

# Review on Prediction of Churn Customer Behavior

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**Abstract:** This paper represents that Churn Prediction has been major research problem with the growth of market development as customer's asset more valuable persons for growth of company. The task of churn prediction is to identify the customers who are pretending to shift from one company to another. As in the competitive environment, it becomes necessary to focus on retaining churn customers as well as attracting new customers. The overall objective of this paper is to compare the various algorithms of Data Mining have been used for making distinguish between customers into loyal and churn, so that appropriate steps can be taken into consideration in order to retain the churn customers to the company as customers are more valuable to the survival and development of the company.

**Keywords:** Churn Customers, Churn Taxonomy, Causes of Churn customers

## 1. INTRODUCTION

With the growth of companies, needs of customer changes day by day and each customer is now facing free products (discounts) and number of choices. In order to get all profit and services, customers change their service provider to other, where they found some extra benefit. Changing of service provider by the clients is called "Churning" or "Attrition". The concept of churn prediction becomes the crucial problem in every organization. Acquiring and retention of new clients becomes major issue in the business growth. Attraction of new customers always put much pressure on the company. While new companies concentrate on acquiring new clients, old one focuses on retention of existing clients. Retention of old customer makes profit to the company. Acquiring new customers in an organization takes twelve times more than retaining them. An organization growth depends upon number of customers regularly visited, or on the loyal customers. Therefore, company always used DM techniques in making distinction between churn and loyal clients so that appropriate methods would be applied in future for holding churn clients in future. Churn customers are the customers who tend to move to another company. Different Data Mining techniques have been use to separate the churn and loyal customers for the profit of company by reducing churn customers in a company. Churn prediction is a method of differentiating churners and non-churners, so that appropriate steps can be taken to retain them .To control the churn customers in company, it becomes necessary to develop an effective model for churn prediction. DM techniques have been used to discover

necessary data from warehouses or from other information resources. NN, DT, SVM are the most popular DM techniques for churn prediction.

### 1.1 Churn Customers

Churn customers' leads to the loss of company as they are moving from one company to another, where they found some extra profit. It is not easy to identify the customers who are tending to move or leaving the company. Therefore, company prefers to use various DM techniques in order to hold the churn customers as customers are the valuable persons for them. Churn means the role of customers who are about to relocate their usage of service to a competitive service agency. Churn prediction methods gives the prediction regarding customers who planning to churn soon whereas churn operations helps on the other hand which aims to recognize such churners and to execute some beneficial actions to minimize the churn effect. Customer churn behavior can be predicted from the four factors: client behavior, client perceptions, and client demographics and macro-environments.

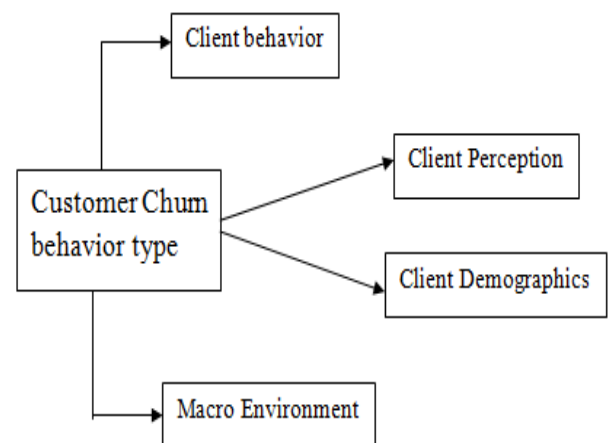


Fig 1: Churn behavior Type

1. Client Behavior- refers to the treatment by the clients. These also relates to the main components that are utilized by the company and how the customers are dealing with them.
2. Client Perception- it relates to the attachment of the customers to the company. It is basically relates to the activation and deactivation of the relation with the company.

3. Client demographic-includes personal information of customers, also used for churn calculation.
4. Macro environment- variable belongs to the changes available in the world and the different views of the customers about the product qualities. Macro environment variable identifies the changes in the world and the different experience of customer which affect the way they use the service. For instance, in the telecommunication trade people who have survived a natural disaster and could rely on their mobile phones during it are more likely to continue using the service.

