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Management

Tapping the Potentials Through Digital Marketing – A Way on Data Mining Technique

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ABSTRACT Data Mining technique is the most popular and familiar technique to identify the hidden pattern or hidden customer behaviour from the customer data. Clustering analysis is the one of most common data mining technique. Cluster Analysis is a powerful segmentation tool allowing web users/ customer to segment a given population into discrete groups of similar individuals / behaviour. The main aim of this is to identify groups of people who share common characteristics, so forming a target market. In this paper, an extensive study is made to list the various data mining technique for potential customer group identification to improve business strategy

KEYWORDS : Digital Marketing, Data Mining, Cluster Analysis, Segmentation, Target marketing

Introduction

Digital marketing is a collective work for the targeted marketing, measurable marketing, and interactive marketing of products or services using digital technologies to attract, reach and retain customers for their business. The main goal is to promote brands, build preference and increase sales through various digital marketing techniques and tools. In these tools, cluster analysis tool plays vital role in segmenting the potential customer from the web user database.

It is well known that consumers are not all alike. This provides a big challenge for the development and marketing of profitable products and services in any organization like banking. Not every offering/ service will be right for every customer, nor will every customer be equally responsive to digital marketing efforts. For this, customized service is needed to improve the profitability of business. Customer Segmentation is the one of the solution for the above said problem.

Segmentation is a way of consolidating customers into groups with similar traits, product preferences, or expectations. Once segments are recognized, marketing strategy and in many cases even products can be customized for each segment. The better the segment(s) chosen for targeting by a particular organization, the more successful the organization is assumed to be in the marketplace. The data mining technique used for customer segmentation is the cluster analysis.

Cluster Analysis is a set of data-driven partitioning techniques designed to group a collection of objects into clusters, such that the number of groups (i.e. clusters/segment) as well as their forms are unknown the degree of association or similarity is strong between members of the same cluster is weak between members of different clusters. A cluster is a group of similar objects (cases, points, observations, examples, members, customers, patients, locations, etc). In this case, cluster is also known as segmentation. As a result of this, customers are segmented into different groups based on their common behaviour.

Customer segmentation is one of the most fundamental strategic digital marketing concepts. The grouping of web users based on their willingness, purchasing power, and the authority to buy etc, The better the segments chosen for targeting by a particular organization, the more successful the organization is in the marketplace. The objectives are accurately predicting the needs of customers and improve the profitability of particular organization.
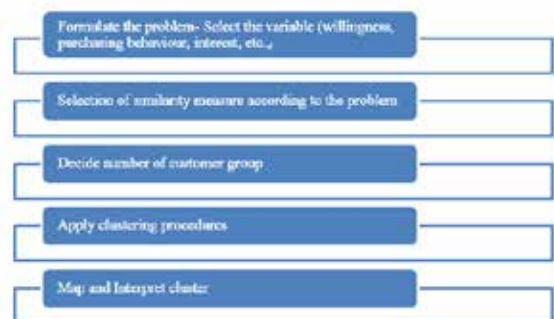
This paper studies how various cluster analysis techniques are applied to extract customer segment form the web data. This paper is organized as follows: section 2 describes about an overview of cluster analysis. Section 3 lists the existing work available in the literature. Challenges and limitations are pointed in the section 4. Finally, section 5 concludes the study carried out.

Cluster Analysis

In general, Cluster analysis processes through the raw data about customers available in the web database and groups them into clusters. A cluster is a group of relatively similar web customers. Customers who belong to the same cluster are similar to each other at same they are also dissimilar to customers outside de the cluster, particularly customers in other clusters. The primary input for cluster analysis is a measure of similarity between customers, such as

- correlation coefficients
- distance measures,
- association coefficients

The following are the basic steps involved in cluster analysis:

- Formulate the problem- Select the variable (willingness, purchasing behaviour, interest, etc.)
- Selection of similarity measure according to the problem
- Decide number of customer group
- Apply clustering procedures
- Map and interpret cluster

2.1 Variables used for customer segmentation

- Demographics
- Age
- Gender
- Education
- Income
- Home ownership, etc.
- Psychographics
- Lifestyle
- Attitude
- Beliefs
- Personality
- Buying motives, etc.
- Brand Loyalty
- Geography
- State
- ZIP
- City size
- Rural vs. Urban, etc.

