Purpose of Data Mining for Analyzing Customer Data

Dr. P. Isakki alias Devi

Researcher

Tamilnadu, India

Abstract: Using data warehousing and data mining, Customer Relationship Management (CRM) becomes an important area where companies can gain the competitive advantage. Companies can improve their processes to deliver better service at a minimum cost through CRM. Companies can extract hidden information of the customers from large databases by using data mining techniques. Organizations can determine the value of customers and predict their behavior and requirements. Data mining tools can answer business questions. The technology becomes an integral part of the business process. By implementing different data mining techniques, we can analyze the customer data.

Keywords: Data Mining; Customer Relationship Managemen; Customer Data; Customer Retention; Loyalty; Association; Classification; Clustering; Prediction; Sequential / Temporal Patterns and Decision Tree.

I. INTRODUCTION

Data mining is the non-trivial process of extraction of hidden, previously unknown and potentially useful information from large databases. It encompasses concepts from statistics, database systems, machine learning, neural networks, information science, and so on. It is described as knowledge or extraction of knowledge discovery in databases. The purpose of data mining is used to identify trends and patterns in data. Data mining techniques are widely used information technology for extracting marketing knowledge and supporting marketing decisions [3, 5]. CRM helps companies to gather information based on current and future needs and demands of customer. With CRM system, a company can improve its processes to deliver better service at a lower cost [2]. The process of data mining is discoveries and trends hidden in large volumes of data into database format and data storage.

By implementing different data mining techniques and algorithms, we can analyze data which is collected from the customer and can develop a group of appropriate information. By using this analyzed information, companies can expand marketing and take decision for future plan and developing new products. Customer Relationship Management can be categorized into two parts, one is operational and other is analytical. Automation of business processes include into operational customer relationship management. The analysis of customer behavior and characteristics can be included into an analytical customer relationship management.

Individual customer segment's information can be gathering through online or by maintaining different customer profile. By analysing different segments of customer, one can know about the behavior towards particular product. We can understand the customer towards particular product by communicating with customer. Eventually, it improves customer retention and customer loyalty for products. It also includes an attention towards the customer services for customer satisfaction.

II. CUSTOMER DATA MANAGEMENT

If we have a detailed picture of our target customers, companies will have an effective and targeted marketing. Customer Data Management (CDM) is a solution mechanism in which an organization's customer data is collected, managed and analyzed. CDM is geared to resolve customer requirements and issues while enhancing customer retention and satisfaction. It allows an organization to convert customer data into customer intelligence (CI).

a) Collect Customer Data

We need to collect the customer details such as:

1. Name and contact details:

    » Allows to market directly to them.

    » Let's make communications personalized.

    » Need to contact them if an order is running late.

2. Transaction history:

    » Indicates user preferences - which products they want to buy, when and how often.

    » Reveals how valuable customer they are.

    » How much they spend and how often.

3. Communications with customers:

    » Need to keep records.

    » Monitor the customers.

4. Profile: age, gender, profession, income, hobbies, and so on:

    » To find target customers.

5. Spending habits:

    » How customers shops - such as impulse buys, considered purchases, comparing the prices from different businesses regular basis, and so on.

b) Tips to Collect and Utilize Customer Data

1. Create a system to collect customer data.

2. Don't collect all data at once.

3. Use website and social media for data collection.

4. Use email newsletter.

Attracting new customers is good, but it comes at a high expense. Retaining old customers is a prodigious way to keep a constant flow of profit and will boost your word-of-mouth marketing.

III. DATA MINING TECHNIQUES

There are numerous data mining techniques have been developing and using in data mining projects. They are association, classification, clustering, prediction, sequential / temporal patterns and decision tree. Only through data mining techniques, it is possible to extract useful pattern and association from the stock data [6].

a) Association

A pattern is discovered based on a relationship between items in the same transaction. It is also known as relation technique. The association technique is used in market basket analysis to identify a set of products that customers frequently purchase together. It helps to identify new customers.

The data about a customer reliably revealing preferences to a certain goods or services provides information about which associated products the customer is more likely to buy. The classic case of market basket analysis is an example for identifying associations. For example, an online store, which analyzes the shopping baskets of their customers, can better personalize their advertisement campaigns and proliferation transactions. On the other hand, an online store can antedate what its customers would need and suggest other products.

b) Classification

Classification is a classic data mining technique based on machine learning. It is used to classify each item in a set of data into one of predefined set of classes or groups. Classification method makes use of mathematical techniques such as decision trees, linear programming, neural network and statistics. In classification, we can develop the software that learns how to classify the data items into groups.

c) Clustering

Clustering is a data mining technique that makes meaningful or useful cluster of objects which have similar characteristics using automatic technique. It is the task of segmenting a heterogeneous population into a number of more homogenous clusters [4]. This technique defines the classes and puts objects in each class. Clustering and segmentation are the processes of creating a partition so that all the members of each set of the partition are similar according to some metric. A cluster is a set of objects grouped together because of their similarity or proximity. Objects are decomposed into an exhaustive and mutually exclusive set of clusters. The system has to discover the subsets of related objects in the training set and then finds descriptions that describe each of these subsets. One approach to form a cluster is to form rules which dictate membership in the same group based on the level of similarity among members. Another approach to form a cluster is to build set functions that measure some property of partitions as functions of some parameter of the partition.

