CHURN ANALYSIS PROJECT

UNDERSTANDING CUSTOMER CHURN

Customer churn refers to the discontinuation of business with a firm or service by customers or subscribers. In the highly competitive telecom industry, customers have the flexibility to switch between various service providers, contributing to an annual churn rate of 15-25 percent.

The challenge in individualized customer retention arises from the large customer base that most firms have, making it impractical to allocate significant time to each customer. The associated costs would outweigh any additional revenue. However, if a corporation could predict which customers are likely to leave in advance, it could strategically channel customer retention efforts towards these "high-risk" clients. The ultimate objective is to expand coverage and foster increased customer loyalty, with the key to success lying in understanding and meeting customer needs.

Recognizing the significance of customer churn as a critical metric, businesses emphasize the importance of retaining existing customers over acquiring new ones due to the cost-effectiveness involved.

To identify early indications of potential churn, a comprehensive understanding of customers and their interactions across various channels is essential. By proactively addressing churn, businesses can not only maintain their market position but also thrive and expand. The larger the customer network, the lower the initiation costs and the greater the profit, making client retention and an effective retention strategy crucial focal points for the company's success.

OBJECTIVES

1. Determine the comprehensive churn rate within the telecommunications company.

2. Conduct an in-depth analysis to identify factors or patterns correlated with customer churn.

THE DATASET

Customer churn prediction dataset of a fictional telecommunication company made by IBM Sample Datasets. Context Predict behaviour to retain customers. You can analyse all relevant customer data and develop focused customer retention programs.

Content Each row represents a customer, each column contains customer's attributes described on the column metadata.

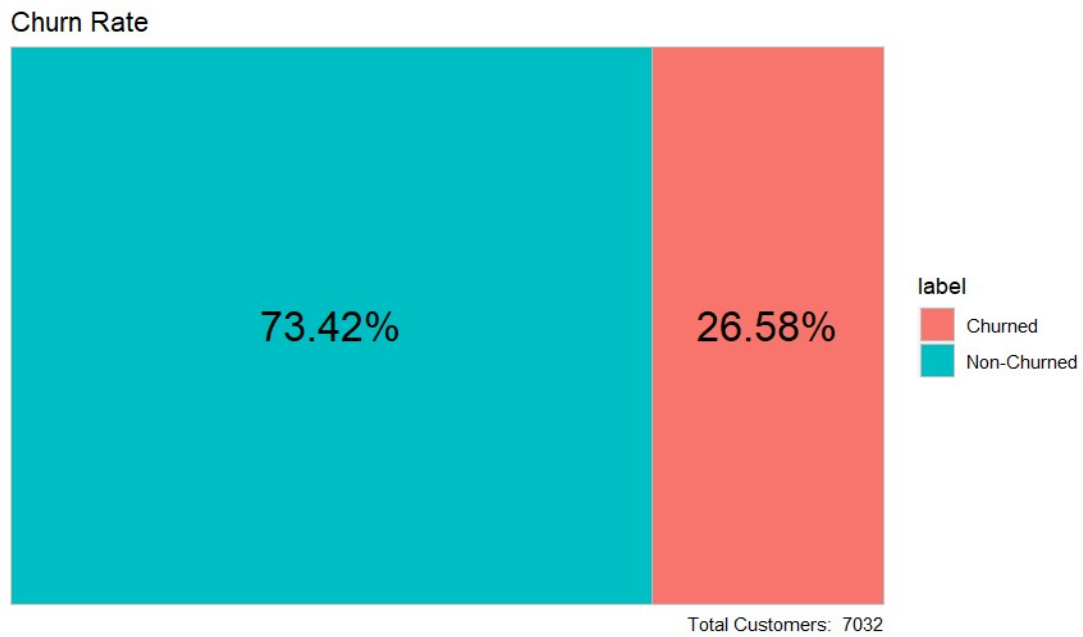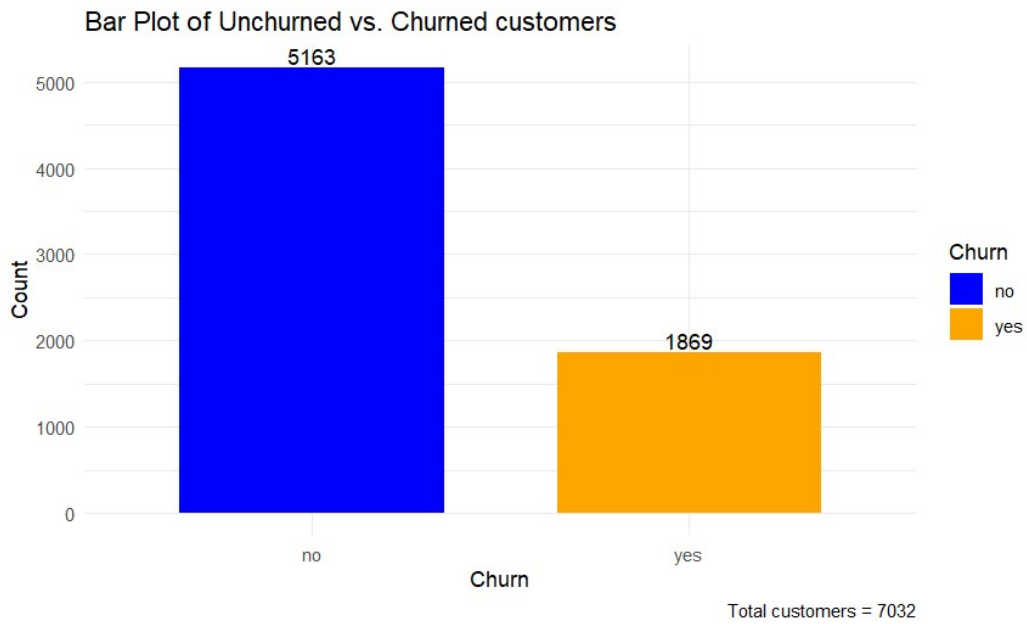The data set includes information about:

- Customers who left within the last month: the column is called Churn.

- Services that each customer has signed up for: phone, multiple lines, internet, online security, online backup, device protection, tech support, and streaming TV and movies.

- Customer account information: how long they've been a customer, contract, payment method, paperless billing, monthly charges, and total charges.

- Demographic info about customers: gender, age range, and if they have partners and dependents.

