



# International Journal of Innovative Research in Computer and Communication Engineering

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## Implementation of Clustering Technique in Marketing Sector

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**ABSTRACT:** Cluster analysis divides data into meaningful or useful groups (clusters). One of the most important problems in modern finance is finding efficient ways to summarize and visualize the stock market data to give individuals or institutions useful information about the market behaviour for investment decisions. The enormous amount of valuable data generated by the stock market has attracted researchers to explore this problem domain using different methodologies. Potential significant benefits of solving these problems motivated extensive research for years. We proposed clustering techniques that are being used in Data Mining is presented. Data mining adds to clustering the complications of very large datasets with very many attributes of different types. This imposes unique computational requirements on relevant clustering algorithms with k-means method is one of the clustering techniques. Data mining facilitates marketing sector by classifying customer demographic that can be used to predict which customer will respond to a mailing or buy a particular product and it is very much helpful in growth of business.

**KEYWORDS:** Marketing, data mining, clustering technique.

### I. INTRODUCTION

Advancements in computer technologies caused a rise in information production and data base system volume. To discover the data with the potential to be useful which are kept in databases and to create meaningful patterns from these are stated as data mining [2]. Businesses are in a tense competition which needs continuity in today's consumer focused markets. Businesses have to apply effective and low cost marketing strategies to be successful in these competition conditions to create effective marketing strategies true information is needed and to obtain true information future headed forecasting systems which can analyze the data in multiple dimensions are needed. In this connection, the data mining techniques are used widely in marketing field same as many other fields.

Clustering is the process of grouping a collection of objects into classes of similar objects. Cluster analysis is a very important tool in data analysis. It is a set of methodologies for automatic classification of a collection of patterns into clusters based on similarity. Cluster analysis has wide applications in data mining, information retrieval, biology, medicine, marketing, and image segmentation. With the help of clustering algorithms, a user is able to understand natural clusters or structures underlying a data set. For example, clustering can help marketers discover distinct groups and characterize customer groups based on purchasing patterns in business.

Cluster analysis is unique tool, which can be widely applied on marketing area. Therefore cluster analysis is being used in order to solve the marketing issues like market segmentation of consumer market (products and services), identification of market structure, description simplification.

K means clustering is an exclusive clustering algorithm. Each object is assigned to exactly one of a set of clusters. For this method of clustering we start by deciding how many clusters we would like to form from our data [5-7].



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A large number of clustering algorithms have been developed for different purposes. Based on the strategy of how data objects are distinguished, clustering techniques can be broadly divided in two classes: hierarchical clustering techniques and partitioning clustering techniques. However there is no clear boundary between these two classes.

## A. Partitioning methods

Partition clustering algorithms divide the data set into a specified number of clusters. Partitioning clustering algorithms, such as K-means, PAM (Partition around Medoids) or K-medoids and CLARANS (Clustering Large Application Based on Randomized Search). K-means is the most popular and easy-to understand clustering algorithm.

The K-means Algorithm most widely used partitioning algorithm is the iterative K-means approach. The algorithm is called *k*-means due to the fact that the letter *k* represents the number of clusters chosen.

## B. Hierarchical methods

Hierarchical clustering, also known as Connectivity based clustering, is based on the core concept of objects being more related to nearby objects than to objects farther away. Hierarchical clustering is a method of cluster analysis that constructs the clusters or groups by recursively partitioning the instances in either a top-down or bottom-up approach. Hierarchical clustering algorithm builds a cluster hierarchy or a tree of clusters.

## II. LITERATURE REVIEW

Radhakrishnan et al.,[1] described the Data Mining Application in Marketing .Data mining is applied to this problem by first defining what it means to be a good prospect and then finding rules that allow people with those characteristics to be targeted. Prospecting requires communication. Broadly speaking companies intentionally communicate with prospects in several ways. Partitioning method is referred as centroid based clustering such as K-means and partitioning around medoids. The clustering technique also plays a significant role in data analysis and data mining applications [3,5,6,8].

Chandan et al.,[7] are developed A new Approach Document clustering help in organising documents in groups according to their similarity of contents. Businesses are in a tense competition which needs continuity in today's consumer focused markets. Businesses have to apply effective and low cost marketing strategies to be successful in these competition conditions.

Zhang et al.,[9] Marketing is one of the mostly used application area for Data mining by the industry in general. Banking is not an exception. Retaining customers and finding new customers are getting increasingly difficult because of cut throat competition prevailing in the market these days. This is where data mining can help a great deal. In traditional markets, customer clustering is one of the most significant methods used in studies of marketing. This study classifies existing customer cluster/segmentation methods into methodology-oriented and application-oriented approaches. Most methodology driven studies used mathematical methodologies; e.g. statistics, neural net, generic algorithm (GA) and Fuzzy set to identify the optimized segmented homogenous group [2,4].

Chopra et al.,[10] Data mining applied to customer relationship management systems can analyze customer data. Data mining techniques can help in classifying customers according to the customer's, attributes, behaviour, needs, preferences, value and other factors. Sreekumar et al.,[3] determined how customers will react to a change in interest rates, which customers will be likely to accept new product offers, what collateral would require from a specific customer segment for reducing loan losses.

## III. EXISTING SYSTEM

In traditional markets, customer clustering is one of the most significant methods used in studies of marketing sector. This study classifies existing customer cluster/segmentation methods into methodology-oriented and application-oriented approaches. Most methodology driven studies used mathematical methodologies; e.g. statistics, neural net, generic algorithm (GA) and Fuzzy set to identify the optimized segmented homogenous group .Retaining customers and finding new customers are getting increasingly so it difficult to identify. One of the most important problems in modern finance is finding efficient ways to summarize and visualize the stock market data to give

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individuals or institutions useful information about the market behavior for investment decisions. The enormous amount of valuable data generated by the stock market has attracted researchers to explore this problem domain using different methodologies.

