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Customer Relationship Management in Online and Retail Shopping Center Using Data Mining

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ABSTRACT

Customer Relationship Management is a very important management skill in improving the organization's profit. Data Mining is a technique, which is very effective in gradual improvement in Customer Relationship Management. Customer Relationship Management enables you to focus on the relationship between your organization and your individual – whether it's a customer, a service user, a colleague or a supplier. CRM is not just for sale. Some of the biggest gains in productivity may come from CRM as a sales and marketing tool and embed it into your business – from human resources to customer service and supply chain management.

This paper deals with Data mining techniques which have been used to improve customer relationship management with different ideas mainly in retail shop and online companies such as Big Bazaar, Amazon , CraftVilla . To succeed, companies must be proactive and anticipate what a customer desires.

1. Introduction

In today's scenario, competition between different business organizations is becoming increasingly fierce. The most valuable factor in business transactions is the customer, hence interest in researching Customer Relationship Management (CRM) is increased, which automatically forces researchers to research in the IT field for Knowledge Discovery, especially-data mining of the CRM.

To manage relationship with customers, companies need to gather the right information about their customers and organize that information for proper analysis and action. It needs to keep this information up-to-date, accessible to employees, and provide the expertise of employees to transform data into products that better meet customer needs.

The purpose of this paper is to discuss various data mining techniques in different retail stores and online companies, which supports to retain their customers. It also aims to support management by understanding the needs, interests and preferences of the customers.

This paper introduces about CRM and "Whom is CRM for" in section 2. In Section 3, Data Mining and its technique is described. Section 4 describes about Role of CRM and Applications of Data Mining in CRM. Section 5 details about Role of Mobile Application in CRM using Data mining. Finally, in Section 6, Conclusion is given.

2. Customer relationship management

"Your customer doesn't care how much you know until they know how much you care."

− Damon Richards, Director of Programs, Freewheelin' Bikes

CRM is a technology that manages the relationship and interaction between a company and its customers and potential customers. The goal is simple: improve business relationships. CRM systems help companies stay in touch with customers, streamline processes and increase profitability [9].

CRM usually refers to the CRM system, a tool that helps with contact management, sales management, productivity, and many more.

1.1 Who is CRM for?

The CRM system is for everyone- from sales, customer service, business development, recruitment, marketing or any other line of business, which provides a better way to manage external interactions and relationships that promote success. CRM tools allow to-

i. store present customers' and prospective customers' contact information in a central location,
ii. identify sales opportunities,
iii. document service issues,
iv. manage marketing campaigns,
v. provide information about each customer interaction to anyone in the company who might needs it,
vi. collaborate and increase productivity with visibility and easy access to data.

Everyone in your company can see how customers communicate, the products they buy, the time of the last purchase, the cost of the payment, etc.

CRM system is divided on the basis of their prominent characteristics. There are four basic types of CRM systems –

(i) **Strategic CRM**
(ii) Operational CRM
(iii) Analytical CRM
(iv) Collaborative CRM

The following table 1 lists the types of CRM and their characteristic features –

Type	Characteristic
Strategic CRM	Customer-centric, based on acquiring and maintaining profitable customers.
Operational CRM	Based on customer-oriented processes such as selling, marketing, and customer service.
Analytical CRM	Based on the intelligent mining of the customer data and using it tactically for future strategies.
Collaborative CRM	Based on application of technology across organization boundaries with a view to optimize the organization and customers.

Table 1: Types of CRM and their characteristic features

3. Data Mining

Data mining is the process of viewing a large repository of information to generate new information. Data mining does not imply to extracting new data, it is about inferring patterns and new knowledge from the collected data [1][2].

Data mining experts rely on database management, statistics and machine learning techniques and techniques to better understand how to process and draw conclusions from large amounts of information. There are various technologies, which may be used to achieve goal.

3.1 Data Mining Techniques

There are different data mining techniques for different data analysis as shown in fig 1.

i. Tracking patterns

One of the most basic techniques in data mining is learning to identify patterns in a data set. This is usually the identification of certain anomalies in your regularly occurring data. For example, it may be observed that sales for any particular product appear to have soared before the holidays, or warm weather will allow more people to visit any website.

ii. Classification

On the basis of Machine Learning and Artificial Intelligence, Classification techniques are used for data mining. It is used to classify data for different types of categories. This technique is used to retrieve information about data and metadata.