- The link for the dataset : https://huggingface.co/datasets/scikit-learn/churn-prediction

EXPLORATORY DATA ANALYSIS

Segment	Churn rate (in %)
Female	26.96
Male	26.20
Senior Citizens	41.68
Partnered	19.72
Unpartnered	32.98
Dependents	15.53
No Dependents	31.28
Phone Service	26.75
No Phone Service	25.00
Single Lines	25.08
Multiple Lines	28.65
Internet Service	31.86
DSL Internet	19.00
Fiber Optic Internet	41.89
No Internet Service	7.43
Online Security	14.64
No Online Security	41.78
Online Backup	21.57
No Online Backup	39.94
Device Protection	22.54
No Device Protection	39.14
Tech Support	15.20

| Segment	Churn rate (in %)
No Tech Support	41.65
TV Streaming	30.11
No TV Streaming	33.54
Movie Streaming	29.95
No Movie Streaming	33.73
Month-to-Month Contract	42.71
One Year Contract	11.28
Two Year Contract	2.85
Paperless Billing	33.59
Paper Billing	16.38
Mailed Check	19.20
Bank Transfer	16.73
Credit Card	15.25
Electronic Check	45.29

Bar Plot of Unchurned vs. Churned customers

Total customers = 7032

Churn Rate

Total Customers: 7032

- The overall churn rate is calculated to be approximately 26.58%

- Percentage of male and female customers is similar, so is their churn rate.

Churn in Female vs Male Customers
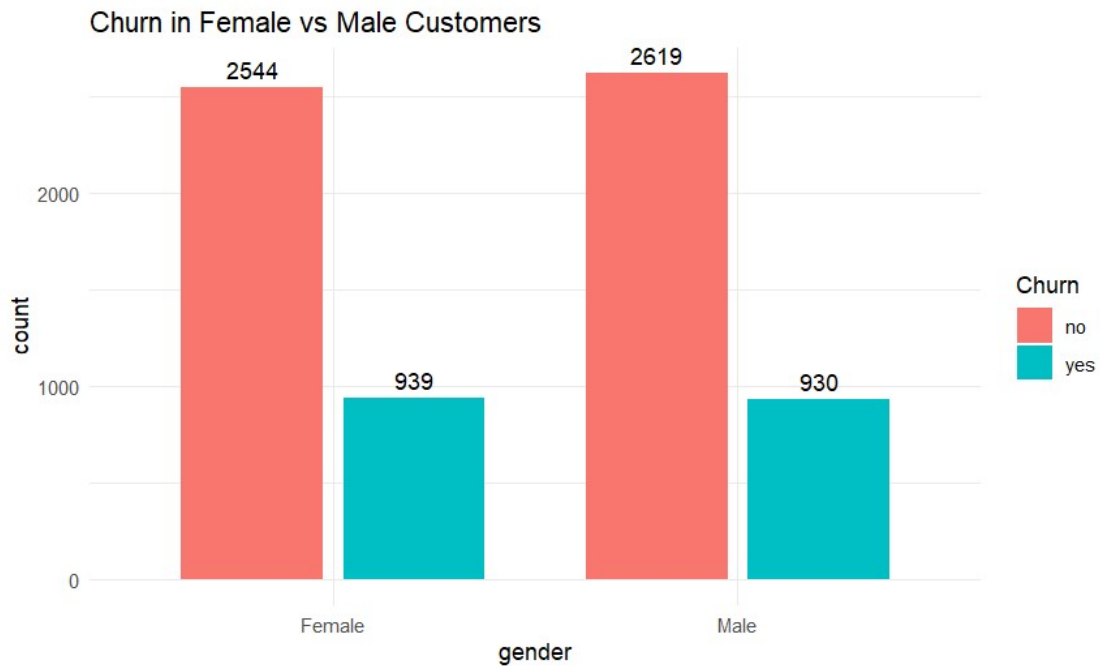
- 41.68% of the total senior citizen customers have churned.

TreeMap of Churned vs. Unchurned Senior Citizens

Total senior citizens = 1142
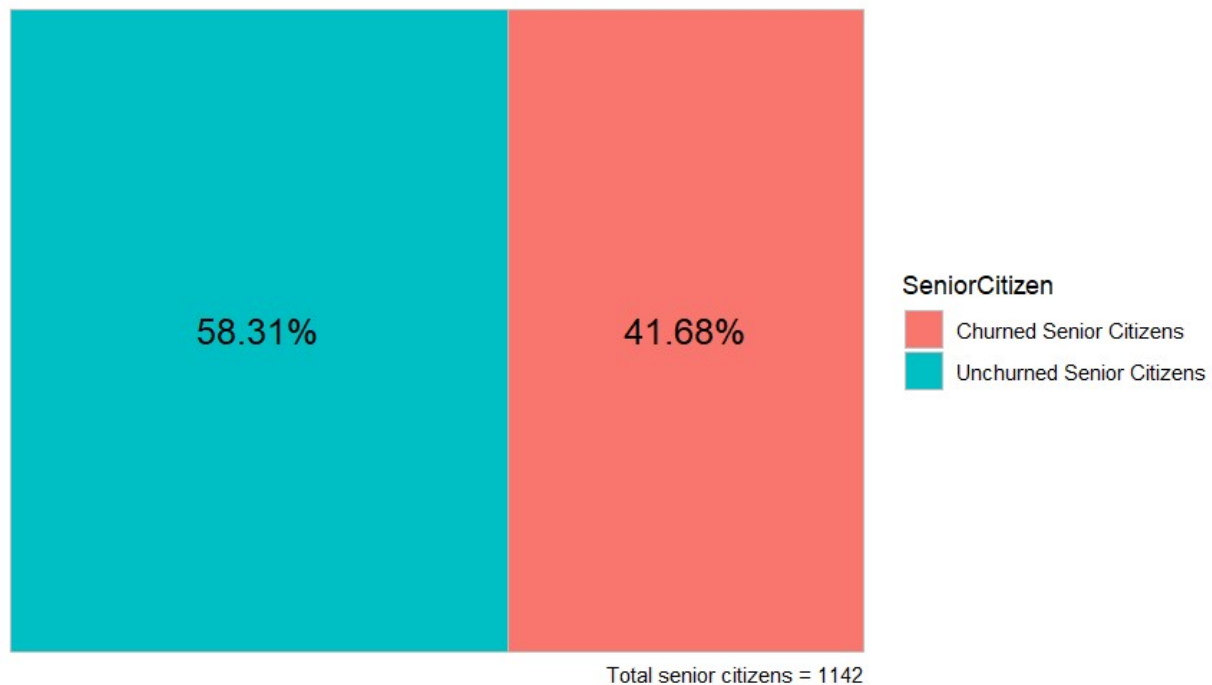
- Customers without partners are more likely to churn than the customers with partners.

