

# Telecom Customer Churn

## **PROBLEM STATEMENT**

In the modern world, almost all of the civilized population subscribe to a telecommunications provider for their cellular connections, internet connections, landline, television connection etc. As such, modern telecom companies generate tons of revenue from their customers and would like to keep them subscribed to their services for as long as possible. However, many customers often switch or unsubscribe (churn) from their telecom providers for a variety of reasons. These could range from unsatisfactory service, better pricing from competitors, customers moving to different cities etc. Therefore, telecom companies are interested in analyzing the patterns for customers who churn from their services and use the resultant analysis to determine in the future which customers are more likely to unsubscribe from their services. One such company is Telco Systems. Telco Systems is a market-leading Telcom solution provider that creates and operates high quality, service assured, carrier-grade, intelligent networks. Telco Systems is interested in identifying the precise patterns for their churning customers and have provided the customer data for this project.

## **BUSINESS OBJECTIVE**

This project aims to identify the patterns for whether a telco customer churns from their service or not.

## **METHODOLOGY**

We will use the industry standard CRISP-DM process for the execution of this project. Since our target variable “Churn” is a categorical variable with binary values (“Yes” or “No”), we will use the CART algorithm to derive a classification tree and generate the decision rules. Modelling will be done with the help of statistical tools/software packages to execute the algorithm and perform resultant analysis. The data will be split into two subsets, namely a training data set and a test data set. The training dataset will be used to generate the model and the model will be applied to the test data set in order to verify the accuracy of our model.

## **DESCRIPTION**

The dataset has approximately 7000 records. There are 21 total variables including our target variable and no missing values.

Each variable and its description are given as follows.

1. **CustomerID** : Company assigned Customer ID (Unique primary Identifier)
2. **Gender** : Customer gender (female, male)
3. **SeniorCitizen** : Whether the customer is a senior citizen or not (1, 0)
4. **Partner** : Whether the customer has a partner or not (Yes, No)

5. **Dependents** : Whether the customer has dependents or not (Yes, No)
6. **Tenure** : Number of months the customer has stayed with the company
7. **PhoneService** : Whether the customer has a phone service or not (Yes, No)
8. **MultipleLines** : Whether the customer has multiple lines or not (Yes, No, No phone service)
9. **InternetService** : Type of Customer's internet service (DSL, Fiber optic, No)
10. **OnlineSecurity** : Whether the customer has internet service security or not (Yes, No, No internet service)
11. **OnlineBackup** : Whether the customer has online backup plan or not (Yes, No, No internet service)
12. **DeviceProtection** : Whether the customer has internet device protection or not (Yes, No, No internet service)
13. **TechSupport** : Whether the customer has tech support or not (Yes, No, No internet service)
14. **StreamingTV** : Whether the customer has streaming TV or not (Yes, No, No internet service)
15. **StreamingMovies** : Whether the customer has streaming movies or not (Yes, No, No internet service)
16. **Contract** : The contract term of the customer (Month-to-month, One year, Two year)
17. **PaperlessBilling** : Whether the customer has paperless billing or not (Yes, No)
18. **PaymentMethod** : The customer's payment method (Electronic check, Mailed check, Bank transfer (automatic), Credit card (automatic))
19. **MonthlyCharges** : The amount charged to the customer monthly (Continuous variable)
20. **TotalCharges** : The total amount charged to the customer (Continuous Variable)
21. **Churn** : Whether the customer churned or not (Yes or No)(Target Variable)

The dataset can be seen as follows. Dataset obtained from <https://www.kaggle.com/>

