

# MARKETING MODEL FOR EFFICIENT CRM (Customer Relationship Management)

<sup>1</sup>K.Alekhyas, <sup>2</sup>M.Raghu, <sup>3</sup>G.Manoj Kumar, <sup>4</sup>B.Sai Sameer, <sup>5</sup>V.Kalyan Kumar

<sup>1,2,3,4,5</sup>U.G Student, Department of Computer Science and Engineering,  
Anil Neerukonda Institute of Technology and Sciences,  
Sangivalasa, Visakhapatnam, Andhra Pradesh, India.

**Abstract**-Today, the Customer Relationship Management has become the foundation for any successful business. It not only helps a firm to increase the profits but also helps to know the preferences of the customers and increase the quality of the Website. The project aims to efficiently handle the CRM (Customer Relationship Management) based on the RFM Analysis. The RFM Score is calculated on a range of 0-5 and the Customer Segmentation is done based on this score. So, this overall score helps the Website Administrator to know the loyalty of the customer. The log data is collected from two or more number of websites and the average of the RFM Scores is calculated. This score is used to analyse the loyalty of a customer and customer behaviour through online.

**Keywords**- Customer Relationship Management, Loyalty, RFM (Recency, Frequency, Monetary) Analysis, Customer Segmentation, Profits.

## 1. INTRODUCTION

A healthy and good relationship between the customers and company is the cornerstone for any successful business. This has led to the emergence of many Customer Relationship Management based technologies and different methods to find the potential customers. Behavioural analysis of the customers helped the companies find the different types of customers and their preferences. This has also helped to identify the Relationship patterns among customers and segment them according to their interests[1]. This way of classifying the customers helps the administrators to identify the hibernating or inactive customers and perform some strategies to increase the profits. Currently, there are many metrics like Recency, Customer Lifetime Value, Monetary Value, Customer Retention Rate etc. to measure the loyalty of a customer. One famous methodology that is used to measure the Customer Loyalty is RFM Analysis which considers the Recency, Frequency and Monetary values of a Customer and analyse their performance.

## 2. METHODOLOGY

The RFM Analysis is done by considering three values: Recency, Frequency and Monetary. Recency is the number of days back the customer has logged into the website.

Frequency is the number of times the customer has viewed the website and Monetary is the amount that the customer has spent. Now, based on the three parameters the loyalty of a customer is measured. For measuring the loyalty of the customer, a metric called RFM score is maintained. This RFM score is calculated on a range of 0-5.

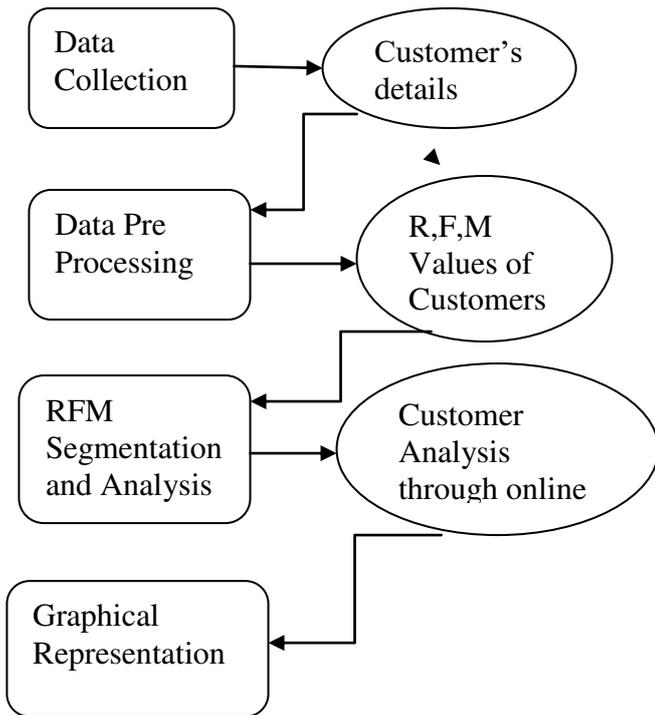
According to these RFM score values for Recency, Frequency and Monetary, the customers are segmented into eleven(11) classes. This segmentation is done based on two values, where in one is the Recency score and another is the combined score of Frequency and Monetary values. The customer with highest Recency value is allocated with a score of 0 whereas the customer with lowest Recency is allocated a score of 5. Whereas the customer with highest frequency is allocated a score of 5 and customer with lowest frequency is allocated 0. Similarly is the Monetary score. Now the average of the Frequency and Monetary scores is calculated and the value obtained is the second score required for the Customer segmentation. After the segmentation of customers, the administrator could check the type of customers in his/her website and take necessary measures .