Percentage of Churn in Customers with and without Partners

- Customers without dependents are more likely to churn than the customers with dependents.

Percentage of Churn in Customers with and without dependents
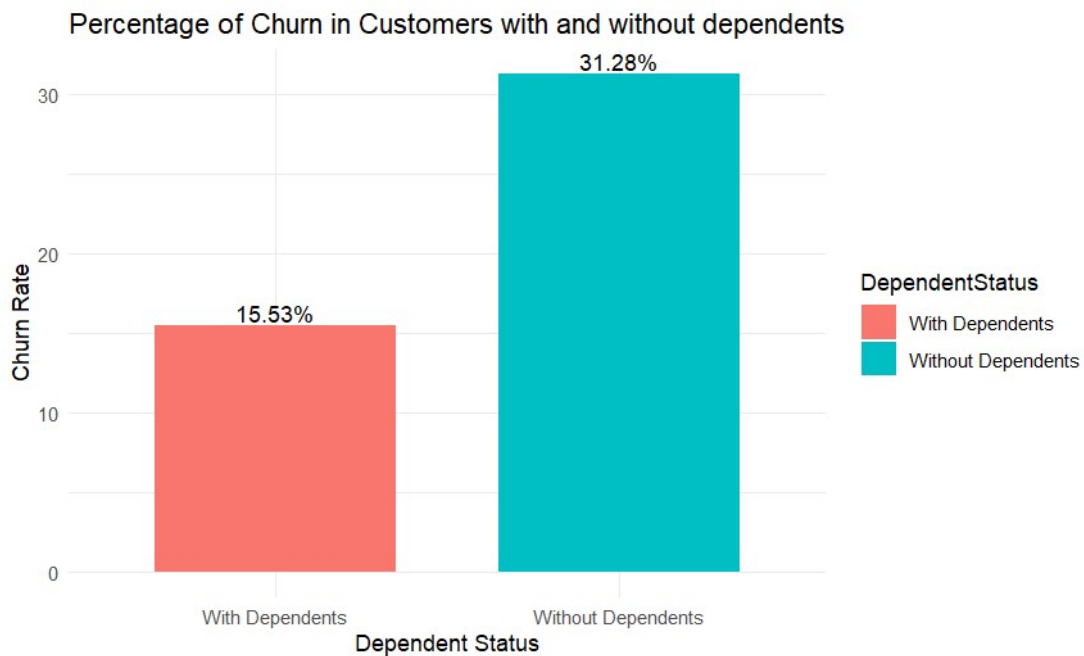
- Customers with shorter tenure are more likely to churn than the customers with longer tenures.

Churn Rate Across Tenure Ranges
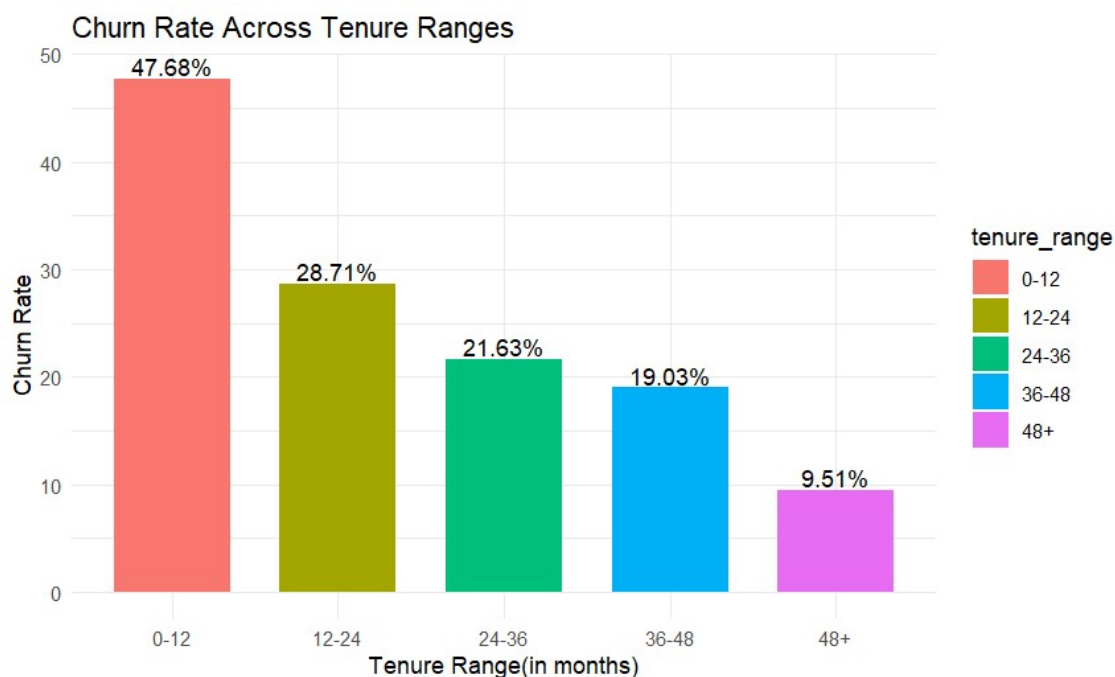
#90.32% of the total customers are using phone service. Churn rate is similar for both the customers with and without phone service.

# The churn rate of customers with single and multiple lines is similar.

Majority of the churned customers are using fiber optic internet service and customers without internet service are not leaving the company.