### 1.2 Churn Taxonomy

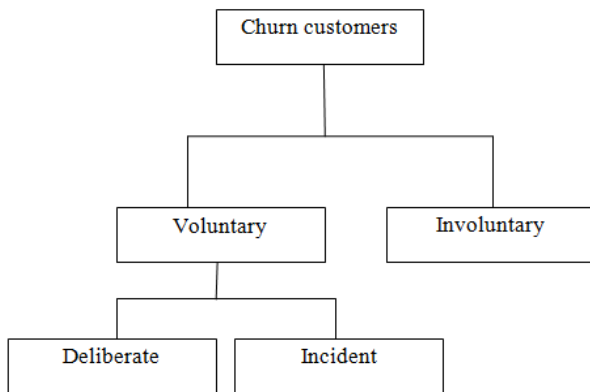


Fig 2: Churn Taxonomy

Churn customers are to be divided into two types: - voluntary and involuntary. In involuntary churners customers are the easiest to identify as the company disconnect the services to the customers, due to some reasons, like for fraud, non-payment etc. It become hard to identify voluntary churner as it occurs when customers automatically terminate his/her service with the provider as they found some profit in other service provider (E.Shaaban and M. Nasr, 2012). Voluntary churn can be sub-divided into two main categories, incidental churn and deliberate churn. Incidental churn occurs, not because the customers planned on it but because something happened in their lives. For example: change in financial condition churn, change in location churn, etc. Deliberate churn happens for reasons of technology (customers wanting newer or better technology), economics (price sensitivity), service quality factors, social or psychological factors, and convenience reasons. Deliberate churn is the problem that most churn management solutions try to solve voluntary churn can be sub-divided into two main categories- incidental churn and deliberate churn. Incidental churn occurs, when customer disconnects the service due to some problems, for example: financial problem of customers, change in location churn, etc. Deliberate churn occurs where customer tends to move other company as they found benefits or offers in competitor service.

### 1.3 Causes of Churn Customers

It is important to understand the root cause of churn attrition so that future plans can be made in order to retain them in company. It is not easy to control the churn

attrition .There are several reasons due to which loyal customers can change their service provider. Some of explained are as –

1. Dissatisfaction- Satisfaction or Dissatisfaction can affect the company level. Customer becomes churn as they do not satisfy with the service that is provided by the existing company. Therefore, they like to change the service. Dissatisfaction customers can change the position of company as they may lead to churn attrition.
2. Higher cost- It becomes the major cause for the customers to be churned. Declaring high prices on the products or service leads to the churn attrition. Sometimes, organization declares higher cost on the service or product, to fill the gap, which may lead the churn attrition. Price incentives can change the level of company as it causes churn attrition.
3. Quality- customers tend to move as they do not found appropriate connection of services to their place or are not happy with the quality of product that the company is provided to them. Quality mainly is of two types: Technical quality which refers to the product that is delivered to customers and Function quality that defines how the product is delivered to the customers.
4. Lack of features- customers dissatisfied with the features of the product. They become churners as sometimes; company provides less features of product to them as they indicated before. Customers may switch to other company as the exact features are not provided by them.
5. Privacy concerns: Consumers have an increasing awareness that companies they deal with have a lot of information about them, including their spending habits, personal financial information, health information, and the like. Breaking of privacy promises, publicized privacy problems, telemarketing, and other issues are causing many customers to consider their personal privacy as an asset and they are holding their service providers responsible for keeping privacy promise.
6. New Technology or New competitor- Sometimes, customers leaves the company and move to another as they found some extra benefit on the product in the other organization. Customers tend to move as new technology offers by any organization. Customers can disconnect the service as they found something new about same product in other.
7. Communication channel- customers can obtain information from various communication channels about new products and become much aware about the quality of products.
8. No Loyal Brand- Brand issues are also the major cause of churn customers. Customers always want to buy products from the loyal brand company. Issue may be arising due to new services or entry by consumers to the reputed company.
9. Security- Mostly, company is not responsible to secure the data regarding their customers. Consumers are aware about their personal information like name, phone number or personal financial information. It is mostly found in Telecommunication services as privacy issues occur.

