

A Two-Layer Clustering Model for Mobile Customer Analysis

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Abstract- Customer segmentation provides an effective and efficient way to obtain insights into customer characteristics and behavioral preferences. In order to enhance customer relationship management and to focus on a dynamically changing market place, we have built a two-layer clustering model for mobile telecom customer analysis. The first layer identifies the cluster by domain expert in accordance with the contribution of the basic degree of customer segmentation. The second layer uses clustering algorithms to group together highly homogeneous groups and identify representative groups in order to explain the characteristics of the group. It then builds a mobile-user clustering model based on customer attributes, contribution to help enterprises view changes in customer value and behavior. The clustering results of this study are readable, have marketing implications, and are intuitive. They can be combined with the product to assist marketing staff with effective marketing. After verification, this method does achieve the desired results.

INTRODUCTION

Existing System:

In existing system, Data clustering and clustering algorithms let us group highly homogeneous individuals and assign dissimilar individuals to the appropriate segments. By analyzing customer attributes, behaviors, and preferences, we can determine the high homogeneity of individual clusters, and the high degree of dissimilarity among individuals, given the appropriate segments. In addition to effectively controlling the homogeneity of characteristics among the mass customer base, this analysis can also be used for limited customers—for example, to develop management strategies and marketing principles to assist in customer relationship management (CRM).

Disadvantage

It is not a cost-effective solution, as it needs a good server design which can be a bit expensive.

Server clustering is not much flexible, as not all the server types can be clustered

There are many applications which are not supported by the clustered design.

PROPOSED SYSTEM

In this study, we propose a two-layer clustering model based on the analysis of customer attributes, customer contributions, and cluster segmentation. We cluster the value of mobile customers and execute customers' characteristics on a regular basis in a systematic way. Our model can also be applied to other business areas that track consumer behavior, such as membership cards used in retail sales (as with Costco) or bank-issued credit cards. Through such cards, organizations can record and identify customer consumption and use our proposed clustering model for business analysis. Preference analysis can help a company view changes in customer value and behavior and, at any time, adjust its product strategy to retain high-quality customers. Our model provides a way for companies to plan for long-term CRM and retain high-quality customers. In addition, short-term marketers can use this modeling approach to promote products or services accurately.

Advantage

Server clustering is completely a scalable solution. Resources can be added to the cluster accordingly.

Server clustering is specifically designed for high availability solution.

MODULE DESCRIPTION

Clustering Server
Customer
Marketing

Clustering Server:

- a) we can determine the high homogeneity of individual clusters, and the high degree of dissimilarity among individuals, given the appropriate segments.
- b) a two-layer clustering model based on the analysis of customer attributes, customer contributions, and cluster segmentation. We cluster the value of mobile customers and execute customers' characteristics on a regular basis in a systematic way.
- c) through such cards, organizations can record and identify customer consumption and use our proposed clustering model for business analysis. Preference analysis can help a company view changes in customer value and behavior and, at any time, adjust its product strategy to retain high-quality customers.

Customer:

- a) In addition to effectively controlling the homogeneity of characteristics among the mass customer base, this analysis can also be used for limited customers—for example, to develop management strategies and marketing principles to assist in customer relationship management (CRM).
- b) Our model provides a way for companies to plan for long-term CRM and retain high-quality customers. In addition, short-term marketers can use this modeling approach to promote products or services accurately.
- c) (c). Business applications include targeted or direct marketing based on customer grouping and clustering, customization services, good CRM, and customer behavior, attributes, and preferences.

Marketing:

- a) customers form appropriate segments, which helps the company focus on its target customers and then develop CRM, marketing strategies, and promotional activities.
- b) The big data platform cross-analysis function maintains each group of customers and, along

with effective marketing programs, forms the second layer of customer clustering analysis.

- c) provide real-time, diverse, and rich customer information through preplanned pre-analysis to strengthen the target customer base and reduce the workload of marketing staff.
- d) use data mining technology to tap potential target customers, increase the feasibility of marketing products and services, and improve the accuracy of precision marketing.

Customer Clustering

We can divide clustering algorithms into the following general categories:

- Hierarchical. The data points are merged or split to form the target clusters.
- Partitional. The number of clusters to be formed is specified in advance, and the data points are assigned iteratively to the respective clusters.
- Density-oriented. Clusters are formed by concatenating the data space distribution density thresholds in line with the data points.
- Grid-oriented. The data space is quantized into a grid structure in accordance with grid-based units for clustering.
- Model-based. Existing models (often statistical ones) are used to cluster data points individually.