Customers using different types of internet service
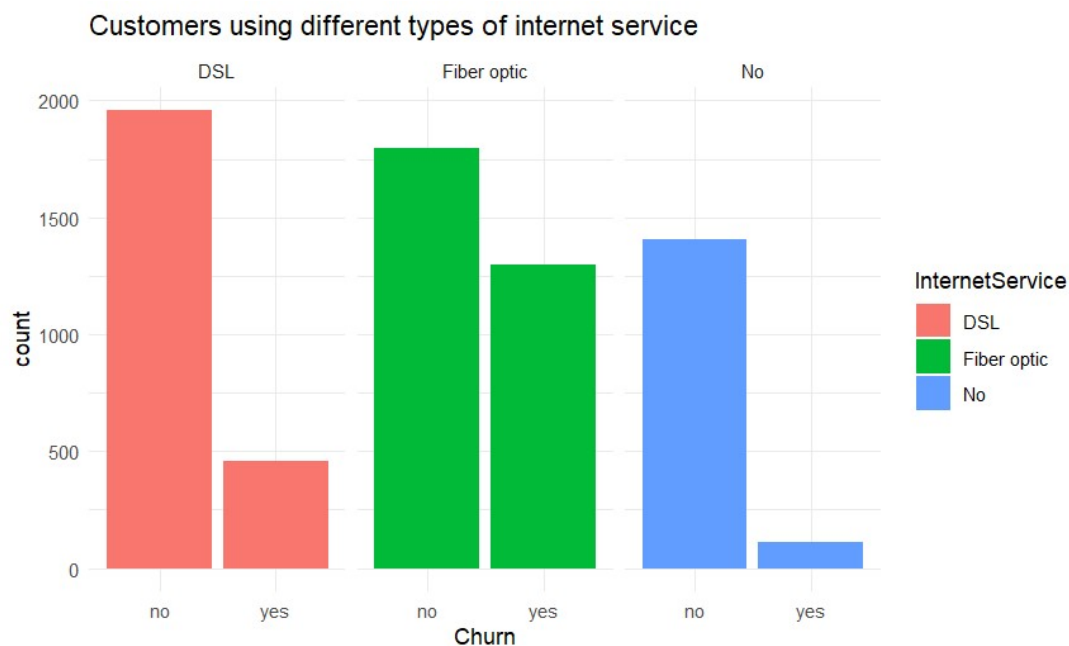
- Customers using online security have a lower churn rate (14.64%), while customers not using online security experience a higher churn rate (41.78%).
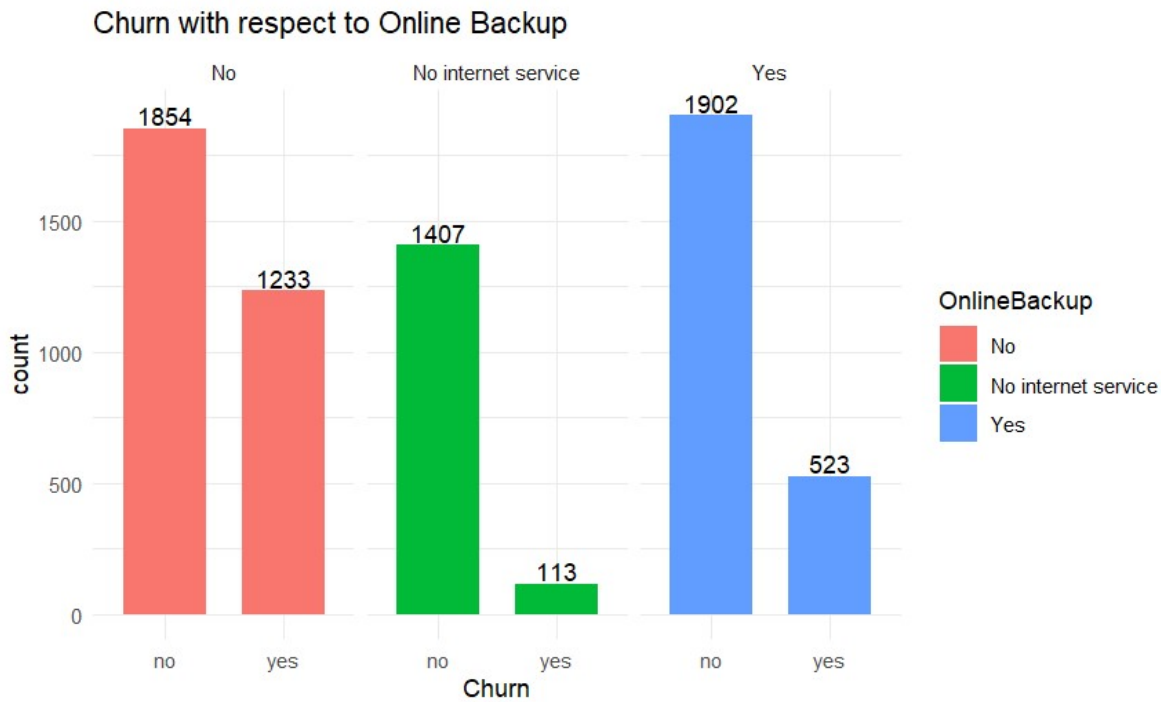
Churn based on Online Security
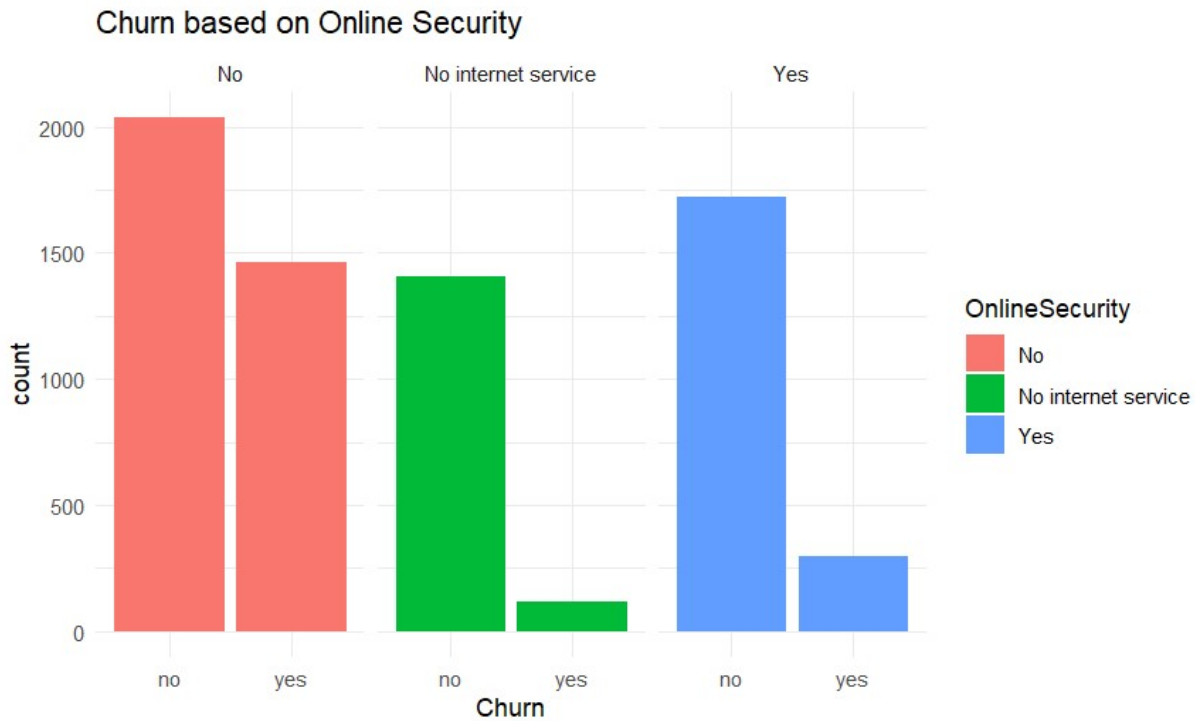