Distance Measures is used to compute the similarity among customers. Based on the number of customer segments, similar customers are grouped into cluster or segment. At last, each segment is mapped according the problem domain.

Existing Work

This section discusses about various data mining techniques available in the literature.

Huanget. al. applied K-means method, Fuzzy C-means clustering method and bagged clustering algorithm to analyze customer value for a hunting store in Taiwan and finally concluded that bagged clustering algorithm outperforms the other two methods.

Hosseini et al. adopted K-means algorithm to classify the customer loyalty based on RFM values. Cheng and Chen (2009) used K-means and rough set theory to segment customer value based on RFM values.

Migueis.V.L et al. proposed a method for customer's segmentation, given by the nature of the products purchased by customers.This method is based on clustering techniques, which enable segmenting customers according to their lifestyles.

Rajeshri Lanjewaret. al, elaborates upon the use of thedata mining technique of clustering to segmentcustomer profiles for a milk product company.K-Means Clustering algorithm can help to identify customer buyingpatterns and behaviors, improve customer service forbetter customer satisfaction and hence retention. Inaddition, the research focuses on profiling customersand finding a relation between the profile and thesegments are also discussed.

In Pramod Prasad et. al. , data mining techniques are applied for retail industry.Retail Industry collects huge amounts of data on sales, customer buying history, goods transportation, consumption, and service. With increased availability and ease of use of modern computing technology and e-commerce, the availability and popularity of such businesses has grown rapidly. Many retail stores have websites where customers can make online purchases. These factors have resulted in increase in the quantity of the data collected. For this reason, the retail industry is a major application area for data mining. Moreover, authors have concurred that K-Means performs comparably to Expectation Maximization clustering.

The scope of this paper to understand and predict the behavior of customers with behaviour segmentation methodology. The result of the study can

support customer development by offering the right products to right customers and better targeting of product promotion campaigns.

The paper aimed to study different DM techniques used so far for customer segmentation in online retail Industry and lists identified the gaps from previous studies in this field.

This paper briefly explains customer segmentation and how k- means clustering could be used in order to divide the customers into different groups. A simulation study is shown to support the concept.

Limitations in Cluster Analysis Methods

From the above study, it has been observed thatbenchmark clustering algorithm called K-Means clustering algorithm is used frequently for customer group extraction. In K-Means Clustering algorithm or any other partitional clustering algorithm,

Need to specify K (number of clusters) in advance

Applicable only for numeric data

In general, it has problems when clusters are of differing

•　Sizes
•　Densities
•　Unable to handle noisy data and outliers

To overcome above mentioned limitations, an intelligent cluster analysis method is developed to extract potential customer group for digital marketing.

Ways to extract potential customer group

This subsection lists the some of the ways for identification of customer group. They are:

•　To apply intelligent clustering techniques for customer group identification. Some bio-inspired optimization algorithms like Ant-Colony optimization, Particle Swarm optimization algorithm, Bees' Colony algorithm, Firefly optimization algorithm, Cuckoo Search algorithm etc., are combined with the traditional clustering to get the better result.

•　To use Two way clustering instead of one way clustering (i.e horizontal partition or vertical partition oof data). Two way clustering is the simultaneously clustering of customer data into subgroups called bicluster or co-cluster. These biclusters or co-clusters capture the local behaviour of the customer exactly. This result plays vital role in the target marketing concept. Target marketing is the fundamental part of the digital marketing.

Conclusion

The study carried out in this paper revealed that cluster analysis is the one of the best method to identify customer segments. But, it has its own pros and cons. It has been observed that cluster analysis method is combined with intelligent approach. Otherwise, it should be hybridized with the optimizing approach. For optimizing approach, we can use swarm intelligence approach. This work is carrying out in future.

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