Classification is used to classify each item in a set of data into one of a predefined set of categories or groups. Classification uses mathematical techniques such as decision trees, linear programming, neural networks, and statistics. In the Classification, applications are developed on specific algorithm that can learn how to group data items.

iii. Clustering

By studying one or more attributes or classes, individual data can be group together to form a structured opinion. At a simple level, the cluster uses one or more attributes as the basis for identifying clusters of related results[3][4]. Clustering is useful for identifying different information because it is related to other examples, so the similarity and scope consistency may be observed [5].

The cluster can work in both directions. Assuming that there is a cluster at a certain point and then using the identification criteria, it may be confirmed that the result obtained is correct.

iv. Prediction

Prediction is a broad topic ranging from predicting component or machine failures to identifying fraud or even predicting company profits. Used in conjunction with other data mining techniques, Prediction involves analyzing trends, classifications, pattern matching, and relationships. Forecasting an event may be performed by examining the past pattern or instances. For example, to identify whether the transaction is fraudulent, credit card authorization can be used by combining decision tree analysis of a single past transaction with classification and historical pattern matching.

v. Sequential patterns

Sequential patterns are generally used for long-term data, and are a useful technique to identify the regular occurrence of a trend or similar event. For example, with customer data, you can determine that customers are buying a specific collection of products together at different times of the year [6]. In the shopping basket app, you can use this information to automatically suggest adding certain items to the basket based on their frequency and past purchase history.

vi. Decision trees

In contrast to most other technologies (primarily classification and prediction), decision trees can be used as part of the selection criteria or to support the use and selection of specific data throughout the structure. In the decision tree, you start with a simple question that has two (or sometimes more) answers. Each answer leads to another question to help classify or identify the data so that it can be categorized or predicted based on each answer [7][8].

Figure 1: Classification of data mining techniques in CRM

4. Role of data mining in CRM

Data mining technology in CRM can help a business to find and select relevant information, which can then be used to fully understand the customer life cycle, including four phases:

i. customer identification,
ii. customer attraction,
iii. customer retention and
iv. Customer development.

Better business models are created with larger databases, which result in providing more business values.

Data mining typically involves the use of predictive and descriptive modeling techniques as key elements [10]. Using CRM in this age of data analysis enables organizations to manage customer retention, select the right prospects and customer base, set optimal pricing policies, and objectively measure and rank which suppliers are best suited to their needs. The process of data mining in CRM is shown in fig 2.

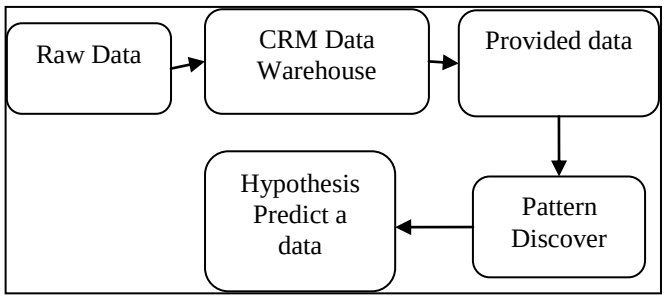

Figure 2 Data Mining Process in CRM

4.1 Applications of Data Mining in CRM

i. **Market Basket Analysis: It** determines which products customers buy together. This knowledge can improve inventory, store layout strategies and promotions.
ii. **Sales forecasting:** Checking time-based models helps companies make inventory decisions. In addition, it may help the organization with supply chain management, planning finances and fully controlling internal operations. Examining time-based patterns helps businesses make stocking decisions. Furthermore, it helps in supply chain management, planning your financials and gives complete control over internal operations.
iii. **Database marketing:** Retailers can design customer profiles based on customer demographics, tastes, preferences, purchase behavior, and more. It may also help marketing teams to design personalized marketing campaigns and promotional offers. Retailers can design profiles of customers based on their demographics, tastes, preferences, buying behavior etc. It may also aid the marketing team in designing personalized marketing campaigns and promotion offers [11][12].It may increase productivity, optimize company resource allocation and deliver the desired return on investment
iv. **Predictive life-cycle management**: Data mining helps organizations predict the lifetime value of each customer and appropriately serve each market segment.
v. **Product Customization**: Manufacturers can customize products to meet the specific needs of customers. To do this, they must be able to predict which features should be bundled to meet customer needs [13].