- The churn rate for customers without device protection is higher (39.14%) compared to customers with device protection (22.54%).
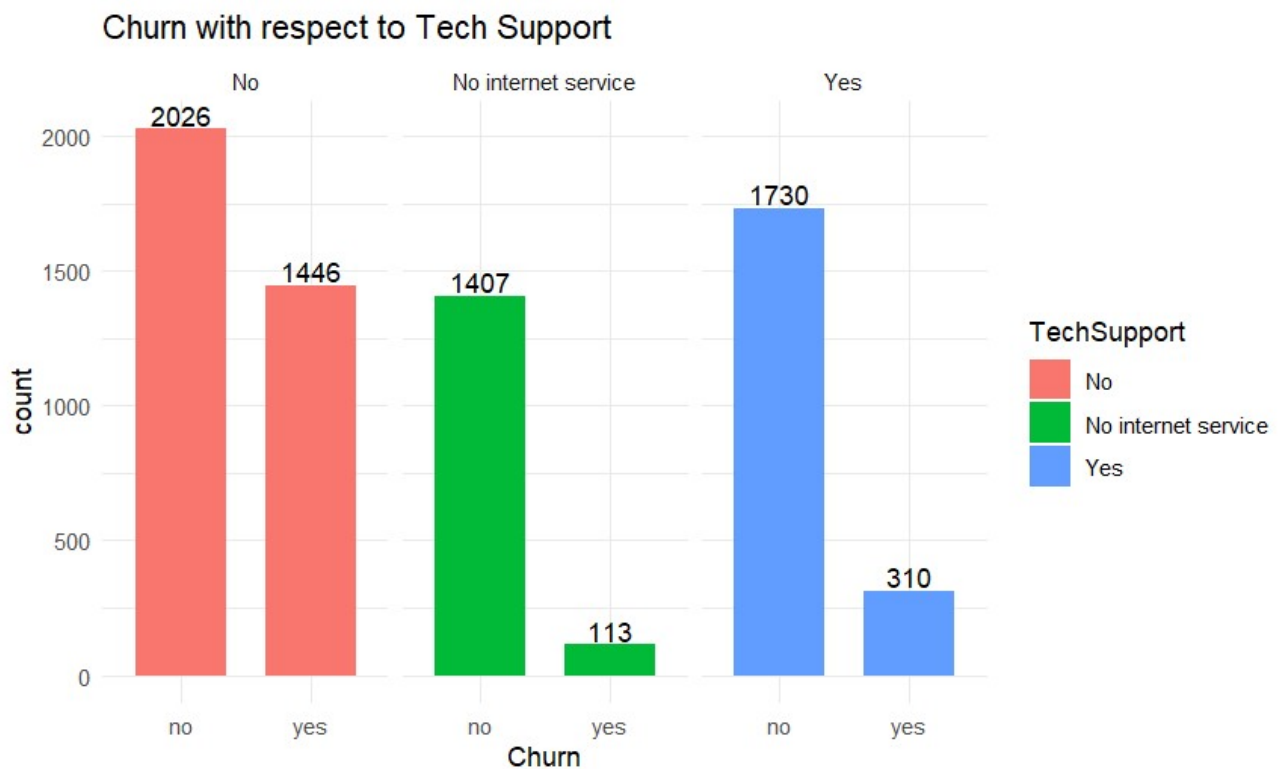
Churn with respect to device protection
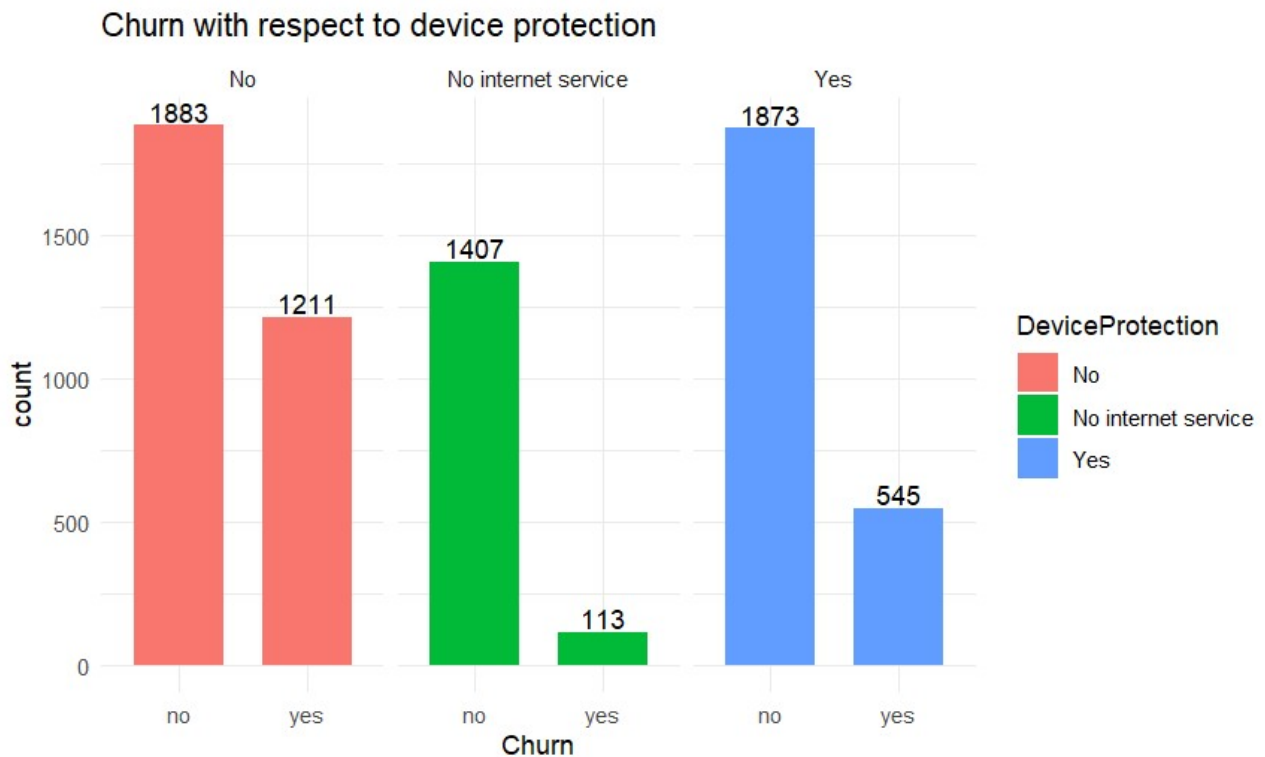
- The churn rate for customers without online backup is higher (39.94%) compared to customers with online backup (21.57%).

