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## Designing Combo Recharge Plans for Customers using Apriori Algorithm

Tanisha Ingale\*, Shashank Damani\*\*, Deepshikha\*\*\*, Aditya Karmalkar\*\*\*\*, Santosh Darade\*\*\*\*\*

*Department Of Computer Engineering, Sinhgad Institute of Technology and Science, Pune-41*

### ABSTRACT:

*Machine Learning has become an integral part of human research now a day. People are tending to select more automatic system rather than going with the manual handling. Data mining has the huge effect on business analysis as all business rely on their behaviour of customers. Mining the behaviour of customers can help the very existence of the company. For mining such kind of data, association rules are used. This algorithm helps in finding the itemsets that are used frequently. This paper has proposed the way to satisfy customers in telecommunication market. Knowing the customer's recharge pattern can enhance their will to use the same service provider. By mining the recharge pattern of individual customer, this system should be able to provide a new combo of recharges which will indeed be less than the individual recharges. For mining such frequent itemsets, this paper has used Apriori algorithm.*

**KEYWORD:** *Data Mining, internet based facilities, SMS, Association Rule Mining, Clustering, Frequent Item-set, Apriori Algorithm, Churn Rate.*

### INTRODUCTION:

Now a day, telecom markets are facing huge competition when it comes to customer satisfaction. People are tending to change their service provider due to the un-satisfaction they feel. Loss of customer from their service provider is known as churn. Because of the competitive environment, churn rate is becoming high. Customer are tending to switch to other operator whose schemes match their requirement. Customers often switch service provider due to good promotional offers and lower monthly cost from other providers. As prepaid customers are not bind by any contract to the service providers so prepaid customers are inherently more prone to discontinue the service. Indian customers are mostly prepaid customers, so there is always a very high chance of attrition. As per current data churn rate in India has gone up to 14 per cent per month with incremental net additions are at 8-10 million. Mobile number Portability (MNP) is a scheme that is introduced in India by Telecom Authority of India (TRAI). A customer can use MNP to change service provider without changing his/her mobile number. So, looking at current MNP statistics in India will give some insight about the grave necessity to reduce customer attrition. As per the latest press release of TRAI around 5.16 million customers have used MNP in June 2016. Total number of MNP requests since inception stood around 224.43 million in the same period. We see that churn reduction has become a survival strategy for the telecom service providers. In this work, instead of predicting who are going to churn and offering them some promotional offer, this study will focus to minimize the customer dissatisfaction which is one of the most important attribute that contributes to churn. Goal of this study is to identify such recharge

combo offers that will bundle all important services (like talk value, data, SMS, Value Added Services (VAS) etc.) in such a way to make most of the customers happy (with the offer) as well as maximize revenue per user from all services.

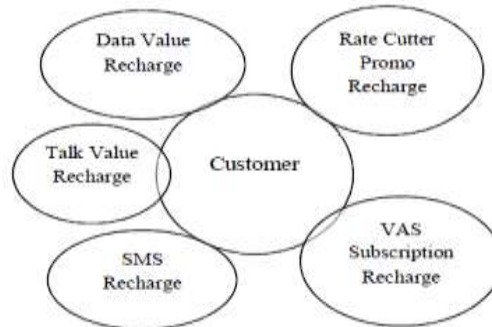


Figure 1 : Different Types of Recharges

Data mining is the technique of sorting through large data storage to identify patterns and establish relationships to solve problems using data analysis. Data mining is the process of analyzing large amounts of data stored in a data warehouse for useful information which makes use of artificial intelligence, neural networks, and advanced statistical tools to reveal trends, patterns and relationships. Data mining tools allow business market to predict future trends. Information generated through data mining is used for decision making. Data mining supports many different techniques for knowledge discovery and prediction such as classification, clustering, sequential pattern mining, association rule mining and analysis, sequence or path analysis. Data mining is mainly used in mathematics, cybernetics, genetics and marketing, business analysis, strategic decision making, financial forecasting, future sales prediction etc. Our proposed model uses association rule mining technique. This technique is used to show relationship between different items. By analyzing large dataset correlation among items can be analyzed. Market basket analysis is another name given to association rule mining technique.

Two important concepts of association rule mining are :-

1. Support :- It is the count of the itemset in the total number of transactions. The support for an association rule  $X \rightarrow Y$  is the percentage of transactions in the database that contains  $X \cup Y$ .

