Customer Churn Prediction for Telecommunication Companies.

Abstract-

Customer Churn prediction is one of the serious causes for Telecommunication or Subscription based Companies. Companies usually focus on customer acquisition and keep retention as a secondary priority. Churn is basically a metric that shows customers who stop using the services of a company, also known as customer attrition. Machine learning can be helpful to predict churn on an individual customer basis and take countermeasures such as discounts, unique offers, or other satisfactions to keep their customers. Here we are presenting a machine learning-based customer churn prediction method in which the analysis of several factors and prediction for churn is done using ML approaches of Support Vector Machines, KNN. The data on heart disease symptoms have been collected from the Kaggle Repository and have been performed on the data using ML methods.

Problem Statement-

The problem in telecommunication companies is that most of the customers churn the subscription because they are now not interested in the company due to its services. So, the reasons can be subscriptions, internet service type, and monthly charges. To remove this problem, The main objective can be identifying the factor that led to churn, and we are going to create an ML model to predict the behavior of customers.

Dataset-

Telco Customer Churn

Kaggle Dataset is used for predicting customer churn.

This Telco Churn Prediction dataset, provided by IBM, contains a sample of customer data with attributes such as customer services, account information, and demographics. The dataset also includes a binary label indicating whether the customer has churned or not. The goal of this dataset is to predict whether a customer is likely to churn or not based on their profile and services subscribed.

By analyzing the customer data and developing retention strategies, telecom companies can not only retain their customers but also acquire new customers by attracting customers from their competitors. In this regard, machine learning models can be used to predict churn and identify the most important features that contribute to customer churn. This can help telecom companies develop focused customer retention programs and improve their business performance.

Data Details

- customerID : Customer ID
- gender : Whether the customer is a male or a female
- SeniorCitizen : Whether the customer is a senior citizen or not (1, 0)
- Partner : Whether the customer has a partner or not (Yes, No)
- Dependents : Whether the customer has dependents or not (Yes, No)
- tenure : Number of months the customer has stayed with the company
- PhoneService : Whether the customer has a phone service or not (Yes, No)
- MultipleLines : Whether the customer has multiple lines or not (Yes, No, No phone service)
- InternetService : Customer’s internet service provider (DSL, Fiber optic, No)
- OnlineSecurity : Whether the customer has online security or not (Yes, No, No internet service)

- OnlineBackup : Whether the customer has online backup or not (Yes, No, No internet service)
- DeviceProtection : Whether the customer has device protection or not (Yes, No, No internet service)
- TechSupport : Whether the customer has tech support or not (Yes, No, No internet service)
- StreamingTV : Whether the customer has streaming TV or not (Yes, No, No internet service)
- StreamingMovies : Whether the customer has streaming movies or not (Yes, No, No internet service)
- Contract : The contract term of the customer (Month-to-month, One year, Two year)
- PaperlessBilling : Whether the customer has paperless billing or not (Yes, No)
- PaymentMethod : The customer's payment method (Electronic check, Mailed check, Bank transfer (automatic), Credit card (automatic))
- MonthlyCharges : The amount charged to the customer monthly
- TotalCharges : The total amount charged to the customer
- Churn : Whether the customer churned or not (Yes or No)

Objectives

- What's the percentage of Customer Churn and customers that keep in with the active services?
- Are there any patterns in Customers Churn based on gender?
- Is there any pattern/preference in Customers Churn based on the type of service provided?
- What are the most profitable service types?
- Which features and services are most profitable?

Applicable Regulations-

1. **Lack of a Comprehensive Methodology:** Finding a proper Churn Modelling technique is one of the biggest problems businesses encounter when attempting to build an efficient Customer Churn model. However, there is not a single approach that can be used in all circumstances. For instance, machine learning techniques are used because they are effective and can classify and manage huge amounts of data. Using hazard and survival functions, survival analysis predicts which customers will leave during a specific period. We have access to many additional strategies, each of which has a specific function. Therefore, you must evaluate the performance of many models to determine which approach is best for your company.
2. **Measuring Churn Model Performance:** Choosing the appropriate metrics is a crucial step when trying to optimize the datasets for accurate Churn Analysis. The decision-making process as well as the performance are impacted by a Churn model's precision. Therefore, before implementing the Churn Model, businesses need to develop techniques to evaluate its performance.
3. **Exploratory Analysis:** Exploratory analysis can be used to uncover mistakes, anomalies reciprocity, and the connections between various functions for which domain knowledge alone is insufficient. This requires thorough exploratory study execution to create an effective Churn Prediction Model.

