

Analyzing Customer Behavior using Data Mining Techniques: Optimizing Relationships with Customer

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Abstract

In this scenario achieving Customer satisfaction is no longer satisfied with a simple listing of marketing contacts, but wants detailed information about Customers' past purchase as well as prediction of future purchases. Simple Database software based on SQL does not support these increased demands for information. Data mining is often defining as finding hidden information in the database. Alternatively it has been called as data analysis, knowledge discovery and deductive learning. Data mining technologies and techniques for recognizing and tracking pattern with in data helps business sift through layers of seemingly unrelated data for meaningful relationship, where they can anticipate rather than simply read to Customer needs In this paper we discuss a business and technological overview of data mining and outline how can we optimize Customer profitability through data mining application, along with sound business processes and complement technologies, data mining can reinforce and redefine Customer relationship. The aim of this research paper to find out the role of data mining in Customer focus business strategy because -With rapid globalization of business and product differentiation becoming less relevant and competitive, Customer relationship has become a factor of competitive advantage. Today's Customers are in charge. It is easier than ever for Customers to comparison shop and with a click of the mouse, to switch companies. As a result Customer relationship becomes a company's most valuable asset. Every company's strategy should address how to find and retain the most profitable Customers.

Key words – Data Mining, CRM, Customer Relationship

1.0 Introduction

Traditional method of conducting business and industrial operation have undergone a sea change due to globalization of business extensive use of internet and telecommunication networks and use of information technology . There are structural change and change in works cultures affecting social and personal life of everybody. In general technology has taken front seat in shaping business operation impacting on cost, time resource in a positive way. The processes namely communication, transportation, production, conversion have become s shorter, intelligent and automated. Decision making response in now driven by knowledge and not by information alone. The decision makers are required to read quickly to mission critical needs due to rapidly changing volatile and competitive markets. They need a multidimensional support of information. The decision maker now needs the information for strategic decision and not for routine operational decision. The decision maker is a specialist and needs the information urgently from internal and external data base which gives a larger view of the problem scenario.

Data mining has quickly emerged as highly desirable tools for using current reporting capabilities to uncover and understand hidden pattern in vast data base these patterns are then used in models that predict individual behavior with high accuracy. The result data mining helps in decision making helps in Customer Relationship Management (CRM) it also affect the cost and production of the business. There are a wide variety of data mining applications available, particularly for business uses, such as Customer Relationship Management (CRM). These applications enable marketing managers to understand the behaviors of their Customers and also to predict the potential behavior of prospective clients. An example of the kind of task that a data mining technique may assist with is the prediction of future client retention. For example, a company may decide to increase prices, and could use data mining to predict how many Customers might be lost for a particular percentage increase in product price.

2.0 Data Mining & Data Warehouse

Data mining is the process of extracting patterns from data. Data mining is becoming an increasingly important tool to transform these data into information. It is commonly used in a wide range of profiling practices, such as marketing, surveillance, fraud detection and scientific discovery. Data mining is usually used in conjunction with a data warehouse to help with certain type of decision. Data mining can be applied to operational database with individual transaction. To make data mining more efficient the data warehouse should have summarized collection of data. In fact, for very large database running in terabytes of data, successful use of data mining will depend first on the construction of a data warehouse

Data mining, by its simplest definition, automates the detection of relevant patterns in a database. For example, a pattern might indicate that married males with children are twice as likely to drive a particular sports car as married males with no children. If you are a marketing manager for an auto manufacturer, this somewhat surprising pattern might be quite valuable.

However, data mining is not magic. For many years, statisticians have manually "mined" databases, looking for statistically significant patterns. Data mining uses well-established statistical and machine learning techniques to build models that predict Customer behavior. Today, technology automates the mining process, integrates it with commercial data warehouses, and presents it in a relevant way for business users. The leading data mining products are now more than just modeling engines employing powerful algorithms. Instead, they address the broader business and technical issues, such as their integration into today's complex information technology environments. In the past, the hyperbole surrounding data mining suggested that it would eliminate the need for statistical analysts to build predictive models. However, the value that an analyst provides cannot be automated out of existence. Analysts will still be needed to assess model results and validate the plausibility of the model predictions. Because data mining software lacks the human experience and intuition to recognize the difference between a relevant and an irrelevant correlation, statistical analysts will remain in high demand.