Churn with respect to Online Backup

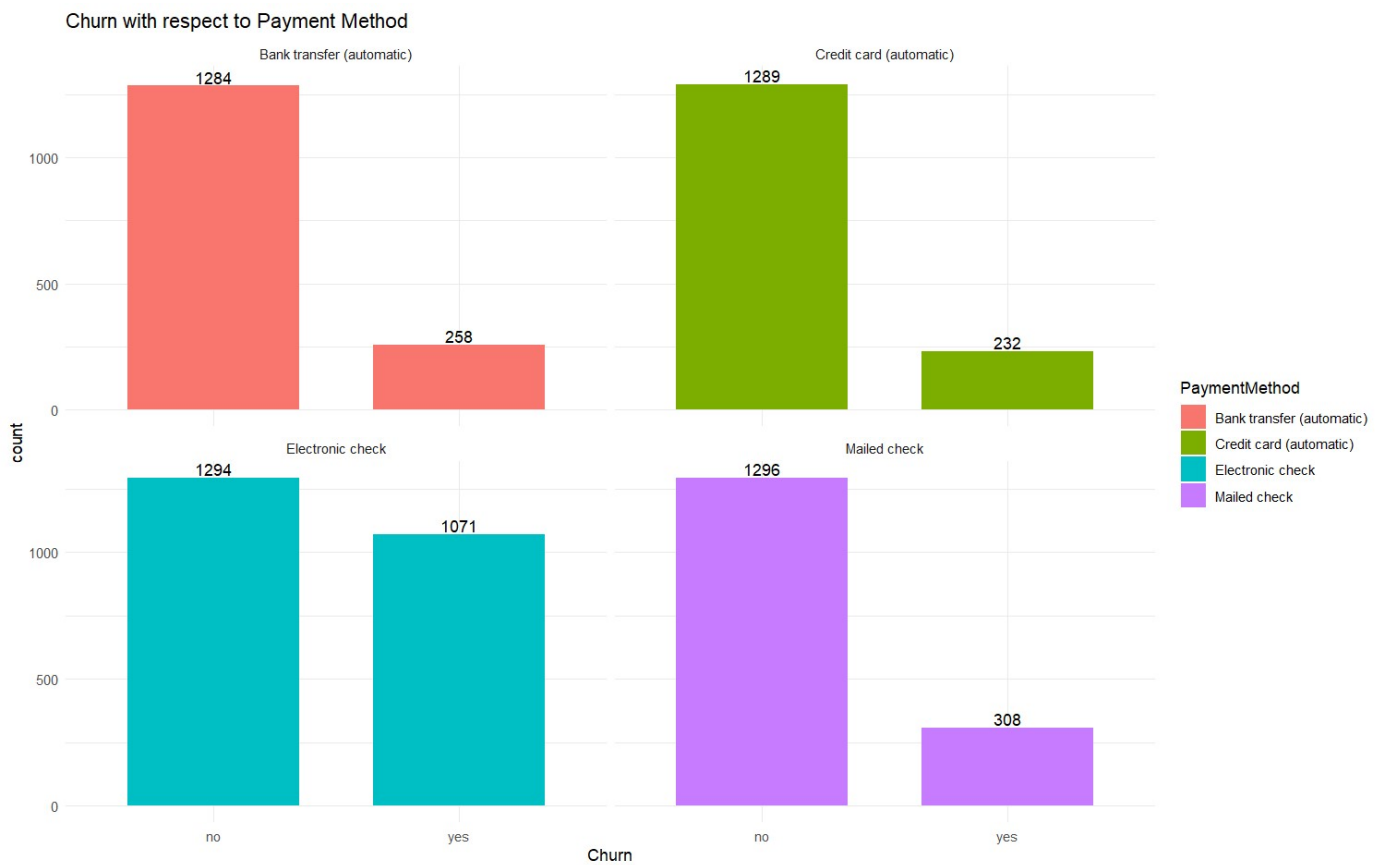- The churn rate for customers without tech support is higher (41.65%) compared to customers with tech support (15.20%).

Churn with respect to Tech Support
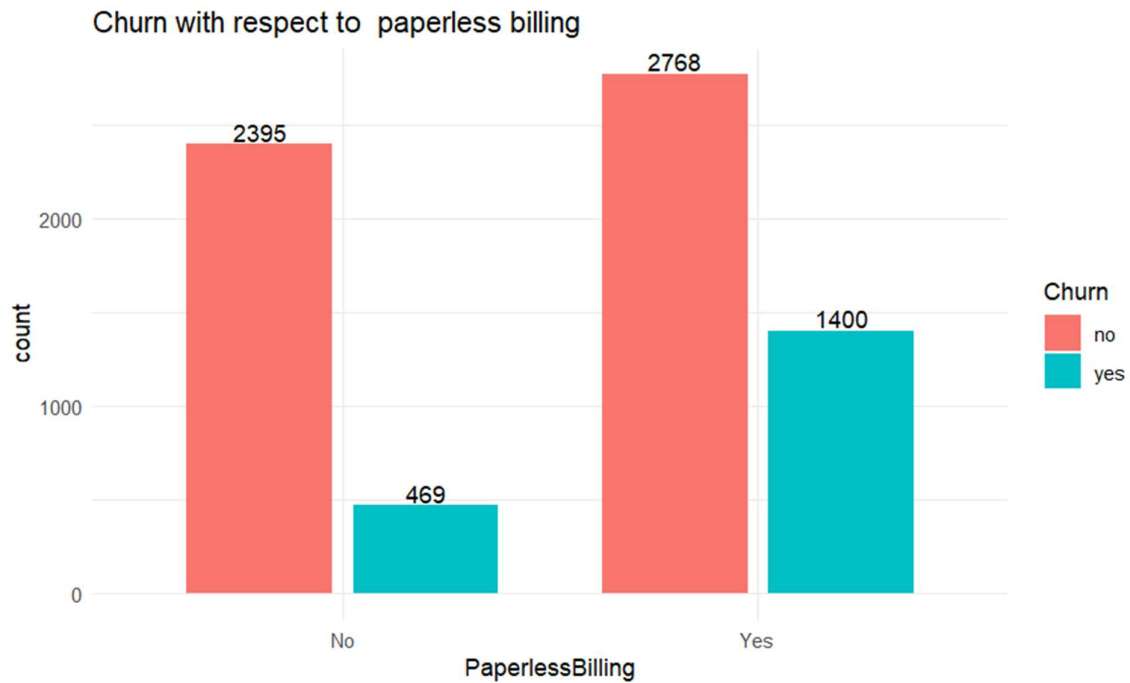
- We can say that the longer the contract the lesser churn.