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
CustomerID	Gender	SeniorCitizen	Partner	Dependents	tenure	PhoneService	MultipleLines	InternetService	OnlineSecurity	OnlineBackup	DeviceProtection	TechSupport	StreamingTV	StreamingMovies	Contract	PaperlessBilling	PaymentMethod	MonthlyCharges	TotalCharges	Churn
1	Female	0	Yes	No	0	Yes	No	DSL	No	Yes	No	No	No	No	Month-to-month	Yes	Electronic check	29.85	29.85	No
2	Female	0	Yes	No	1	No	No	phone service	DSL	No	Yes	No	No	No	Month-to-month	Yes	Electronic check	29.85	29.85	No
3	Male	0	No	No	38	Yes	No	DSL	Yes	No	Yes	No	No	No	One year	No	Mailed check	56.85	1389.5	No
4	Male	0	No	No	2	Yes	No	DSL	Yes	Yes	No	No	No	No	Month-to-month	Yes	Mailed check	53.85	108.15	Yes
5	Male	0	No	No	43	No	No	phone service	DSL	Yes	No	Yes	No	No	One year	No	Bank transfer (automatic)	42.3	1840.25	No
6	Female	0	No	No	2	Yes	No	Fiber optic	No	No	No	No	No	No	Month-to-month	Yes	Electronic check	76.7	151.6	Yes
7	Female	0	No	No	8	Yes	Yes	Fiber optic	No	No	Yes	No	Yes	Yes	Month-to-month	Yes	Electronic check	99.65	820.5	Yes
8	Male	0	No	Yes	22	Yes	Yes	Fiber optic	No	Yes	No	No	Yes	No	Month-to-month	Yes	Credit card (automatic)	89.1	1949.4	No
9	Female	0	No	No	10	No	No	phone service	DSL	Yes	No	No	No	No	Month-to-month	No	Mailed check	29.75	301.9	No
10	Female	0	Yes	No	28	Yes	Yes	Fiber optic	No	No	Yes	Yes	Yes	Yes	Month-to-month	Yes	Electronic check	104.8	3646.05	Yes
11	Male	0	No	Yes	62	Yes	No	DSL	Yes	Yes	No	No	No	No	One year	No	Bank transfer (automatic)	56.15	3487.95	No
12	Male	0	Yes	Yes	13	Yes	No	DSL	Yes	No	No	No	No	No	Month-to-month	Yes	Mailed check	43.95	567.45	No
13	Male	0	No	No	18	Yes	No	No	No internet service	No internet service	No internet service	No internet service	No internet service	No internet service	Two year	No	Credit card (automatic)	18.95	128.1	No
14	Male	0	Yes	No	38	Yes	Yes	Fiber optic	No	No	Yes	No	Yes	Yes	One year	No	Credit card (automatic)	100.35	5681.1	No
15	Male	0	No	No	49	Yes	No	Fiber optic	No	Yes	Yes	No	Yes	Yes	Month-to-month	Yes	Bank transfer (automatic)	101.7	5006.1	Yes
16	Male	0	No	No	25	Yes	No	Fiber optic	Yes	No	Yes	Yes	Yes	Yes	Month-to-month	Yes	Electronic check	105.5	2686.05	No
17	Female	0	Yes	Yes	69	Yes	Yes	Fiber optic	Yes	Yes	Yes	Yes	Yes	Yes	Two year	No	Credit card (automatic)	113.25	7895.15	No
18	Female	0	No	No	52	Yes	No	No	No internet service	No internet service	No internet service	No internet service	No internet service	No internet service	One year	No	Mailed check	26.45	2622.9	No
19	Male	0	No	Yes	71	Yes	Yes	Fiber optic	Yes	No	Yes	No	Yes	Yes	Two year	No	Bank transfer (automatic)	106.7	7182.25	No
20	Female	0	Yes	Yes	10	Yes	No	DSL	No	No	Yes	Yes	No	No	Month-to-month	No	Credit card (automatic)	55.2	528.35	Yes
21	Female	0	No	No	23	Yes	No	Fiber optic	No	Yes	No	Yes	No	Yes	Month-to-month	Yes	Electronic check	90.85	1862.9	No
22	Male	1	No	No	1	No	No	phone service	DSL	No	No	Yes	No	No	Month-to-month	Yes	Electronic check	39.65	39.65	Yes
23	Male	0	Yes	No	12	Yes	No	No	No internet service	No internet service	No internet service	No internet service	No internet service	No internet service	One year	No	Bank transfer (automatic)	13.8	202.25	No
24	Male	0	No	No	1	Yes	No	No	No internet service	No internet service	No internet service	No internet service	No internet service	No internet service	Month-to-month	No	Mailed check	20.15	20.15	Yes
25	Female	0	Yes	No	58	Yes	Yes	DSL	No	Yes	No	Yes	No	No	Two year	Yes	Credit card (automatic)	59.9	5205.1	No
26	Male	0	Yes	Yes	49	Yes	No	DSL	Yes	No	No	Yes	No	No	Month-to-month	No	Credit card (automatic)	59.8	2970.3	No
27	Female	0	No	No	30	Yes	No	DSL	Yes	Yes	No	No	No	No	Month-to-month	Yes	Bank transfer (automatic)	51.3	1510.4	No
28	Male	0	Yes	Yes	47	Yes	Yes	Fiber optic	No	Yes	No	No	Yes	Yes	Month-to-month	Yes	Electronic check	99.35	4749.15	Yes
29	Male	0	Yes	Yes	1	No	No	phone service	DSL	No	Yes	No	No	No	Month-to-month	No	Electronic check	38.2	38.2	Yes
30	Male	0	Yes	No	72	Yes	Yes	DSL	Yes	Yes	Yes	Yes	Yes	Yes	Two year	Yes	Credit card (automatic)	90.25	6389.45	No
31	Female	0	No	Yes	17	Yes	No	DSL	No	No	No	No	Yes	Yes	Month-to-month	Yes	Mailed check	64.7	1093.1	Yes
32	Female	1	Yes	No	73	Yes	Yes	Fiber optic	Yes	Yes	Yes	Yes	No	No	Two year	Yes	Credit card (automatic)	96.35	6766.9	No
33	Female	1	No	No	2	Yes	No	Fiber optic	No	No	Yes	No	Yes	Yes	Month-to-month	Yes	Credit card (automatic)	95.5	181.65	No
34	Female	0	Yes	Yes	27	Yes	No	DSL	Yes	Yes	Yes	Yes	No	No	One year	No	Mailed check	66.15	1874.45	No
35	Male	0	No	No	1	Yes	No	No	No internet service	No internet service	No internet service	No internet service	No internet service	No internet service	Month-to-month	No	Bank transfer (automatic)	26.2	26.2	No
36	Male	1	No	No	1	Yes	No	DSL	No	No	No	No	No	No	Month-to-month	No	Bank transfer (automatic)	43.25	43.25	No