3.0 Current Scenario of Customer Relationship in Business

The way in which companies interact with their Customers has changed dramatically over the past few years. A Customer's continuing business is no longer guaranteed. As a result, companies have found that they need to understand their Customers better, and to quickly respond to their wants and needs. In addition, the time frame in which these responses need to be made has been shrinking. It is no longer possible to wait until the signs of Customer dissatisfaction are obvious before action must be taken. To succeed, companies must be proactive and anticipate what a Customer desires. It is now a cliché that in the days of the corner market, shopkeepers had no trouble understanding their Customers and responding quickly to their needs. The shopkeepers would simply keep track of all of their Customers in their heads, and would know what to do when a Customer walked into the store. But today's shopkeepers face a much more complex situation. More Customers, more products, more competitors, and less time to react means that understanding your Customers is now much harder to do.

3.1 Obstacle in Customer relationships:

- Segments of your market and try to keep the best for themselves. Compressed marketing cycle times. The attention span of a Customer has decreased dramatically and loyalty is a thing of the past. A successful company needs to reinforce the value it provides to its Customers on a continuous basis. In addition, the time between a new desire and when you must meet that desire is also shrinking. If you don't react quickly enough, the Customer will find someone who will.
- Increased marketing costs. Everything costs more. Printing, postage, special offers (and if you don't provide the special offer, your competitors will).
- Streams of new product offerings. Customers want things that meet their exact needs, not things that sort-of fit. This means that the number of products and the number of ways they are offered have risen significantly.

- Niche competitors. Your best Customers also look good to your competitors. They will focus on small, profitable

Successful companies need to react to each and every one of these demands in a timely fashion. The market will not wait for your response, and Customers that you have today could vanish tomorrow. Interacting with your Customers is also not as simple as it has been in the past. Customers and prospective Customers want to interact on their terms, meaning that you need to look at multiple criteria when evaluating how to proceed. You will need to automate:

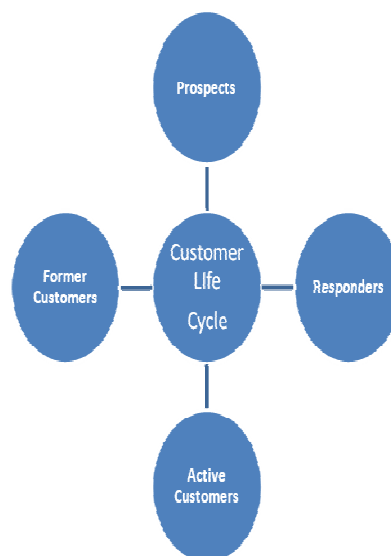
- The Right Offer
- To the Right Person
- At the Right Time
- Through the Right Channel

The right offer means managing multiple interactions with your Customers, prioritizing what the offers will be while making sure that irrelevant offers are minimized. The right person means that not all Customers are cut from the same cloth. Your interactions with them need to move toward highly segmented marketing campaigns that target individual wants and needs. The right time is a result of the fact that interactions with Customers now happen on a continuous basis. This is significantly different from the past, when quarterly mailings were cutting-edge marketing. Finally, the right channel means that you can interact with your Customers in a variety of ways (direct mail, email, telemarketing, etc.). You need to make sure that you are choosing the most effective medium for a particular interaction.

4.0 Data Mining and CRM

Customer relationship management (CRM) is a process that manages the interactions between a company and its Customers. The primary users of CRM software applications are database marketers who are looking to automate the process of interacting with Customers.

