Customer Profiling and Segmentation using Data Mining Techniques

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Abstract: delighted customer is the key to success for a company; hence it becomes very important to keep the customers not just satisfied, but happy. A company must segment the market and select the one which seems the most profitable and where it gets the best results. This is done so as to not waste resources and time on segments that will not help the company grow. Data mining techniques are used for this purpose. Data Mining is defined as the process of gaining knowledge from data, it is a technique to find out patterns that are not easily visible on the surface but are important. Data Mining has applications in various diverse backgrounds.

I. INTRODUCTION

CUSTOMER Profiling and Segmentation is used to understand the behavior of customers and acts as a guide to help reach a company's ideal customers. The customer is given the utmost importance in this system, and the business develops around him/her. The paper discusses the importance of this and also some successful examples.

II. CUSTOMER PROFILING

Customer profiling is a method to create a portrait of customers, which includes their personal and transactional details. It helps companies make various customer-centered decisions regarding their business. Customer Profiles or Personas are created with the help of customer research. Understanding the customers is the secret of successful selling today, the customer is the king and must be treated so. It is easier to retain an existing customer than to get a new one. Hence the more you make them happy, the higher are the chances that they will stick to you.

III. SEGMENTATION

Segmentation is the process of making smart decisions about how various different attributes which are a part of the customer profile relate to give important patterns and groups or segments amongst customers. These segments can be as trivial as different age groups or gender or geographical location, however sometimes the analysis leads to patterns in behavior attributes that wouldn't have been seen with naked eyes and hence help get better performance.

IV. DATA MINING

Data mining is the process of extraction of important information and patterns from large databases. It is a powerful tool, helpful to companies as it predicts customers' and market's future trends and behavior based upon the available data, allowing business owners to take charge of the situation, and make knowledge-driven decisions. Data mining tools can answer business questions that are otherwise too time consuming to solve. Using past data, patterns are generated and future behavior of customers is predicted.

V. THE PROCESS OF PROFILING AND SEGMENTATION

To build the customer profiles, two kinds of data of the customer is collected- personal and transactional or factual and behavioral. The factual data includes information like name, age, salary, gender, date of birth etc. The behavioral data consists of customer's actions i.e. his/her transactional details. On this data, data mining techniques are applied to discover rules like association and classification rules. These include observations like
1. Customer X usually purchases product Y at store Z
2. If Customer X buys product P, he also buys product Q
3. Customers belonging to a particular age group buy product Z more frequently
A number of algorithms are available to discover such rules, eg Apriori for association rules mining and CART algorithm (Classification and Regression Trees) for classification rules.
Apriori algorithm is a classic algorithm used which operates on large databases containing transactions. It

is an iterative algorithm which starts with a small frequent item set and extends every time. These item sets highlight the general trends amongst the customers.

Classification and Regression Trees analysis is used to generate predictive model to classify items into classes based on their attributes. The models are obtained by partitioning the data recursively and after that, fitting a simple prediction model within each of the partition that was made.

The next step after generating rules is validation of rules. The validation is an iterative process. Unlike rule discovery, which is done for each customer separately, rule validation is done for all customers at once. For e.g. a rule that when X buys P he also buys Q, may be common to many customers. Collective

VI. Case Studies

A. Power Electric Industry of Japan In Japan, Customer Profiling was used in Power Electric Industry after there were changes made in the existing laws in the year 2000. The Revised Electric Utility Law allowed partial deregulation of the retail electric power supply, which meant that companies other than the 10 major electric companies could now supply electric power for high voltage customers and the rates charged to the customers for electricity would be negotiable, between the companies and their respective

Customers. Due to this partial deregulation, companies had to take steps to form strategies to fight new entrants. Using customer relations was one of the strategies. To oppose the new entrants effectively, in the liberalized sector, it became important for the companies to recognize important and preferred customers based on the customer profiles generated by using information like the amount of electricity consumption, the load factor etc. and not simply view and treat all the customers same. For this purpose the following steps were carried out

1. Customer Segmentation

Contract information of customers was studied and analyzed like the amount of electricity consumption, load factor, personal attributes of the customers and the needs of customers was understood while filtering out the preferred customers. The segmentation was done into finer groups based on factors like profits and needs of company.