Churn with respect to Contract type
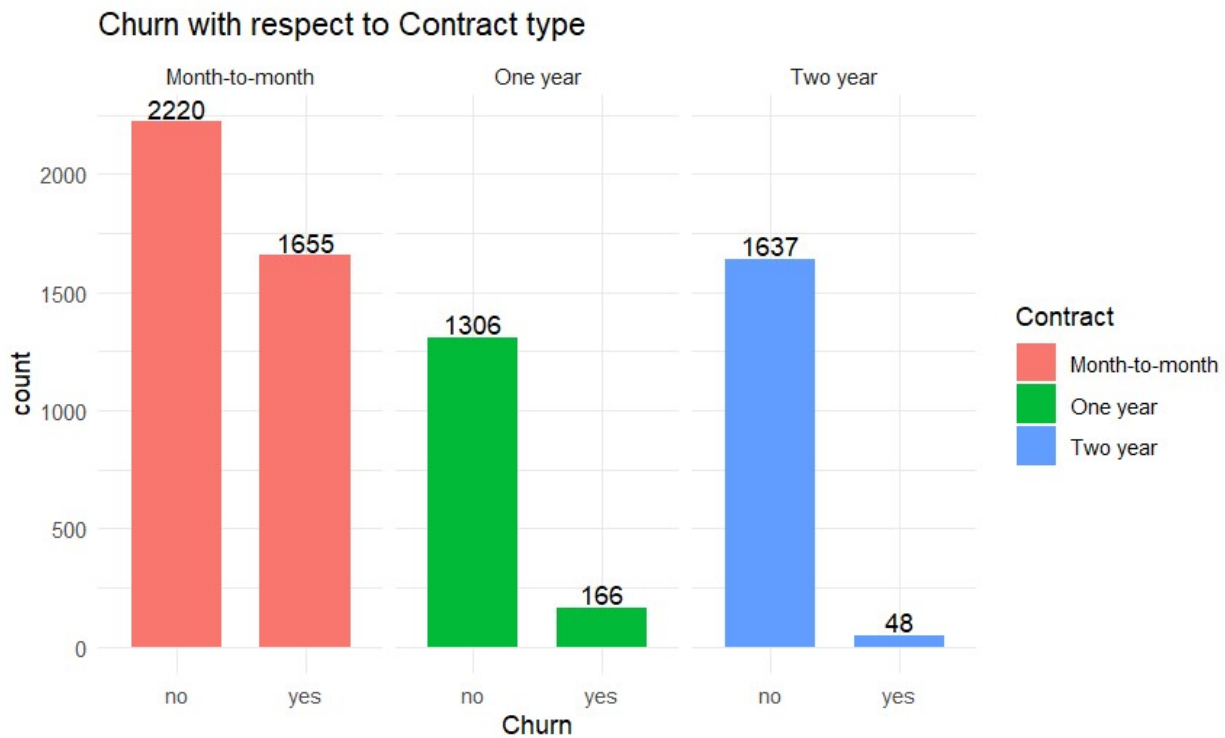
- Customers using electronic check as their payment method have the highest churn rate (45.29%).

### Churn with respect to Payment Method

- The churn rate for customers with paperless billing is notably higher (33.59%), indicating a potential impact of billing method on customer retention.

Churn with respect to paperless billing

- churned customers tend to pay more in monthly charges.

Violin Plot of Monthly Charges by Churn
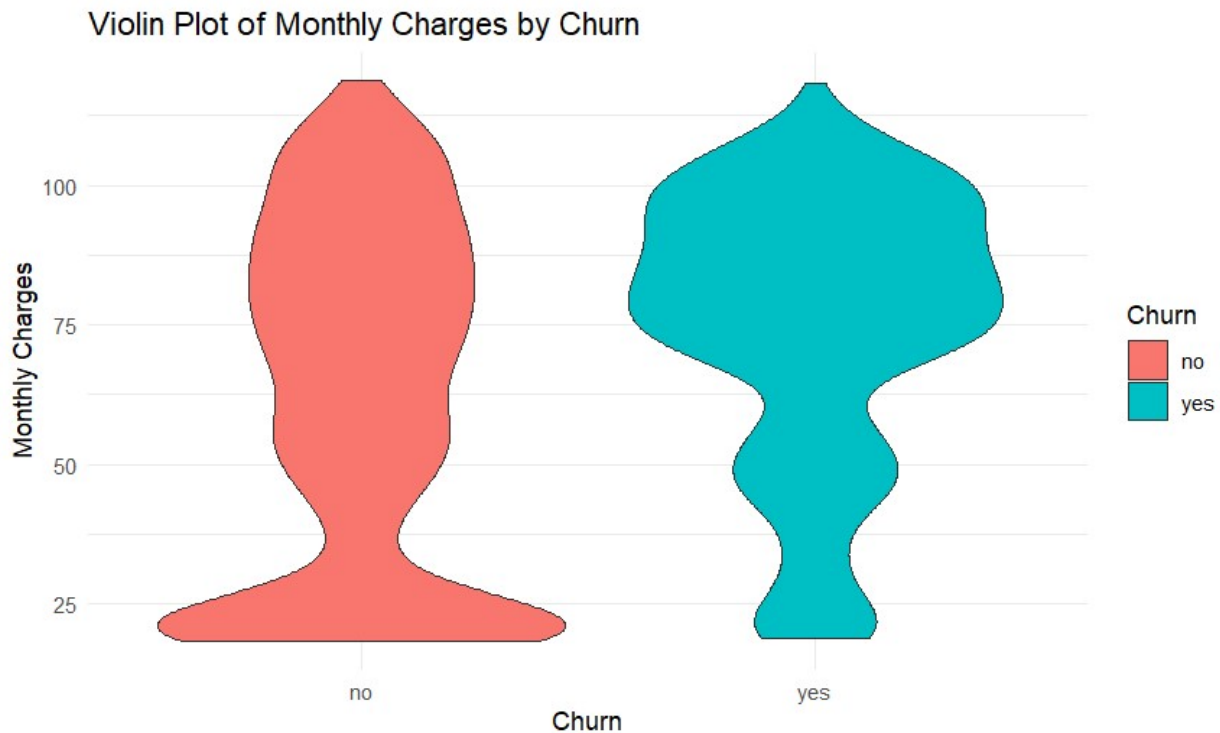
- Churned customers tend to pay less in total charges.

