.

2. Customer Differentiation

Every customer has their own lifetime value from the company's point of view and each and every customer imposes unique demands and requirements.

3. Customer Interaction

Customer demands change over time. Keeping track of customer behaviour and needs is an important task of a CRM program.

4. Customization

“Treat the entire customer uniquely” is the motto of the entire CRM process.

Customer life cycle:

Customer life cycle denotes the relationship between the customer and the organisation. The organisation describes three ways to increase the customer values,

- 1) Increase the purchase rate of a particular product
- 2) Sell more products
- 3) Retain customer for more period of time

Four Stages of Customer Interaction are,

1. Initiation – the active management welcomes a new customer to begin the relationship
2. Integration– the active management assess the product or service after the initiation stage has been completed.
3. Intelligence – the active management accumulate all the previous learning’s from the Initiation to Integration stages and conduct additional research, assess performance of the customer. Finally the vendors should decide about further investigation to do to better understand the customers to maintain a long term relation with them.
4. Value Creation – the active management of developing a partnership with the customer to become an inextricable part of the customer’s performance.

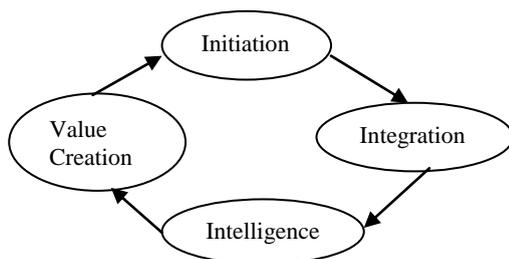


Fig 2: Stages of Customer interaction

The attributes and processes of each stage of customer transformation result in a specific customer experience. Each stage results in an experience which leads to the next stage, ultimately resulting in achieving value creation for both parties. The experience in each stage is comprised of three action states and an end state:

- Emotional – what the customer feel
- Intellectual – what the customer should think
- Behavioural – what the customer should do
- Culminating Status – the state of the customer at the end of a specific stage which enables the transition to the next stage

Link between Data Mining and CRM

Data mining and customer relationship management are the two common functions used by the organisation to focus the customers. Data mining is a quantitative process by which organisation collect specific information about their customers. CRM allows an organisation to alter business operations based on the information obtained through data mining. For example, a company can change sales prices or other product attributes to meet consumer demand. The bridge between common functionalities used by the organisation requires creation of reports based on information gathered from data mining.

Using CRM it is easier to select the right customers from a large set of potential customers. Data mining can help the organizations to offer the most appealing products to the existing customers or identify customers by which the organization is at risk of losing. So the result is improved revenue because of a greatly improved ability to respond to each individual contact and reduced costs due to properly allocating resources.

CHI-SQUARED AUTOMATIC INTERACTION DETECTION ANALYSIS (CHAID):

Decision tree is a tree shaped structure that is used to represent the set of decisions. A decision tree method includes Classification and Regression Trees (CART) and Chi Square Automatic Interaction Detection (CHAID) method. Both techniques are used for classification of the data set. But the widely used decision tree model is Chi-Squared automatic interaction detection analysis since it can visualize the relationship between the target (dependent) variable and the related factors with a tree image.

CHAID model is used to represent decision trees, where one variable causes the example of one or more variables. A multivariable regression model tests several variables against each other to evaluate possible correlations. CHAID is a type of decision tree technique, based on adjusted significance testing. The "trunk" of the tree

represents the total modelling database. CHAID then creates a first layer of "branches" by displaying values of the strongest predictor of the dependent variable. Then it automatically determines how to group the values of this predictor into a manageable number of categories. Nominal CHAID model is created when dependent variable are predicted using two values. When dependent variable is at least ordinal then Ordinal CHAID model is generated. CHAID is often used in the context of management to select groups of consumers and predict how their relationship with the management affects the organisation. It uses a combination of CHAID segmentation and logistic regression response probability modelling to establish predictive models that are deployed over a proprietary Internet system

IV. Conclusion

The information obtained from the customers is helpful to the organisation to full fill the needs and wants of their customers. The organisation can also earn profit and maintain a long term relation with the customers, but they should ensure that the privacy of the customers, should not get affected during usage of the data.

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