2. Service Menu Planning

Preferred customers were then given benefits like discounts, added value services etc.

3. Income Analysis Income analysis of customers was done.

rule validation helps us deal with common rules at once. The validation of rules is done based on certain Validation operators like similarity based rule grouping, 2 template based rule filtering, redundant rule elimination etc.

Based on these, we can segment our customers into different groups and accordingly market our product and take decisions like which segment to target, how to market the products so as to reap maximum benefits.

Fig. 1: The process of making profiles

4. Service Response Analysis RFM (Recency, Frequency, Monetary) analysis approach and Decision Tree was used for this. In RFM analysis, consumers are segmented based on how recently a consumer has purchased (recency), how often they have purchased (frequency), and how much the consumer spends (monetary).
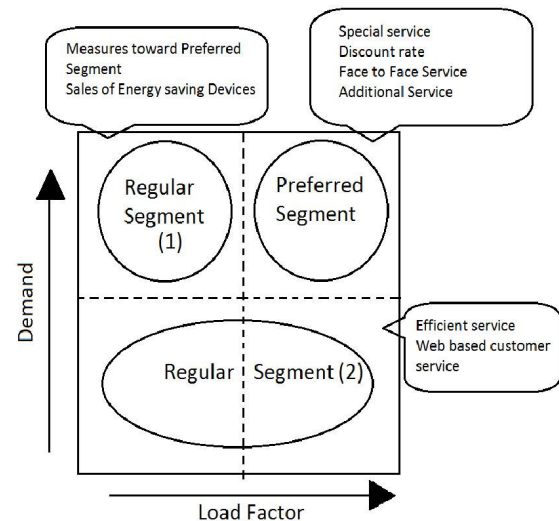

Fig. 2: Segments of the population

The amount of electricity used and the load factor were divided into two levels, and all customers of the company were divided into four groups or segments. Those customers belonging to the group of high electricity consumption and high load factor were seen as preferred or targeted customers and all the other customers belonging to the other 3 groups were seen and labeled as regular customers.

Various services and offers were then used to retain the preferred customers with the company. These customers were given special attention and were treated in a special way by being offered special is

count charge menus, and other unique services. For regular customers business was made more efficient by providing them good customer care services like answering their queries and solving their problems through call centers and over the Internet.

B. Credit Card Business

Customer profiling and segmentation using data mining techniques also finds its use in the credit card business. The customers are classified into various groups or clusters using the Recency, Frequency and Monitory (RFM) technique, to identify high profit customers. After which, association rules are mined using data mining techniques.

Proper application of data mining techniques ensures that important patterns and rules are figured out which allows the companies to know their customers well and provide them with better services. This not only helps make the customers happy, but also proves beneficial to the company as their time and other resources are put to use in the right direction.

Using the association rules to study and analyze customer transactions in detail, the companies can predict which products might be purchased by customers together, and based on the rules for combining popular products, decision makers of the company can come up with more appealing plans for marketing or better operational rules and can also offer products that customers might find interesting. Hence, the

Clusters can be used as a basis for dividing marketing targets.

Taking note of the fact, that customer's behavior of spending may change with time, time-varying and dynamically adjusted spending patterns are also explored.

VII. Conclusion

Comprehensive data warehouses that integrate transactional data with customer, supplier, and market information have created an explosion of information. Competition between firms over customers and profits, requires proper and timely analysis of this integrated data. Companies must realize the importance of customer segmentation and profiling use it to achieve better results by narrowing customer focus and targeting distinct segments.

Acknowledgment

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