# DESIGNING COMBO RECHARGE PLANS FOR TELECOM SUBSCRIBERS USING ITEMSET MINING TECHNIQUE

**Shailesh Ingale , Pankaj Gudmewar,Swapnil Dhaware,Vishal Bagade, Prof P. Nawghare**

## 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.

**Keywords:** *customer retention , prepaid churn, apriori algorithm, association rule Mining, frequent item set.*

## I.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. Customers 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.

## II.BACKGROUND

Most of the work on customer retention focuses on churnerprediction and offering some kind of promotional offeringsand/or targeted marketing towards those probable churnercustomers so that they stay with the service provider. Authorsin [5] uses CDR and analyses call volume, call frequency, calling time etc. to group customers and to identify potentialchurners and proposes targeted promotional offerings to retainthem. Authors in [9] developed a Usage Risk and Usage
Opportunity (UR/UO) model to capture all customer usagerelated behavior and applied that model on prepaid customerdata to categorize them into different groups such as grower,decliner, flat, stopper, new user etc. They use this knowledgefor the telecom service provider to leverage the opportunities toenhance revenue and mitigate the usage risk. A differentapproach is based on social network analysis of the customer Relationships with other customers. This model analyzes thefeatures or attributes of the links or social ties among customersand uses the result obtained to predict churn. This modelexpects that all those customers connected by strong links will

exhibit similar behavioral pattern, that is, if one of them churnsthen others will likely to follow [1]. In a recent study [2]researchers investigated the time-to-churn prediction.

A single customer normally makes more than one recharge for different recharge-types. Our aim is to identify those set of recharge types that are done very frequently and by a great percentage of customers within a fixed time period (may be for a month).
Our work mainly focuses on customer satisfaction by givingthem value for money recharge offers in a way that fits thembest. As in India and other developing economies most of thetelecom customers are highly price sensitive and always lookfor value-for-money, so we try to model proper rechargecombos that will give them more value at lower price and at thesame time make sure to preserve average revenue per user(ARPU) with growing customer base.

## III.METHOD AND EQUATIONS

### Data Preprocessing

We adapt the association rule mining using Apriori from. We used this for mining association rules in a retaildataset.
**Input:** Properly transformed and aggregated historicalRecharge data of telecom subscribers (of some telecom circle),T.
Let s = minimum threshold support for an itemset to beconsidered. This value will be decided after consulting businessexperts and management of the telecom service provider.
In a similar way c = minimum threshold for confidence willbe defined.

#### The Apriori Algorithm

1. Find all individual elements (1 element itemset, L1)that have a minimum support of s.
2. DO
a. Use previously found i element itemset (Li) to findall (i+1) element itemsets with a minimum support.
 b. This becomes the set of all frequent (i+1) itemsetsthat are interesting.

3. WHILE itemset size less than k.
Deriving the Association rules with Apriori
*Step 1*: Use Apriori to generate frequent item-sets of alldifferent sizes
*Step* 2: During each iteration of Apriori divide each frequentitemset X into two parts antecedent (LHS) and consequent(RHS). The Association rule becomes of the form R:
LHS->RHS.

**PROPOSED SYSTEM**

Lot of research has been done on different ways to predict churn. Most of the existing work is based on post-paid customers where lot more information is available about the customer and comparatively easy to predict churn. Some work on prepaid churn has been done with the help of call detail record analysis. Therefore, 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.

This paper proposes a model and analysed a set of recharge transaction data and used Apriori algorithm to find the support and confidence values for different recharge-types of recharge plans and ranked them in order of their support count i.e. percentage of customers using those service-category recharges in the same month.Existing theory proposes to predict the customers who are likely to switch the service provider. This study was mainly to gauge the level of customer satisfaction and to analyse the factors driving the customer churn on Indian prepaid segment. Based on the churn factors, the operational retention strategies were designed to enhance the customer loyalty by arresting the churn rate.
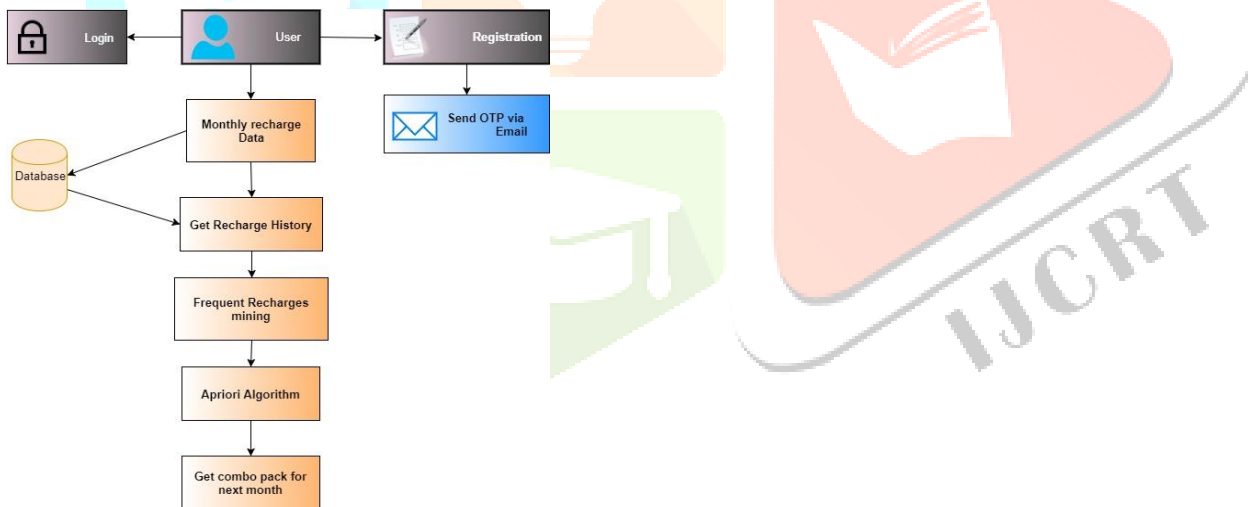
## IV. FIGURES AND TABLES



**Fig: System Framework**

## V. 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.

## VI. FUTURE WORK

Future work will include: A customer may rechargesame type of recharge multiple times in a month so aggregatingthem for the whole month needs to be done. Some of theexisting recharge plans may have varying validity period soproper modeling needs to be done to accommodate it beforeconsidering them for monthly analysis.

## REFERENCES

**Journal Papers:**

[1]    Backiel, Aimée, Bart Baesens, and GerdaClaeskens. "Predicting time-tochurnof prepaid mobile telephone customers using social networkanalysis." Journal of the Operational Research Society (2016).

[2]    Owczarczuk, Marcin. "Churn models for prepaid customers in the cellulartelecommunication industry using large data marts." Expert Systems withApplications 37, no. 6 (2010): 4710-4712.

**Conference Papers:**

**[3]**    Dairo, Adeolu O. "Customer base management in a prepaid mobilemarket: Usage risk and usage opportunity model." African Journal ofMarketing Management 7, no. 3 (2015): 42-51.

[4]    Dongre, Jugendra, Gend Lai Prajapati, and S. V. Tokekar. "The role ofApriori algorithm for finding the association rules in Data mining." InIssues and Challenges in Intelligent Computing Techniques (ICICT),2014 International Conference on, pp. 657-660. IEEE, 201.

[5] Burgett, J., ShahzadHussain, Catholijn M. Jonker, A. Razaq, and K. Silz."Mobie: Personalized automated recharge of prepaid mobile phones." InInternational Workshop of Central and Eastern Europe on Multi-AgentSystems, pp. 54-61. Springer Berlin Heidelberg, 2001.