TABLE 1  
Customer Segmentation using R,F,M scores

S.No.	Class of the Customer	Range of the Recency score	Range of the Frequency and monetary combined score
1	Champions	4-5	4-5
2	Loyal customers	2-5	3-5
3	Potential Loyalist	3-5	1-3
4	Recent Customers	4-5	0-1

5	Promising	3-4	0-1
6	Customers needing Attention	2-3	2-3
7	About to sleep	0-2	3-5
8	At Risk	0-2	2-5
9	Can't lose them	0-1	4-5
10	Hibernating	1-2	1-2
11	Lost	0-2	0-2

**2.1 System Architecture**



*Stages of Processing*

The Marketing model consists of four(4) stages.

1. Data Collection: In this stage, the customer's details are collected from a website .These details include User Id, Registered Mobile number and Email ID. These details are collected and sent to the next stage for data pre processing.

2. Data Preprocessing: The data initially needs to be in preprocessed in order to filter and remove the unwanted data[5].So the datils which are collected are analysed, filtered and R,F,M values are calculated based on the last login date, number of times the customer has logged in and the amount the customer has spent.

**3. RFM Based Segmentation and Analysis:**

The Customer Segmentation helps the administrator the preferences of the customers and indirectly helps in market

segmentation[8].So in this stage, according to the R,F,M values obtained in previous stage the customers are segmented to different classes and the analysis becomes easy to the administrator.This helps the administrator to save time and perform the analysis in an efficient manner.

4. Graphical Representation: After the customer segmentation, the entire RFM Analysis is depicted with the help of three graphs for Recency, Frequency and Monetary scores. This enables the administrator to gain a better understanding about the R,F,M scores of his/her customers and this helps for the efficient Customer Relationship Management(CRM).

**3. PROCEDURE**

Stage 1:

**Data Collection:**

In the first stage of Data Collection, the data from different customers is collected and this data is stored in the form of a file. A sample website is developed for the data collection through which Customers can register themselves with Email ID.

Through this website, the login history is maintained and the Login and Registration details are stored in the Database.

This data is passed onto the next stage for Preprocessing where in these details will be further analysed.



Fig 1. Data Collection Phase

Stage 2:

**Data Preprocessing:**

The Customer's details which are collected in Stage 1 are analysed and the R,F,M scores are calculated.

*Calculation of Recency value:*

Recency value is the difference between last login that the customer has made and the current date. It is measured in terms of No. of days.

Recency value=Last login date- Today's date.

**Calculation of Frequency value:**

Frequency value is the number of times the customer had logged in to the website. It is also measured in terms of number of days.

Frequency value=No. of times of Customer’s login.

**Calculation of Monetary value:**

Monetary value is the price that the customer has spent till date. The current expenditure is summed up to the previous overall Expenditure. This value is measured in terms of Price.

Monetary value=Current expenditure + Previous overall Expenditure.

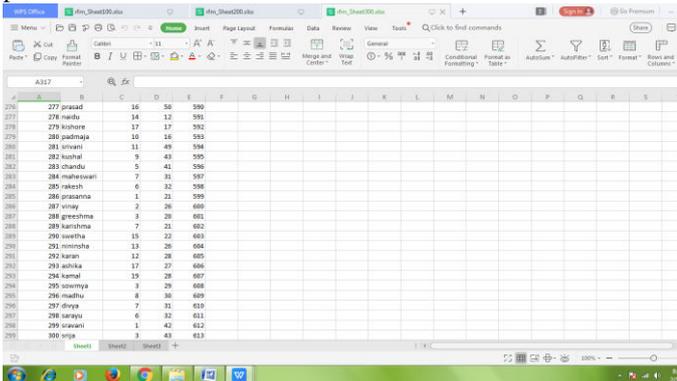


Fig 2.Data Pre processing with 200 customers

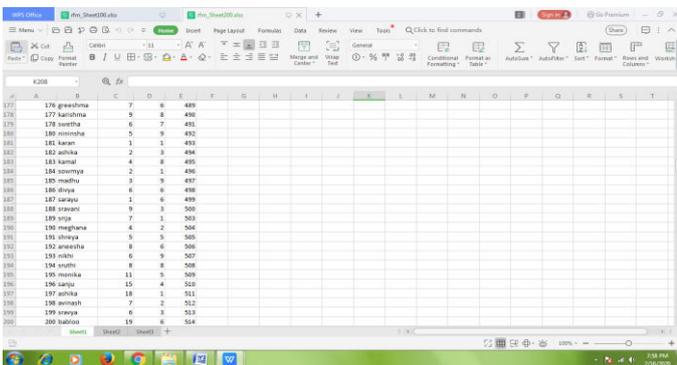


Fig 3.Data Pre processing with 300 customers

**Calculation of r,f,m scores**

The R, F, M scores are calculated on a range of 0-5.