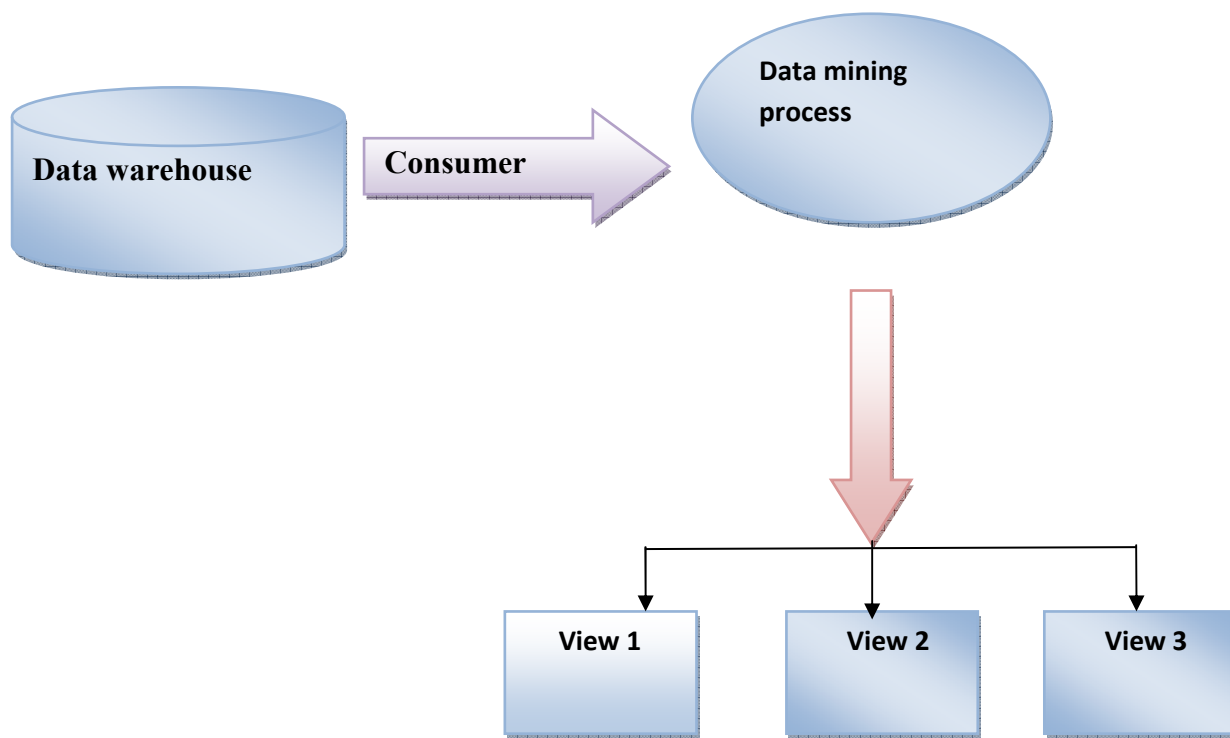
- **Prospects:** people who are not yet Consumers but are in the target market
- **Responders:** prospects who show an interest in a product or service
- **Active Consumers:** people who are currently using the product or service
- **Former Consumers:** may be “bad” Consumers who did not pay their bills or who incurred high costs



Key stages in the Customer life cycle

4.1 Data Mining Application

Data mining in Customer relationship management applications can contribute significantly to the bottom line. Rather than randomly contacting a prospect or Customer through a call center or sending mail, a company can concentrate its efforts on prospects that are predicted to have a high likelihood of responding to an offer. More sophisticated methods may be used to optimize resources across campaigns so that one may predict which channel and which offer an individual is most likely to respond to — across all potential offers. Additionally, sophisticated applications could be used to automate the mailing. Once the results from data mining (potential prospect/Customer and channel/offer) are determined, this "sophisticated application" can either automatically send an e-mail or regular mail. Finally, in cases where many people will take an action without an offer, uplift modeling can be used to determine which people will have the greatest increase in responding if given an offer. Data clustering can also be used to automatically discover the segments or groups within a Customer data set. Businesses employing data mining may see a return on investment, but also they recognize that the number of predictive models can quickly become very large. Rather than one model to predict which Customers will churn, a business could build a separate model for each region and Customer type. Then instead of sending an offer to all people that are likely to churn, it may only want to send offers to Customers that will likely take to offer. And finally, it may also want to determine which Customers are going to be profitable over a window of time and only send the offers to those that are likely to be profitable.



The figures show the application of data mining in Customer relationship management.

4.2 Data Mining Techniques Used in Analytical CRM

4.2.1 Classification- classification is process , which uses criteria to classify Customer population into different classes with associated business data. A class may predict some behavior and tell which mode of payment they prefer. When new Customer enters the system, it is possible to predict buying and payment behavior of the Customer by identifying its class.

4.2.2 Regression – regression is the process of finding a value of a variable which is dependent on other variables. Regression process succeeds when a significant relationship between variable and dependent variables is a tested one. For example, the value of business per day can be Customer frequency of visits and class of Customer.

4.2.3 Link analysis- Link analysis’ is a process of finding the links between two sets of variables the link relationship may be of following types;

- Lang and lead- sale of umbrella lags the rainfall
- Moving together – Bread & Butter
- Configured links –drinks, chips and soda.