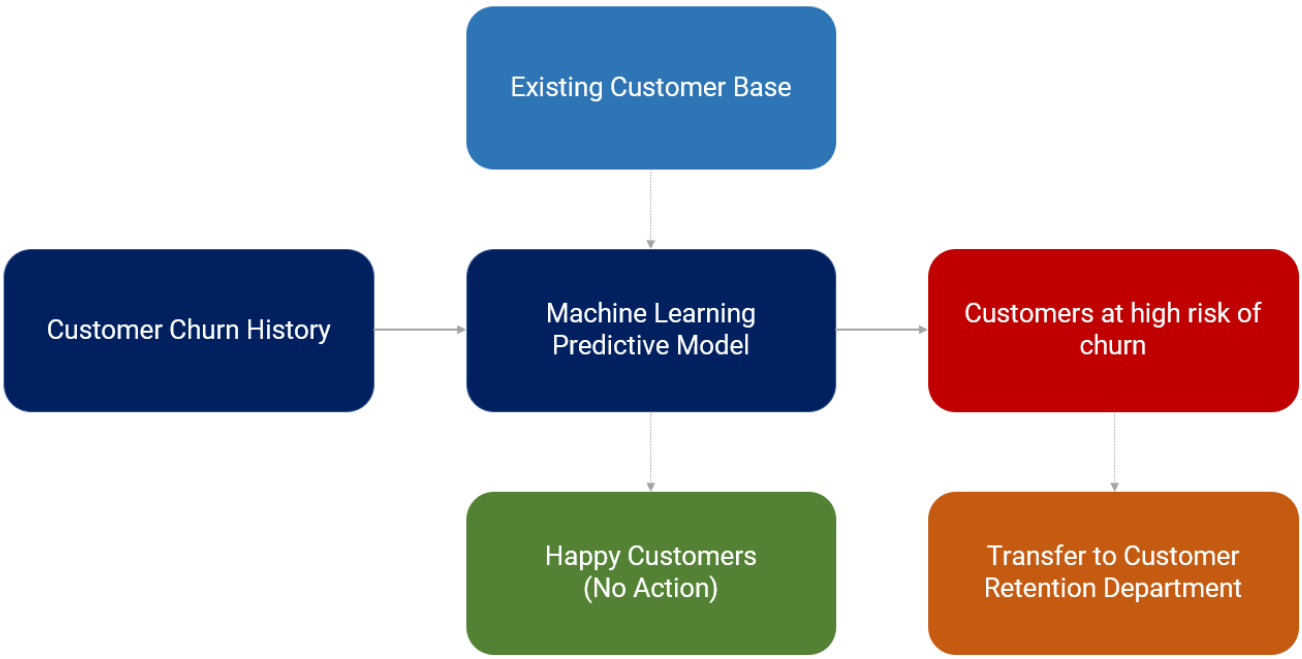
Applicable Constraints-

Any company or organization that experiences customer churn must pay a high price. A high churn rate puts a corporation under pressure to double hard on client acquisition merely to stay afloat. A company's growth pace can be hampered by even a negligible one-digit rise in the churn rate, and what's worse is the fact that high churn rates are more probable to multiply over time.

1. **<u>Expose Product Weaknesses:</u>** Churn Analysis is essential in identifying trends that point to the typical reasons why consumers leave your business. These could range from poor product adoption to low price productivity. Additionally, it is crucial in illustrating the precise way customers interact with your product over the course of their lifecycle. This gives you the opportunity to enhance the things that your consumers already enjoy and to address their concerns.
2. **<u>Discover Customer Opportunities:</u>** To improve customer experience, you must comprehend the needs and expectations of your customers at each point of their journey and adjust your product accordingly. Customer behavioral trends are shown by churn analysis at each touchpoint. You may provide your clients with the personalized involvement they like while also making them feel valued and appreciated.