Data mining together with the rise of **Artificial intelligence** may shape the future of CRM, and aid companies in their quest to become more customer-oriented. The combination of CRM and DM tools may augment the knowledge and understanding of customers, products and transactional data, thereby improving strategic decision-making and tactical marketing activity [14].

Finally the outcome is increased revenue due to improved ability to respond to each individual contact and reduced costs due to optimal allocation of resources.

5. Role of mobile application in CRM using data mining

In the present scenario, a very tough situation has arises to retain a customer for any retail shop. Every retail shop uses different mobile applications to track their customers' records. Records are in the form of bundle of data. To discover meaningful information through that bundle of data, Data Mining Techniques play a very important role.

The very first types of customers are those which always like to visit to shop. To retain these types of customer is also a difficult task. At any time, if they feel any other retail shops offering some good offer, they can move to other retail shop.

One may track record of these types of customer using Data mining techniques, e.g. What is the list of shopping of these customers? Means which type of item they like to purchase more. Which type of offer they like most? etc.

Using data mining techniques, it is easy to know how many customers out of their regular customers have not visited this month or week. Then management department can offer as such they willingly come to again for purchasing.

Mobile applications may be used to keep record and data mining techniques play important role to discover meaningful information.

For example, Big Bazaar retail store are using Future application (android mobile app), through which they firstly keep record and then using DM techniques, are capable to retain their customer.

Other types of customers are those who like to visit any retail shop if they need some important item or product. Main task of Retail Shop Management is that to make them regular customer. This is really a difficult task but through data mining, it may be achieved. Here also mobile application also play very important role.

But the question is- why any as such type of customer will go to install application in their mobile?.

Retail shops are using the concept of 'Cash Back', so customers are willing to install application and they are forced to come for shopping.

In common language, it is called a habit, once it comes again and again. So, here data mining technique once again play an important role to bring new customers.

Now I would like to discuss on online companies such as Flipkart, Amazon and lots of these companies are also using different data mining techniques to satisfy their customer at utmost level.

Different online companies also use data mining to market its products in all aspects to gain a competitive advantage. As social media interventions increase, customers want their companies to buy products primarily for the personalization of online companies.

Providing targeted information to a customer service representative who works with a specific customer is an opportunity to develop. If employees have the right tools to access the information they need when dealing with customers, you can save a lot of time and impress customers. Customer data has become a way to build strong brands and customer loyalty through effective data mining. Each customer is considered an individual and prioritized. If they gain control and transparency, they will feel comfortable and interact with them. Marketers get information on every click. Online companies customer buying history helps them identify customer preferences and choices. After they can conduct online advertisement according to the choice of customer to interact them. The behavior pattern is studied in identifying the marketing channel and making the strategy accordingly analysis.

5.1 Basket Analysis by Retail shop and online:

One approach used is called basket analysis through which the customer behavior is predicted with past performance depending on the purchases and preference. Customer use credit cards in online shopping mostly[15]. Credit card data is used to evaluate the customer behavior through credit limit, interest rates and terms. This data can also be used to identify frauds in online transactions. For example Amazon, Flipkart and all online companies suggests customers to purchase the products on basis of their previous purchases. So it knows what customers is trying to purchase by analyzing customer need.

6. Conclusion

In present era, Data mining techniques may be used in online shopping or retail shopping for retaining and satisfying customers at every level- either on the matter of cost or product. On the behavior of the customer shopping pattern, the companies focus on how to satisfy customers utmost at every level. Many of the time, many customers visit any online website or retail shop at one time only. Now the companies' task here is to make them regular customer through offering some good offer or providing special facilities. But all these are not possible without Data Mining techniques.

Over all the Customer relationship Management in online shopping companies such as Amazon, Flipkart or in Retail shop center is being now very effective only because of using Data Mining techniques. Data mining has not only changed the way data is collected, but has also opened new doors for online retailers' marketing and revenue-generating activities. It has become the key to survival in this global market, and if used effectively, online companies can increase the advertising profits of their customers like Big Bazaar, Amazon, Flip kart.

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