Research on Customer Relationship of Power Marketing Based on Clustering Model of Internet

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Abstract: After entering the new century, information technology and Internet technology have developed rapidly, and the application of network technology has become more and more widely used. In the power marketing relationship, the adoption of new technologies has become increasingly important for the management of customer relationship. This paper combines the concept of difference degree in data mining clustering analysis algorithm to design an evaluation tool suitable for this model. The degree of difference in cluster analysis of data mining is used to describe the similarity between two objects. When the attribute values of the description object are different, the calculation method of the difference degree is also different. In the field of clustering analysis problems, a method for calculating the degree of difference has been proposed for the problem of two-dimensional variable high-dimensional sparse clustering.

1. Introduction
The basic idea of the application of data mining technology in marketing is to identify the customers with the greatest value to the enterprise through the evaluation of existing customer data. If this value is greater than the cost of taking promotional measures for the customer, the customer should be promoted. Therefore, how to evaluate the potential value of customers is the key of marketing data mining technology[1-2].

Aiming at the research of customer relationship in power marketing, research and analysis of the needs of power companies, clustering model to deal with customer relationships, help power companies to establish a complete set of customer relationship management system. The system realizes the following functions: integrating customer information platform, managing sales process, providing after-sales service, planning products and sales analysis, etc., to provide business consultation, customer suggestions and complaints, bill management, online customer service, etc[3-4].

2. Design of sparse clustering model
The sparse difference of the collection reflects the similarity between the objects in the collection. See the specific definition below:

The sparseness of the collection indicates the degree of difference between the objects in the collection. The greater the difference is, the more similar the objects are. The smaller the difference, the more similar the objects. This function fully conforms to the logical definition of customer self-reliance coefficient. The greater the difference, the stronger the tendency for customers to listen to their opinions. Therefore, based on the concept of difference degree, the concept of individual self-reliance index is proposed[5].
Predefined 1: Each customer's purchase record in the database corresponds to the product ID number. In order to facilitate subsequent data processing, each customer is defined as an object. All products in the database are attributes of the object. After purchasing the product, the product attribute value corresponding to the customer is 1, otherwise it is 0; otherwise it is 0.

It can be seen that the predefined definition completely conforms to the definition of sparse features. Definition 2: Suppose there are \(n\) customer objects, each object has \(m\) product attributes, the value is 1 or 0, \(X = (x_1, x_2, \ldots, x_n)\) is a sorted object subset, \(|X|\) is the number of objects, \(\eta\) is the number of attributes of the \(|X|-1\) feature values in the subset that are completely different from the first object\([6-7]\). \(\alpha\) is the number of attributes with a value of 1 for at least one of the first object and the last \(|X|-1\) objects in the subset. Then define the degree of difference of the first object in the sorted collection # as:

\[
SQ(\lambda_1) = \sum_{i=1}^{n} \eta \frac{\eta}{|\lambda| \alpha}
\]  

In Equation (1), \(SQ(\lambda_i)\) is the difference degree of an object, \(I\) is the number of vectors, and \(n\) is the eigendegree.

Then the individual self-dependence index:

\[
SW(\lambda_1) = \sum_{i=1}^{n} \frac{SQ(\lambda_1)}{1 + SQ(\lambda_1)}
\]  

In Equation (2), \(SW(\lambda_i)\) is the degree of dependence on \(\lambda_i\) objects.

In the model, customer objects are divided into primary and secondary, which is different from the definition in cluster analysis, so the object subset \(\lambda\) must be ordered, and \(\eta\) and \(\alpha\) are also redefined\([8-9]\).

3. Architecture implementation

The customer relationship management system can be logically divided into application layer, application support layer, basic resource layer, security support system and operation and maintenance management system. The application layer mainly faces users and constructs various applications, covering customer management, business account management, inventory management, payroll management and system management. The application support layer provides all kinds of common services required by the application layer, such as data exchange service, data synchronization service, transaction processing service, process control service and authorization and authentication service, which can effectively simplify the design and implementation of the application system. The basic resource layer includes the system database and the server database of the data acquisition system, as shown in Figure 1.
According to the SOA design concept, in the overall design architecture of the message bus system, each specific business system is connected to the message exchange platform through the Adapter to send and receive business data. The adapter acts as a coupling message exchange platform. Adapter Kernel implements message interaction with message exchange center and real-time monitoring of messages, and provides the function of distributing messages to application systems. The API provides a set of standard interfaces for the application system. It has sufficient extensibility and can be flexibly embedded in the business process. At the same time, the definition of communication configuration that is not related to the business is isolated from the business code.

4. Function test of marketing customer relationship
The test application of customer management module is shown in Table 1:

| Test title | Customer Management, Test |
|------------|--------------------------|
| Participating role | operator |
| Test object | The Customer management function pages |
| test item | Test content | Test procedure | Test Results |
| 1 | New customer information | As the system administrator, enter the new customer page, add new customer information, click the classification of customer information, add different information, and check whether there is this information in the system | The database holds information about the customer that the user just added |
|   | Description | Instructions | Result |
|---|-------------|--------------|--------|
| 2 | Edit the customer information | Enter the customer information editing and management page, select the query function on the page, enter the query page, select the customer information in the page for editing and management | The customer information in the database changes to the information modified by the user |
| 3 | Add the order information | Enter the order management page and click in the middle of the page Click add new order to add a page to the order Add all order information to the surface | The order information is displayed more successfully in the query page |
| 4 | Comprehensive Query of Order Information | Enter the order comprehensive query page, in the page query just modified order information | Users click on different filter types, different types of orders can appear in the system, just modified information successfully updated |
| 5 | Add a new schedule | Enter the schedule management page, add a new schedule in the page, and submit the system | The database contains the user's newly added schedule information, |
| 6 | The Daily programming management, | Enter the schedule management page and check in the page Find a schedule and proceed with the schedule information Modify and edit | The schedule information in the database was modified successfully |
| 7 | Comment on the schedule | The system administrator carries on the comment to the schedule, add Comment content | Users can see the top leaders' comments, including the content of the comments |

After testing, the mined personal self-dependence index is the number of customers, and the ordinate is the self-dependence index value. The personal self-dependence index is in a normal distribution, which shows that the mined self-dependence index is in line with the actual situation. It is reasonable to be used to estimate customers' purchasing propensity.

5. Conclusion
This paper is based on how to mine each customer's self-dependence index and mutual influence index, and how to maximize and optimize the customer value through these customer relationship attributes. The trust relationship provided by the data source is used to determine the influence relationship between customers. On the basis of data mining, the marketing customer relationship management system can not only optimize the establishment of a good management system, but also improve the quality of existing customers. It can be said that the marketing customer relationship management system is a great thing for the development of the enterprise. This proves the practicality of marketing customer relationship management system for customer relationship management.

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