Each customer is assigned with these three scores.

Initially, the values of recency, frequency and monetary are sorted such that the recency values are sorted from low to high, frequency values are sorted from high to low and Monetary values are sorted from high to low. Let us assume that there are 100 customers on a website. The value of 100 is divided by 5 which yields 5 segments with 20 customers each. Now these 5 segments are allocated a score of 1-5. If the value when divided by 5 yields a remainder other than 0, then the

remainder number of values are allocated to a segment whose score is 0. Thus we have scores from 0-5. Now these customers are assigned with the R,F,M Scores in the following manner:

**Calculation of R(Recency) Score:**

Since the values of recency are sorted in the ascending order, the customers in the first segment are allocated a score of highest score of 5. The remaining segments are allocated with a score of 4, 3 and so on.

**Calculation of F(Frequency) Score:**

Since the values of frequency are sorted in the Descending order, the customers in the first segment are allocated a score of highest score of 5. The remaining segments are allocated with a score of 4, 3 and so on.

**Calculation of M(Monetary) Score:**

Since the values of Monetary are sorted in the Descending order, the customers in the first segment are allocated a score of highest score of 5. The remaining segments are allocated with a score of 4, 3 and so on.

**Stage 3:**

**RFM Based Segmentation and Analysis:**

After the allocation of R,F,M scores we consider two(2) parameters. One is the Recency score range and another is the combined score of Frequency and monetary which is obtained by performing an average of F, M values. Thus the Customer Segmentation is done according to TABLE 1.

In this stage we obtain the customer behaviour through online by performing an average of the two scores of the websites.

Let us assume that there are two websites. The recency score ranges are R1 AND R2 and the combined frequency, monetary scores are FM1 and FM2. Thus the average RFM scores are calculated as follows.

Final R score  $R = (R1 + R2) / 2$

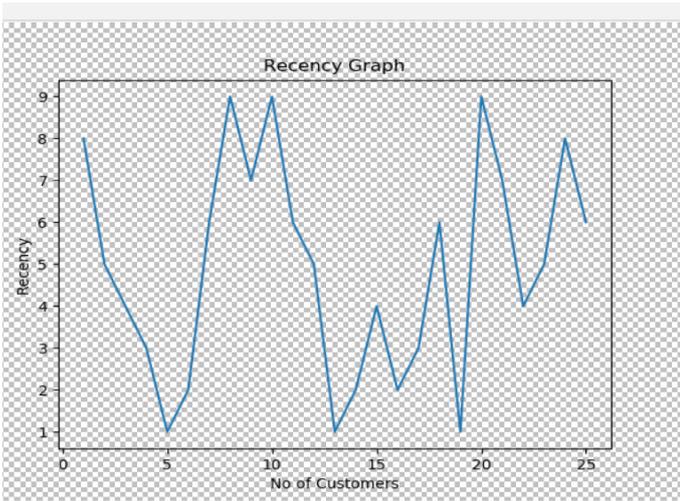
Final FM score  $FM = (FM1 + FM2) / 2$

**Stage 4:**

**Graphical Representation:**

After the calculation of the above two scores, the entire analysis is represented in the form of graphs. We obtain a graph for Recency, Frequency and Monetary which yields a total of three(3) graphs. With the help of these graphs, the website administrator can get a visual representation about his Customers and analyse the performance of the website. [The three graphs are as follows:

Graph showing the Recency Score vs No. of Customers



#### 4.OUTPUT GENERATION

The output we obtain is the Segmented list of Customers with their classes. So, we obtain this in two phases. In the first phase, we obtain the segmentation w.r.t single website and then we perform segmentation w.r.t multiple websites.

Input:

The input is the preprocessed data with Recency, Frequency and Monetary scores which is explained in Sec 3.2.