4.2.4 Segmentation- Segmentation is a process of identifying finite sets of data clusters. For example, Customer can be clustered using following clustering criterion: Buying behavior, Value of purchase, preference for high value, Preference for discount/ bargain purchase.

5.0 Importance of data mining in Modern Business

Data mining is used in re-establishment of hidden information of the data of the algorithms. It helps to extract the useful information starting from the data, which can be useful to make practical interpretations for the decision making. Data mining can be technically defined as automated extraction of hidden information of great databases for the predictive analysis. In other words, it is the retrieval of useful information from large masses of data, which is also presented in an analyzed form for specific decision-making. Although data mining is a relatively new term, the technology is not. Data mining is thus also known as Knowledge discovery in databases since it grip searching for implied information in large databases. However, the use of some advanced technologies makes it a decision making tool as well. Data mining is used in market research, industry research and for competitor analysis. It has applications in major industries like direct marketing, e-commerce, Customer relationship management, scientific tests, genetics, financial services and utilities. Data mining applications are often structured around the specific needs of an industry sector or even tailored and built for a single organization. This is because the patterns within data may be very specific. The value of data mining applications in business is often estimated to be extremely high. Some businesses have

stored large amounts of data over years of operation, yet without an appropriate data mining application are missing out on the very valuable information that may be contained within their existing data.

6.0 A Case Study

Imagine that you are a marketing manager for a regional telephone company. You are responsible for managing the relationships with the company's cellular telephone Customers. One of your current concerns is Customer attention (sometimes known as "churn"), which has been eating severely into your margins. You understand that the cost of keeping Customers around is significantly less than the cost of bringing them back after they leave, so you need to figure out a cost-effective way of doing this. The traditional approach to solving this problem is to pick out your good Customers (that is, the ones who spend a lot of money with your company) and try to persuade them to sign up for another year of service. This persuasion might involve some sort of gift (possibly a new phone) or maybe a discount calling plan. The value of the gift might be based on the amount that a Customer spends, with big spenders receiving the best offers.

This solution is probably very wasteful. There are undoubtedly many "good" Customers who would be willing to stick around without receiving an expensive gift. The Customers to concentrate on are the ones that will be leaving. Don't worry about the ones who will stay. This solution to the churn problem has been turned around from the way in which it should be perceived. Instead of providing the Customer with something that is proportional to their value to your company, you should instead be providing the Customer with something proportional to your value to them. Give your Customers what they need. There are differences between your Customers, and you need to understand those differences in order to optimize your relationships. One big spending Customer might value the relationship because of your high reliability, and thus wouldn't need a gift in order to continue with it. On the other hand, a Customer who takes advantage of all of the latest features and special services might require a new phone or other gift in order to stick around for another year. Or they might simply want a better rate for evening calls because their employer provides the phone and they have to pay for calls outside of business hours. The key is determining which type of Customer you're dealing with.

It is also important to consider timing in this process. You can't wait until a week before a Customer's contract and then pitch them an offer in order to prevent them from churning. By then, they have likely decided what they are going to do and you are unlikely to affect their decision at such a late date. On the other hand, you don't to start the process immediately upon signing a Customer up. It might be months before they have an understanding of your company's value to them, so any efforts now would also be wasted. The key is finding the correct middle ground, which could very well come from your understanding of your market and the Customers in that market. Or, as we will discuss later, you might be using data mining to automatically find the optimal point. The installation and use of data mining applications can sometimes be an

investment that returns dividends quickly by enabling a business to leverage its existing information into more clients, more sales, or greater profits.

7.0 Conclusion

Data mining is primarily used today by companies with a strong Customer focus - retail, financial, communication and marketing organizations. Data mining is having lot of importance because of its huge applicability. It is being used increasingly in business applications for understanding and then predicting valuable data, like Customer buying actions and buying tendency, profiles of Customers, industry analysis, etc. Data Mining is used in several applications like market research, Customer behavior, direct marketing, bioinformatics, genetics, text analysis, e-commerce, Customer relationship management and financial services.

The main contribution of the paper lies in the focusing important issues to improve decision making to optimize your relationships with Customer in highly Customer based business. The study identifies major problems of Customer behavior and that has direct impact on the sale and production. Although this study is based on Indian scenario of business, besides this the results derived from study carried out in the field are equally applicable in other developing countries.

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