Customer Churn Prediction Analysis

Jainam D. Shah
Student, B.Tech (CE)
CSPIT, CHARUSAT
Anand, Gujarat, India

Fenil D. Shah
Student, B.Tech (CE)
CSPIT, CHARUSAT
Anand, Gujarat, India

Mrugendra Rahevar
Assistant Professor (CE)
CSPIT, CHARUSAT
Anand, Gujarat, India

ABSTRACT
This paper depicts that customer churn prediction has settled as a major research issue with the development of market advancement. The assignment of stir expectation is to distinguish the clients who are professing to move starting with one organization then onto the next. More contenders, new and imaginative plans of action and better administrations are expanding the expense of client securing. In this condition specialist co-ops have understood the significance of the maintenance of existing clients. In this way, suppliers are compelled to put more endeavors for expectation and avoidance of stir. The main intention of this paper is to specify the process of designing the churn prediction model, its application and causes, challenges and problems for designing the model and subsequently, the ways through which the churn rate can be ameliorated.

General Terms
Theory and Applications of Data Mining, Business Analytics, Machine Learning.

Keywords
Customer Churn, Data Mining, Prediction Model, Business Analytics, Machine Learning Algorithms.

1. INTRODUCTION
Due to proliferation in the number of industries the competition has been increasing. Many industries offer astonishing and delectable offers to increase the penchant among the customers. Customers get bewildered and begin to switch to different subscriber in search for better offers; so winning new customers is an expensive and tough process. Therefore, industries have become well aware that more than half of the effort has to apply on retaining the customers against signing the new customers and in keeping churn low has become crucial for service-oriented companies. One of the prominent specimens is of Telecom Company. The initial and the foremost step in curtailing outbound churn and establishing loyalty of the prevailing customers is to understand the reasons of churning. Therefore, the churn prophecy is a useful tool to helpful tool to forecast customer at churn risk [1]. Customary agitate or churn expectation systems have the benefit of being basic and powerful concerning deserts in the information, they have genuine impediments to the elucidation of explanations behind churn. In this manner, estimating the viability of an expectation show depends additionally on how well the outcomes can be deciphered for construing the conceivable reasons of churn. The reason for expectation is to foresee the esteem that an irregular variable will accept later on or to assess the probability of future occasions [2]. Churn is characterized to be the action of clients leaving the organization and disposing of the administrations offered by it because of disappointment of the administrations as well as because of better offering from other specialist co-ops inside the reasonable sticker price

of the client. Most DM procedures get their expectations from the estimation of an arrangement of factors related to the elements in a database. DM models might be utilized to anticipate client stir created in numerous orders, for example, statistic information and additionally conduct information. Multiple DM strategies can be used in arrangement and bunching client information to anticipate churners sooner rather than later. These systems may utilize Decision Tree (DT), Support Vector Machine (SVM) notwithstanding Neural Networks (NN), Genetic Algorithms (GA) or Fuzzy Logic (FL) to foresee churners.

2. TYPES OF CHURN
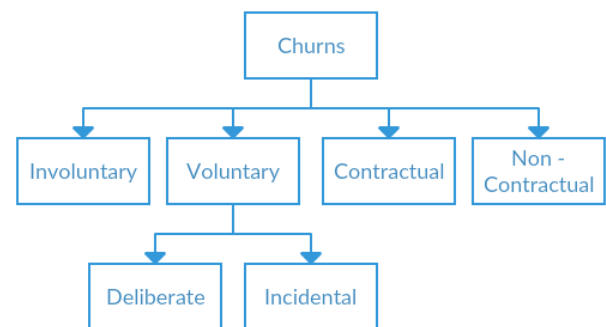As shown in Figure 1, Churns can be classified into various types depending on the aspect.

Fig 1: Churn Taxonomy

2.1 Revocation Method
On the basis of this aspect, Churns are classified as Voluntary and Involuntary.

2.1.1 Voluntary Churn
This type of churn occurs when the user takes a step to cease his subscription of the service contract. This can be further divided into two types mainly, Deliberate and Incidental. Deliberate Churn occurs due to technological reasons such as users needing more up to date or better innovation, high cost, bad quality of support and accommodation reasons. It is the issue that most try to solve [3]. Incidental churn as the name states happens when changes in conditions prevents the customer from further subscription to the given services. For instance, move to an alternate location where the services of the company are not accessible, or customer's money related conditions due to which the customer cannot manage the cost to remain subscribed to the services [4]. Incidental churn is just a little percentage of an organization's voluntary churn.