Final Product Prototype -

Schematic diagram after the machine learning model has been deployed.

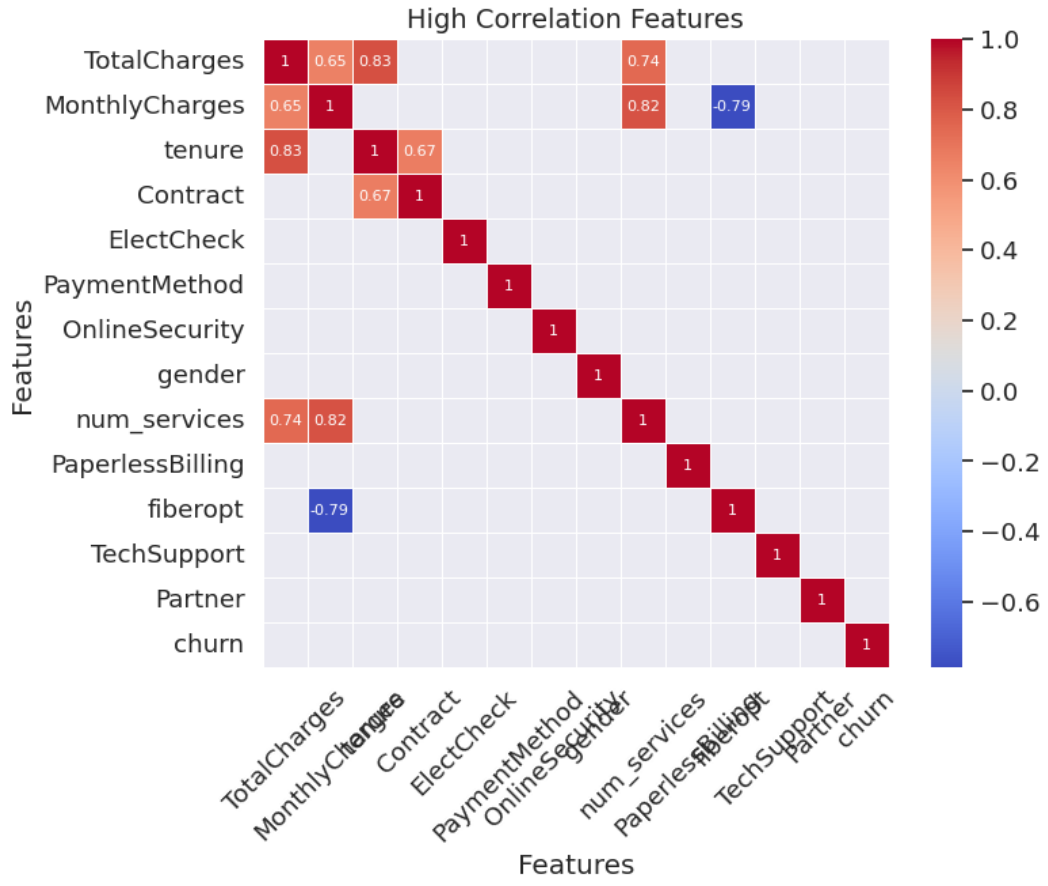


Flask is a web application framework written in Python that has multiple modules that make it easier for a web developer to write applications without having to worry about the details like protocol management. It gives us a variety of choices for developing web applications and it gives us the necessary tools and libraries that allow us to build a web application.

Result-

We can create a functional prototype of the churn prediction and prevention program using the SVM, KNN, or Random Forest approach. Additionally, we can also carry out a feature importance analysis and determine the main causes of client turnover, such as monthly fees, contract type, and tenure.

Heat Map-



Conclusion-

So that we can use machine learning and artificial intelligence to create a functional prototype of the churn prediction and prevention program. For this, the software can accurately predicts and prevents client churn, which may help telecom firms in increasing customer loyalty and retention. The software can also perform better and be more useful for practical applications with further testing and refinement.