d) Prediction

The prediction is one of the data mining techniques that discover relationship between independent variables and relationship between dependent and independent variables. For instance, the prediction analysis technique can be used in sales to predict profit for the future if we consider sales is an independent variable, profit could be a dependent variable. Then based on the historical sale and profit data, we can draw a fitted regression curve that is used for profit prediction.

e) Sequential / Temporal Patterns

Sequential / temporal pattern analyses a collection of records over a period of time. It identifies similar patterns, regular events or trends in transaction data over a business period. The records are related by the identity of the customer who did the repeated purchases. It will detect frequently occurring patterns of products bought over time. For example, a set of insurance claims can lead to the identification of frequently occurring sequences of medical procedures applied to patients who can help to identify good medical practices as well as to potentially detect medical insurance fraud. In sales, with historical transaction data, companies can identify a set of items that customers buy together different times in a year. Companies can use this information to recommend customers buy it with improved deals based on their previous purchasing history.

IV. ANALYZING CUSTOMER DATA

Customer analytics can help to discover new patterns and trends in their data and accurately predict customer behavior. With the help of customer data, organizations can understand how to attract new customers, improve customer retention, and enhance marketing campaign performance. Ability to improve knowledge about customers and markets will enable the business owners to better offer their services and products [1, 7].

a) *Stages in the Customer Analytics Lifecycle*

Customer analytics helps to identify valuable customers, churn prediction and retaining the customers. The customer analytics lifecycle helps for a complete analysis of marketing, CRM and customer intelligence. Fig.1 shows the customer analytics lifecycle.

Fig. 1 Customer Analytics Lifecycle

1. **Customer Segmentation:** It divides the customer base into group of individuals that are similar in specific ways relevant to marketing**.** It allows an analyst to understand the landscape of the market in terms of customer characteristics and whether they naturally can be grouped into segments.

2. **Customer Acquisition:** It is used to acquire new customers and increase market share, and involves offering products to a products to a large number of prospects.

3. **Cross Sell / Upsell:** Cross sell is the practice of selling an additional product to an existing customer. The customers used to spend more money in cross sell. An upsell is to get the customers to spend more money for an expensive model of the same product.

4. **Next Product Offering:** It promotes extra products to existing customers when the time is right.

5. **Customer Retention / Loyalty / Churn:** It aims at maintaining and rewarding customer loyalty and reduce customer defection.

6. **Customer Lifetime Value**: It is a prediction of all the value a business will derive their relationship with customers. It is used to design programs to appreciate and reward valuable customers.

7. **Product Segmentation**: It allows for the optimization of using product affinity.

8. **Voice of the Customer**: It is used to understand what customers say about the company, its competitors and predict customer behavior through unstructured data.

V. CONCLUSION

Companies can extract hidden information of the customers from large databases by using data mining techniques. Customer data is collected, managed and analyzed. Customer data management helps an organization to identify valuable customers. Customer analytics can be helpful to discover new patterns and trends in their data and accurately predict customer behavior.

With the help of customer data, organizations can understand how to attract new customers, improve customer retention, and enhance marketing campaign performance.

References

1. Behrouzian Nejad, M., 2011, "Customer relationship management and its implementation in e-commerce", International Journal of Computer Sciene Inform. Sec., 9(9): pp. 86-90.

2. Behrouzian Nejad, M., E.Behrouzian Nejad, H.S.Nasab and N.Mousavian Far, 2010, "The role of Customer Relationship Management in the Organizations", Proceedings of 2010 1st Regional Conference of Management, Young Researchers Club, Shoushtar Branch, Iran.

3. Bose, I., and Mahapatra, R.K., 2001, "Business data mining-a machine learning perspective, Information and Management", Vol. 39, No. 3, pp. 211-225.

4. Marcello Braglia, Andrea Grassi, Roberto Montanari, 2004, "Multi-attribute classification method for spare parts inventory management", Journal of Quality in Maintenance Engineering, Vol. 10 No.1, pp.55 – 65.

5. Shaw, M.J., Subramaniam, C., Tan, G.W., and Welge, M.E., 2001, "Knowledge management and data mining for marketing", Decision Support Systems, Vol. 31, No. 1, pp. 127-137.

6. Sung-Ju Kim, Dong-Sik Yun and Byung-Soo Chang, 2006, "Association analysis of Customer Services from the Enterprise Customer Management Syste", ICDM, Vol.4065/2006,pp. 279-283.

7. Taghva, M.R., L. Olfat and S.M.H. Bamakan, 2009, "Using data mining techniques for improve customer relationship management in banking industry", Proceedings of the 2009, 3rd Iranian Data Mining Conference, Tahran, Iran.

AUTHOR(S) PROFILE

Dr. P. Isakki alias Devi, receieved B.Sc and M.C.A Degree from Madurai Kamaraj University in 1997 and 2000. She has received M.Phil Degree from Bharadidasan University in 2008. She has received Ph.D. degree from Vels University in 2012. She has 11+ years of teaching experience. Her Research area is Data Mining for Customer Relationship Management. Her special fields of interest include Data Mining, Software Engineering, Cryptography, Programming Languages and Database Management System.