2.1.2 Involuntary Churn
In this type of churn, the company decides to terminate the subscription service of the customer. The termination reasons include misuse of the service, non-payment, credit card

expiration. Compared to Voluntary churn, involuntary churn is easier to find.

2.2 Business Aspect

In terms of business setting, churn can be extensively categorized as Contractual churn and Non-contractual churn.

2.2.1 Contractual Churn

In a Contractual churn, customers would perform some action at discrete intervals. In this type of churn, revocations are observed explicitly.

2.2.2 Non-Contractual Churn

Non-contractual churn happens when customers stop performing some conduct over time. This describes circumstances where the churn cannot be detected quickly on a specific action of customer. So, this type of churn is abstruse in terms of understanding. Example of this churn includes an online fashion retailer because here customers are free to buy or not at any time.

3. CHURN MODEL PROCESSING

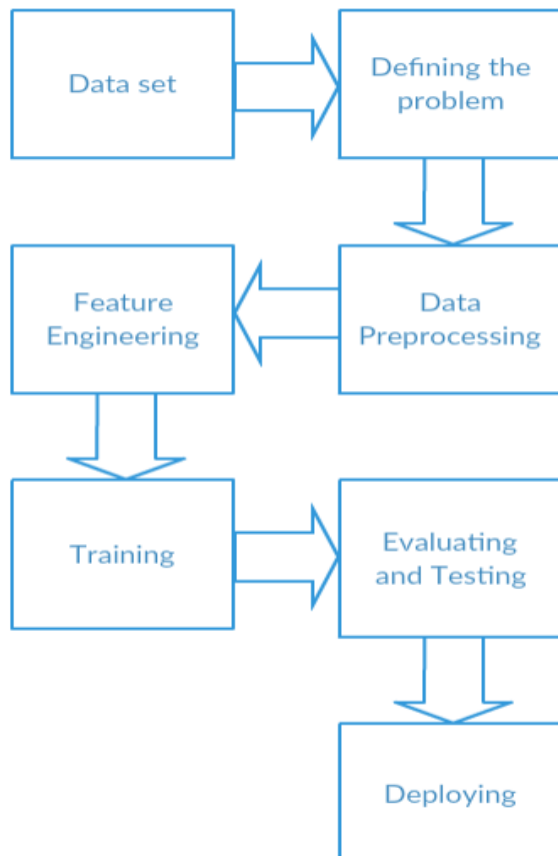As shown in Figure 2, processing a Churn model involves various steps.

Fig 2: Steps of Churn Model Processing

The first step in building a model is to define a problem on the basis of the dataset provided for which the data needs to be understand. Data in the real world is dirty and inconsistent. So, cleaning and preprocessing of data is the most important task in building of any model. If data is not cleaned, it will lead to inaccurate results which would affect the model. This includes removal of outliers, quantizing, handling missing values, converting categorical entries into numeric values [5]. The next step is to implement feature engineering on the

preprocessed data obtained from the previous step. By performing feature engineering, one can analyze the reason for occurrence of churn in an organization. After this comes the selection of algorithm which is needed for training model and get insights from it. There are various algorithms that can be implemented for training the model. Some of which includes machine learning algorithms like Logistic Regression, Decision tree, Neural Network. Once the algorithm is implemented, one need to evaluate and test the results and the performance of the model. This can be done in various ways. The common method is to make a confusion matrix which has data regarding precision and accuracy. The final step includes report generation or implementing a repeatable process over the entire organization which involves deployment [6].

4. APPLICATIONS OF CHURN PREDICTION

There are numerous applications of churn prediction model present in each and every field which provides subscriptions and services. Organizations are winding up progressively more mindful of the actuality that holding existing clients is the best advertising procedure to follow all together make due in industry [7]. From the reasons introduced above it turns out to be evident that it is of incredible significance for an organization to comprehend its clients with the goal for it to advance its business methodology. Along these lines distinguishing clients who are going to beat that is churn winds up not merely essential as far as holding clients yet besides as far as social affair business knowledge. As a reaction in handling these issue organizations have swung to prescient displaying procedures to aid the distinguishing proof of these clients. To outline, Software as a service (SaaS) is a product permitting and conveyance demonstrate in which programming is authorized on a membership premise and is halfway facilitated. It is at times alluded to as "on-request programming." For example, "Microsoft" is recently a cloud service provider which uses predictive models for churn prediction.

Some of the specimens are presented here:

- Telecom service providers and E-commerce players.

- Insurance companies and Banking sectors.

- Vehicle industries as well as Smart phone industries.

- Web-based email service providers such as Outlook, Hotmail, or Yahoo.