Output:

The Output is obtained in two ways:

- Customer Segmentation using single data set
- Customer Segmentation using Multiple datasets for Online behavioral Analysis

The output screens are shown below:

Graph showing Frequency score vs No.of Customers

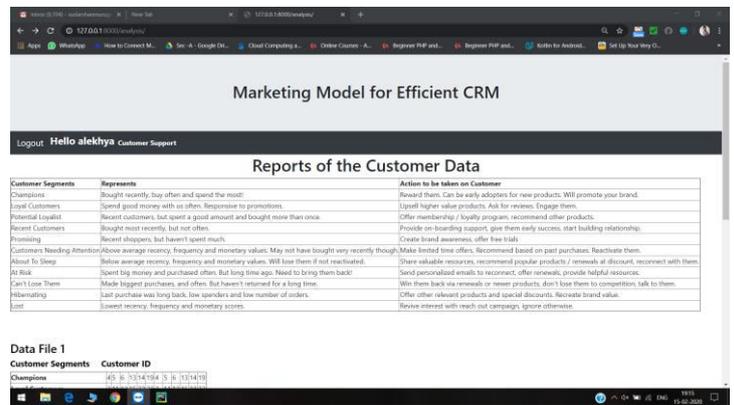
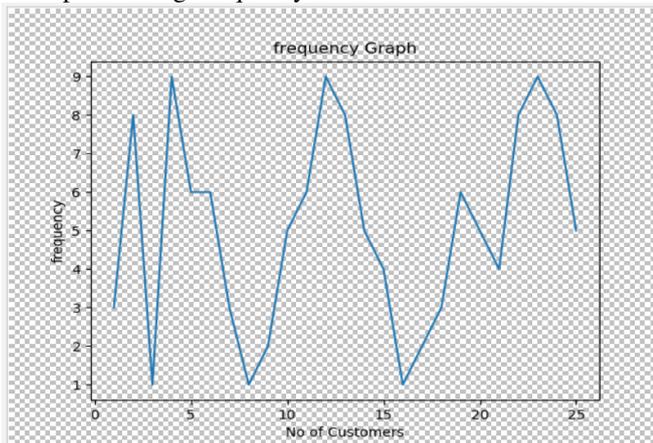


Fig 4. Customer Segmentation using single dataset

Graph showing Monetary score vs No. of Customers

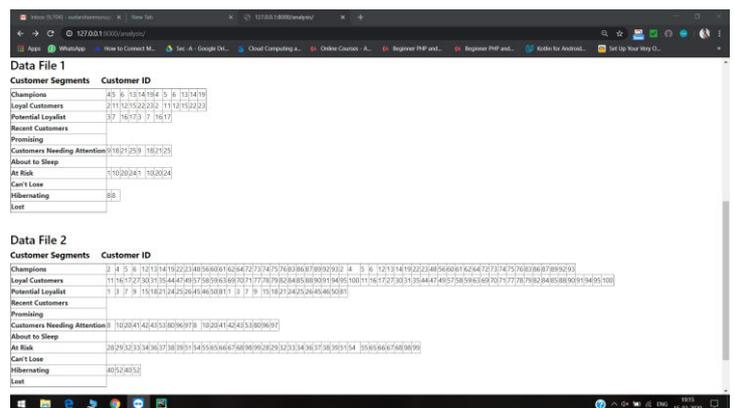
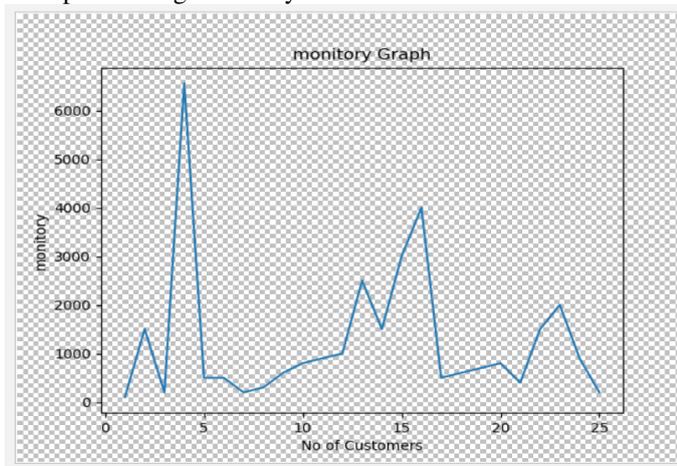


Fig 5. Customer Segmentation using Multiple datasets

#### 5.CONCLUSION

Thus, the ability to accurately predict the value of customers of a company has huge impact on the capacity to make intelligent decisions.[2] Knowing the individual value of each customer allows the identification of the most loyal customers and directing expenditure towards them.

Therefore, our proposed model of segmentation based on RFM Analysis helps us to understand the loyalty of a customer based on the recency, frequency and monetary values. It segments the customer data and then generates a graphical representation which can be understood accurately by the administrator.

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