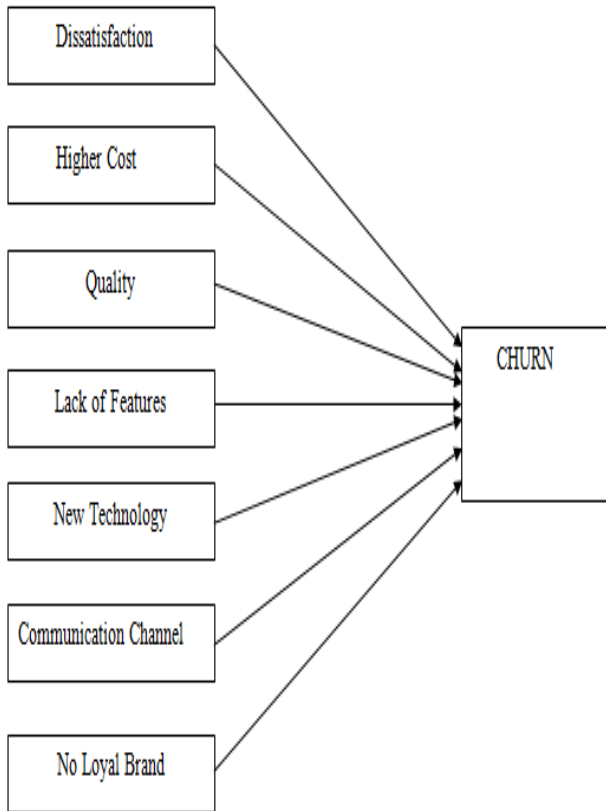


Fig 3: Churn Causes

## 2. RELATED WORK

B.Baesens et al. (2004) [1] used Bayesian network classifier for slope estimation problem for customer life cycle. BNC was compared with other techniques of artificial intelligence and provide the best performance in predicting the life of customer life cycle of long life. J.Hadden et al. (2008) [4] proposed new model based on three different techniques-NN, Regression trees and DT. The proposed model focused on the demographic data and usage for the churn prediction. The use of repairs and complaint data helped the customers to stay within the organization and also expand the model by increasing loyalty in a well defined manner. Xie et al. (2009) [5] developed IBRF (improved Balanced Random Forest) on the dataset of real bank customer with ANN, DT and CWC-SVM and produce better results over RF algorithm

such as BRF and WRF as it combines sampling technique. This novel approach is proposed by combining RF which used cost sensitive and Weighted Random forest which used sampling technique. Indranil Bose et al. (2009) [7] used C5.0 DT with boosting in clusters to predict the churn customers. Clustering technique with C5.0 DT helped to detect the churn customers. Clustering helped to differentiate the customers into different groups, while DT can split the customers at one time based on single attributes. SOM and BIRCH served to generate the intercrossed framework for current and future data. J. Basiri et al. (2010) [10] proposed a hybrid approach OWA (Ordered Weighted Averaging) on LOLIMOT and Bagging & Boosting algorithms to amend the accurate anticipation of churn customers. The algorithms are implemented on telecommunication dataset. For feature selection, Chi-square algorithm is used. W.Verbeke et al. (2011) [11] developed two DM techniques for prediction of churn customers named AntiMiner+ and ALBA (Active Learning Based Approach). AntMiner+ used rule and Active Learning Based Approach for SVM. AntMiner+ worked on the principle of Ant Colony Optimization and ALBA used rule set for high predictive accuracy. P.alias Devi et al. (2012) [12] used clustering and association rule to analyze the customer behavior. K-mean method was used with homogeneous behavior and association rule was to identify the product by customers. Association rules are a priority algorithm and found to be better mining rule as it helps to find the frequent item dataset from the database. A.Kumar et al. (2012) [14] explores the concept of customer loyalty. Customer loyalty becomes the new mean for the growth and profitability of an organization. The acquisition of loyal customers can lead to the better results. N.Kamalraj et al. (2013) [16] determine the possible churners using the predictive data mining model. The main goal of the research is to get the complete investigation about the data analysis in the critical process to precede the successful data mining application. It is used to investigate the data analysis; robust predictive model can be built by discovering the significant churn factors.

### 3. COMPARISON TABLE

Name of author	Title of the paper	Year	Techniques	Benefits	Limitations
Bart Baesens et al.	Bayesian network classifiers for identifying the slope of the customer lifecycle of long life customers	2004	Bayesian network classifiers and artificial intelligence techniques	classifying customers in the binary classification	the creation of variables have not considered the predictive capabilities
J.Burez et al.	Separating Financial from Commercial Customer Churn	2008	Random Forest	Reduce the inherent conflict between those two departments	Cost effectiveness has not been considered
Yaya Xie et al.	Customer churn prediction using improved balanced random forests	2009	artificial neural networks, decision trees, and class-weighted	Determine the distribution of samples and improving the effectiveness and generalization ability.	chosen weak learners would not be cost-effective
Chih-Fong Tsai et al.	Variable selection by association rules for customer churn prediction of multimedia on demand	2009	Association Rules and Neural Networks	Enhance the probability of retaining customers.	time series and trend analysis has not been considered
Sanjay Jamwal et al.	Applying Data Mining to Customer Churn Prediction in an Internet Service Provider	2010	Data Mining Techniques	identify the best churn predictors	Evolutionary optimization techniques has not been considered

### 4. CONCLUSION

This paper shows the comparison of various techniques for churn customer behavior that based on data mining algorithms. The occurrence of churn customers is one of the crucial problems for the growth of a company, as it acquires higher costs as well as use of unsupervised filtering is ignored to reduce the effect of noise in the data and also use of evolutionary optimization is also neglected by the majority of existing researchers. So in near future we will evaluate to predict customer churn behavior using artificial bee colony based algorithm.

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