- Servers and storage providing multinational companies.
- Networking firewalls/security providers and Service providers of hosted applications/apps.

- Industries providing development tools, database management, business analytics.

5. CHALLENGES AND PROBLEMS

- High securing costs matched with a diminishing capacity to secure clients.
- Economical change rates.

- The expanded requirement for separation through suggestion/personalization.

- Progressively focused market with completely information driven new contestants.

6. CAUSES

It is critical to comprehend the underlying driver of churn weakening with the goal that feasible arrangements can be made keeping in mind the end goal to hold them in organization. It is difficult to control the agitate wearing down. There are a few reasons because of which steadfast clients can change their specialist co-op. The reasons are as written below:

- Due to discontentment of customers they churn the existing company and decide to change the service or service provider.

- Pronouncing high costs on the items or administration prompts the stir steady loss.

- Once in a while, association announces higher expense on the administration or item, to fill the hole, which may lead the agitate whittling down [8].

- Value impetuses can change the level of organization as it causes stir steady loss.

- Clients tend to move as they don't discover fitting association of administrations to their place or are not content with the nature of item that the organization provides them.

- Clients dependably need to purchase items from the unwavering brand organization.

- Issues might emerge because of new administrations or section by buyers to the presumed organization.

- Busting with protection ensures showcased security issues, tele sales, and different conditions tend to create bunches of customers to consider his or her one of a kind protection for a property and they are by and large having his or her repair shops subject to keep protection guarantee.

- Confidentiality of customers personalized data [8].

7. CHURN AVERTING

Today, every organization is trying to make progress towards a 0% churn rate which is challenging to accomplish such standards. In order to provide support to the organizations in performing churn reduction, it becomes mandatory to predict the customers with high risk and to calculate their churn time so that one can achieve the needs of the customers and thereby preventing churn [9].

- Design the system which is customer oriented.

- Conduct surveys, and work on them rigorously and religiously.

- Determine the flaws to be improvised as well as consider the weaknesses and work on them.

- Offer additional customer penchant services and Upgrade customer onboarding.

- Classify the customers.

- Use trigger arousing emails.

- Define mission and aims.

- Actively market to surviving clients.

- Provide better billing.

- Increase live communication instead of virtual communication with customers.

- Keep track of competitors. Analyze and improve the customer happiness index (CHI).

- Always thank the clients.

8. CONCLUSION

Summing up each and every aspect numerous predictive models and methods have been invented till date. In this paper, glimpse is provided about the concept of customer churn, various types of churns, process of designing the churn prediction model, applications of churn prediction models, challenges and problems in designing predictive model, causes of customer churns, sources for preventing customer churn.

9. REFERENCES

[1] H. Abbasimehr, M. Setak, M. Tarokh, "A Neuro-Fuzzy Classifier for Customer Churn Prediction", International Journal of Computer Applications, vol. 19, no. 8, pp. 35-41, April 2011.

[2] V. Lazarov and M. Capota. Churn Prediction. Business Analytics Course. TUM Computer Science, December 2007.

[3] S. Gotovac. "Modeling Data Mining Applications for Prediction of Prepaid Churn in Telecommunication Services," vol. 51, no. 3, pp. 275-283, 2010.

[4] John Hadden, Ashutosh Tiwari, Rajkumar Roy, and DymitrRuta, "Churn Prediction: Does Technology Matter?", International Journal of Industrial and Manufacturing Engineering, Vol. 2, No. 4, 2008.

[5] Amal M. Almana, Mehmet Sabih Aksoy, Rasheed Alzahrani, "A Survey On Data Mining Techniques In Customer Churn Analysis For Telecom Industry", International Journal of Engineering Research and Applications, Vol. 4, Issue 5(Version 6), May 2014, pp.165-171.

[6] C. Shearer, "The CRISP-DM model: The New Blueprint for Data Mining," J. Data Warehous., vol. 5, no. 4, pp. 13–22, 2000.

[7] M. K. Kim, M. C. Park and D. H. Jeong, the effects of customer satisfaction and switching barrier on customer loyalty in Korean mobile telecommunications, Telecommunications Policy: Growth in mobile communications, vol. 28, no. 2, pp. 145- 169, 2004.

[8] Deepika Mahajan, Rakesh Gangwar, "Review on Prediction of Churn Customer Behavior", International Journal of Computational Engineering Research (IJCER), Volume, 07, Issue, 09, September – 2017.

[9] Dirk Van, Poel den, Bart Lariviere, "Customer attrition analysis for financial services using proportional hazard models", European journal of operational research, vol. 157, no. 1, pp. 196-217, 2004.