If  $A \rightarrow B$

Support ( $A \rightarrow B$ ) =  $\frac{\text{Tuples containing both A and B}}{\text{Total number of tuples}}$

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Total number of tuples

2. Confidence :- It is the ratio of number of transactions that contain  $A \cup B$  to the number of transactions that contain A.

Confidence ( $A \rightarrow B$ ) =  $\frac{\text{Tuples containing both A and B}}{\text{Tuples containing A}}$

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Tuples containing A

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**Literature Survey:**

**Author:** Giridhar Maji, Soumya Sen

**Title:** Data Warehouse Based Analysis on CDR to Retain and Acquire Customers by Targeted Marketing.

**Objective:** In this paper a mechanism is developed to store CDR data in a suitable Data Warehouse (DW) schema and analytically process these using OLAP tools to understand the prepaid customers usage, spending and propensity to marketing offers.

**Author:** Owczarczuk, Marcin

**Title:** Churn models for prepaid customers in the cellular telecommunication industry using large data marts.

**Objective:** This paper studies usefulness of the popular data mining models to predict churn of the clients of the Polish cellular telecommunication company.

**Author:** Dairo, Adeolu O.

**Title:** Customer base management in a prepaid mobile market: Usage risk and usage opportunity model.

**Objective:** In this paper, Usage Risk and Usage Opportunity model was developed that can be used to understand critical usage behavior within the customer base.

**Author:** Verbeke, Wouter, David Martens, and Bart Baesens.

**Title:** Social network analysis for customer churn prediction.

**Objective:** Social network analysis has been used to predict churn in using relational learning algorithms to incorporate social network effects within a customer churn prediction setup.

**Author:** Gerpott, Torsten J., and Phil Meinert.

**Title:** Choosing a wrong mobile communication price plan: An empirical analysis of predictors of the degree of tariff misfit among flat rate subscribers in Germany.

**Objective:** This paper presents the relationship between the degrees of tariff choice misfit among mobile service subscribers with customer characteristics.

**PROBLEM STATEMENT:****Motivation:**

1. The introduction of Reliance Jio lead to the downfall of other telecom servies.
2. Due to increasing Churn rate, there is a need of a system which can maintain the competency in the telecom market .

## SYSTEM ARCHITECTURE:

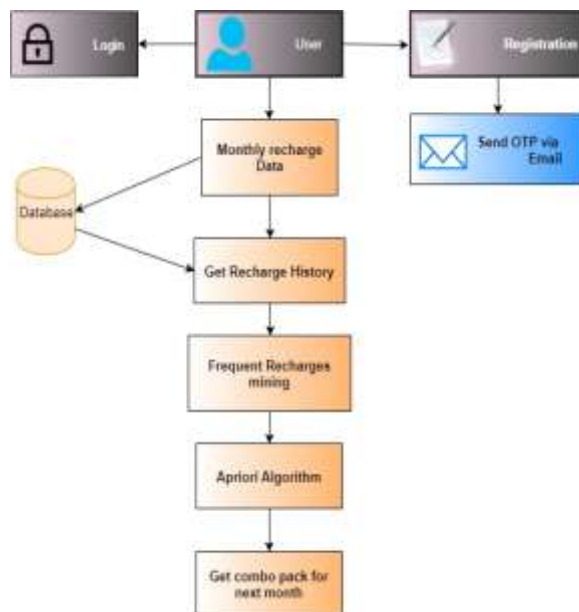


Fig.2: System Architecture

## OUR APPROACH:

1. Firstly, the users will register their account to the system. This will include their Name, Age, Address, Registered Mobile Number, Identity Proof, Nationality etc. After the submit button, the identity of the user will be verified by sending OTP to their e-mail ID. The information of registered users will be stored in the database.
2. After this, the user will be logged in to the system by giving their credentials. This credential will be tallied through the database.
3. After logging in, user will be redirected to their home screen where they need to log their previous amount and scheme they used. Each time the user recharges their phone, their data will be stored in the database.
4. By having sufficient number of user's monthly recharges, our next step is to extract their interest as to which scheme they tend to satisfy.
5. Once their frequent recharges have been extracted and their recharging pattern has been recognized, the combination of schemes will be suggested to them. This will satisfy the customer's requirement.

## CONCLUSION:

This paper has proposed a model to analyse the recharge plans of a customer by using Apriori algorithm and suggest a combo recharge plans. This paper has discussed data pre-processing steps to generate the item set from raw recharge transactions dataset. Proposed model allows

to generate combo data plans after analysis. Expectation is that these combo plans with cost price slightly less than the individual price combined will make most of the customers happy as well as telecom service provider can be sure to get full potential revenue from those customers.

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