Cluster analysis is widely used for multivariate data analysis in fields such as medicine, economics, text mining, and commercial applications. There have been many studies on cluster analysis for separating data characteristics and detecting data-clustering phenomena. Business applications include targeted or direct marketing based on customer grouping and clustering, customization services, good CRM, and customer behavior, attributes, and preferences. According to the 80/20 rule (or the Pareto principle), 80 percent of a company's profits come from the most important 20 percent of its customers, with the remaining 20 percent of profits coming from the ordinary 80 percent of customers. If a company can fully comprehend its key 20 percent of customers, those customers can bring a substantial profit. The related research combines the concepts of customer lifetime value (CLV) and customer segmentation. In this study, customers form an appropriate segment, which helps the company focus on its target

customers and then develop CRM, marketing strategies, and promotional activities.

CLV refers to the total revenue that each customer can bring to the enterprise. It can be divided into the customer's historical value, current value, and potential value. Academic research on customer grouping has been conducted based on CLV, and three different models have been put forward according to customer contribution, basic attributes (such as age and gender), and preferred customer behavior. The results show that customer groups formed through multiple dimensions can differentiate customer attributes effectively. Dividing the majority of customer groups into several special behavioral subgroups helps a company gain an in-depth understanding of its customer base. However, most customer grouping to date has either been based on rules of thumb or has used only the average revenue per user (ARPU) as a benchmark for customer segmentation. Only a few approaches have included other factors, such as customer lifecycle or overall customer contribution. Vodafone, a British telecom operator, segments mobile users into many homogeneous clusters through customer segmentation and customer profiling to identify common features. It uses the analysis and description of user attributes to help management with decision-making and operational guidelines.

ALGORITHM

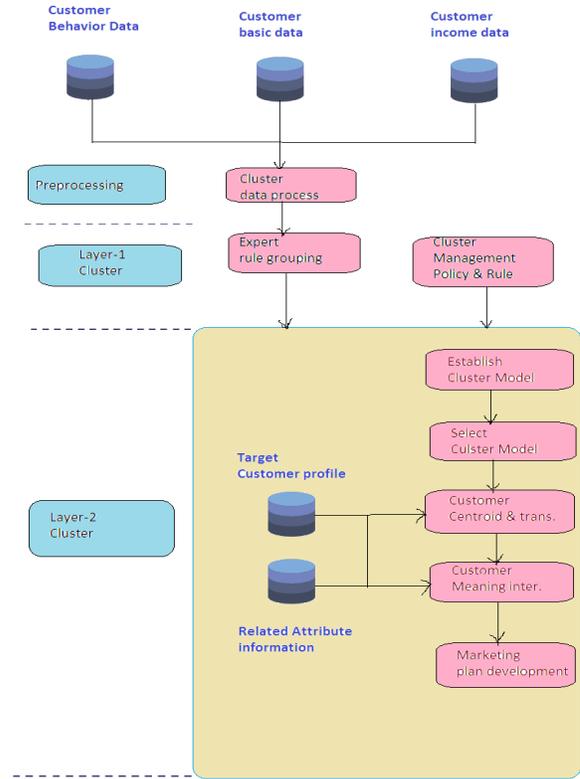
Hierarchical Clustering:

In the first case data are grouped in an exclusive way, so that if a certain datum belongs to a definite cluster then it could not be included in another cluster.

Instead, a hierarchical clustering algorithm is based on the union between the two nearest clusters. The beginning condition is realized by setting every datum as a cluster. After a few iterations it reaches the final clusters wanted. Finally, the last kinds of clustering use a completely probabilistic approach.

Outlier Processing: Replace the outliers using the ceiling or floor method to avoid bias due to extremes

ARCHITECTURE



CONCLUSION

Customer clustering is only included in cluster modeling through mobile voice, data usage behavior, customer contributions, and customer base data. In future work, we intend to increase the grouping of the customer-variables selection function. For different marketing or business needs, a customer-clustering model will be established to increase the flexibility of customer-clustering applications. In addition, in accordance with changing customer group structures to achieve a set threshold value, we aim to establish restart of the cluster modeling process or modify the marketing strategy of the warning mechanism to improve the dynamic feedback model grouping benefits.

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