

Data mining using RFM Analysis

Divya D. Nimbalkar, Asst Prof., Paulami Shah

Abstract— The competitive world of today demands for having good marketing policies to attract the customers as well as retain the old customers. Organizations hence use strategies that would give the best customer satisfaction and which will return all their investments in their products with profit. It therefore becomes necessary to classify different segments of customers so that one can provide them with a personalized service. This paper serves this purpose of managing customer relationship by performing customer segmentation using RFM analysis then performing clustering on the values obtained from this analysis and then classification to get the applicable rules for each customer segment obtained after clustering.

Index Terms— association rule mining, clustering, classification, customer relationship management, customer value, FAPH, K-means Algorithm, RFM model, Rough Set Theory, TOPSIS.

1 INTRODUCTION

The large amount of information present in organizations if used correctly can help generating important patterns and trends. These patterns provide useful insights of customer buying patterns.

But since this data is very complex it becomes even more difficult to know the customer needs, improve their satisfaction and further lead to their retention. Customer relationship management deals with this recognition and retention of potential customers.

The techniques of customer value analysis give details of only the future buying patterns of customer from their past purchasing records. But to know the customers value in future a new technique of RFM analysis is used. This technique uses the three parameters of recency, frequency and monetary value to get the customer loyalty value which is further used in the clustering phase to cluster similar customers and finally develop rules for clusters generated in the previous step. The details of the terms customer relationship management, customer value analysis, RFM analysis are as follows:

1.1 Customer Relationship Management (CRM)

CRM is devoted to improve relationship with customers, it focuses on how to integrate customer value, requirements, expectations and behaviors by analyzing data from customer transactions. CRM is hence the manner in which both existing and new customers are retained in the organization. Enterprises apply some methods to effectively enhance customer relationships which include customer relationship management, customer value analysis, enterprise strategy and positive service mechanisms. An effective CRM is the one that has this capability of having both new and retaining old customers.

1.2 Customer Value Analysis

Customer value analysis is a kind of analytical tool which identifies customer future buying patterns from the existing patterns in large databases. The enterprises apply these methods to know the target customers whose contribution is outstanding. The RFM model is one of the well known customer value analysis method which extracts characteris-

tics of customers using fewer criterions as cluster attributes so as to reduce the complexity of the model.

1.3 RFM Model

RFM analytical model differentiates important customers from large database by three variables as interval of customer consumption, frequency and the amount. The RFM model hence considers Recency, Frequency and Monetary value as the three criteria for getting loyalty value of customers. The detailed definition is as follows:

Recency of last purchase (R): It represents the interval between the latest buying and the present time of a customer. The lower the interval the higher is the recency value of that customer.

Frequency of purchase (F): It represents the number of times a customer buys within a particular period like once in a month, thrice in a year and likewise. The higher the value number of transactions in an interval the higher is the value of F.

Monetary value of purchase (M): It represents the monetary value of the purchases in a particular time interval. Higher the monetary value more is the value of M.

The Table.1 below shows a dataset of customer transactions that are analyzed using RFM analysis with values them being initially in days, number and amount respectively [4].

TABLE 1
AN EXAMPLE OF DATASET : CUSTOMER TRANSACTION [4]

CustomerID	Recency (Days)	Frequency (Number)	Monetary (TL)
1	7	4	540
2	6	20	960
3	45	1	30
4	21	2	44
5	14	4	145
6	32	2	55
7	5	3	130
8	50	1	90
9	35	25	1430
10	10	5	130
11	5	8	540
12	1	9	1430
13	28	3	54
14	17	2	44
15	4	1	37

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