## IV. PROPOSED WORK AND OBJECTIVES

### Proposed Architecture:

The proposed approach is a two phased model. In first phase, collect the data from our organization retail smart store and then do the data cleansing. It involves removing the noise first, so the incomplete, missing and irrelevant data are removed and formatted according to the required format. In second phase, generate the clusters and profile the clusters to identify by best clusters. Fig.1: illustrates the whole process.

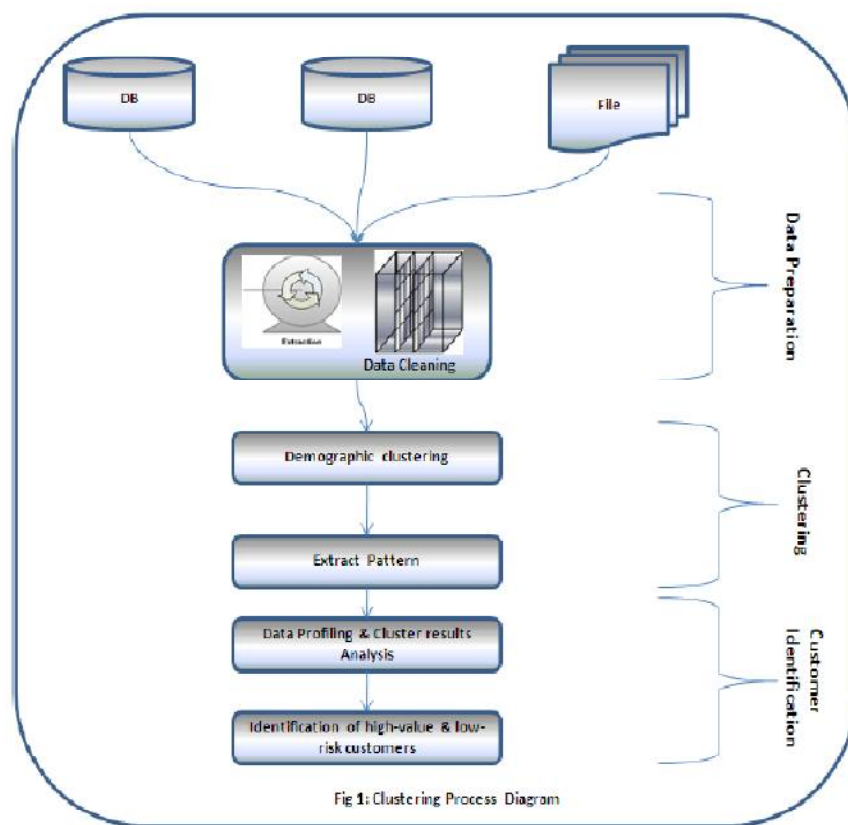


Fig.1 : Clustering Process

Behavioral clustering and segmentation help derive strategic marketing initiatives by using the variables that determine customer shareholder value. By conducting demographic clustering and segmentation within the behavioral segments, we can define tactical marketing campaigns and select the appropriate marketing channel and advertising for the tactical campaign. It is then possible to target those customers most likely to exhibit the desired behavior by creating predictive models.



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In this work demographic clustering algorithm is used to identify the customer clustering. In phase 1, the customer data is cleansed and developed patterns using various parameters and subsequently, in phase 2 profiled the data, developed the clusters and identified the high value low risk customers. From the experimental results it showed that the proposed approach would generate more useful pattern from large data.

The main objective of market segmentation is accurately predicting the needs of customers and thereby intern improving the profitability by procuring or manufacturing products in right quantity at time for the right customer at

optimum cost. To meet these stringent requirements *k*-means clustering technique may be applied for market segmentation to arrive at an appropriate forecasting and planning decisions.

## V. APPLICATION

Clustering techniques are useful in various applications of real world including data/text mining, voice mining, image processing, web mining etc. It is a main task of exploratory data mining, and a common technique for statistical data analysis used in many fields, including machine learning, pattern recognition, image analysis, information retrieval, and bioinformatics .

### A. Application Areas of Clustering

Clustering algorithms can be applied in many fields, for instance:

- Marketing: finding groups of customers with similar interests and behavior given a large database of customer data containing their properties and past buying records.
- Medicine: IMRT segmentation, Analysis of antimicrobial activity, Medical imaging.
- Financial task: Forecasting stock market, currency exchange rate, bank bankruptcies, understanding and managing financial risk, trading futures, credit rating.
- Computer Science: Software evolution, Image segmentation, Anomaly detection.
- Biology: classification of plants and animals given their features, human genetic clustering, transcriptomics.
- Insurance: identifying groups of motor insurance policy holders with a high average claim cost; identifying frauds.

### B. Advantages

- 1) It does not require a-priori specification of number of clusters which is opposite from the case of *k*-means.
- 2) It is able to identify noise data while clustering, so more robust in nature.
- 3) Able to find arbitrarily size and arbitrarily shaped clusters.

## VI. CONCLUSION

With the increase of economic globalization and evolution of information technology, financial data are being generated and accumulated at an unprecedented pace. Data mining techniques will be used to uncover hidden patterns and predict future trends and behaviors in financial markets. The competitive advantages achieved by data mining include increased revenue, reduced cost, and much improved marketplace responsiveness and awareness. We described the process of clustering from the data mining point of view. We gave the properties of a “good” clustering technique and the methods used to find meaningful partitioning. These techniques are being used in marketing sector. This study concludes that clustering techniques and algorithms become a highly active research area in data mining research.

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