Violin Plot of Total Charges by Churn
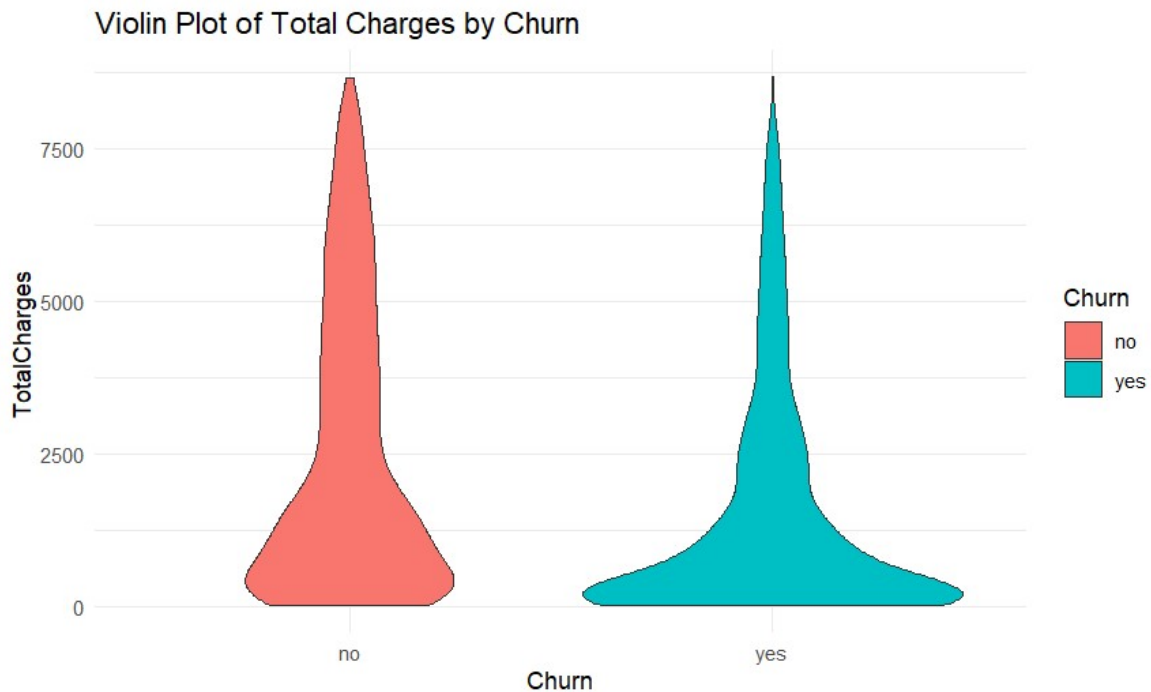
MONTHLY CHARGES AND ITS IMPACT ON CUSTOMER CHURN

Null Hypothesis (H0): Monthly charges do not significantly impact customer churn.

Alternate Hypothesis (H1): Monthly charges have a significant effect on customer churn.

Results

Test Conducted	T-Statistic	P-Value
Welch Two Sample T-Test	-18.341	< 2.2e-16

The statistical analysis yielded a T-statistic of -18.341, accompanied by an extremely low p-value of less than 2.2e-16. This outcome leads us to reject the null hypothesis, indicating that Monthly Charges exert a significant influence on customer churn. The very low p-value suggests that the observed relationship between Monthly Charges and churn is highly improbable to occur by chance, reinforcing the robustness of our findings.

Conclusion: The results indicate a substantial association between Monthly Charges and customer churn.

Given that the mean monthly charges for the group of customers who churned are higher than the mean for those who did not churn, it suggests that, on average, churned customers tend to pay more in monthly charges.

TOTAL CHARGES AND ITS IMPACT ON CUSTOMER CHURN

Null Hypothesis (H0): Total charges do not significantly impact customer churn.

Alternate Hypothesis (H1): Total charges have a significant effect on customer churn.

Results

Test Conducted	T-Statistic	P-Value
Welch Two Sample T-Test	18.801	< 2.2e-16

Sample Estimates:

- Mean in group 'No': 2555.344
- Mean in group 'Yes': 1531.796

95% Confidence Interval:

- Lower Bound: 916.8121
- Upper Bound: 1130.2840

The statistical analysis yielded a T-statistic of 18.801, accompanied by an extremely low p-value of less than 2.2e-16. This outcome leads us to reject the null hypothesis, indicating that Total Charges exert a significant influence on customer churn. The 95% confidence interval also suggests a substantial difference in means, further supporting the robustness of our findings.

Conclusion : The results indicate a significant association between Total Charges and customer churn.In simpler terms, <u>customers who had higher total charges were less likely to churn, while those with lower total charges were more likely to churn.</u>

FACTORS INFLUENCING CHURN

- Senior citizens are prone to churn. Their churn rate is 41.68%
- Customers without partners and dependents are also prone to churn. (~31%)
- Customers using Fiber optic internet are also prone to churn. (41.89%)

- Customers who are not using services like online security, online backup, device protection and tech support are having higher churn rates.
- Customers with month-to-month contracts are experiencing higher churn rates and the customers with longer contracts (i.e. one year and two years) are experiencing lower churn rates.
- Customers using paperless billing are having higher churn rate than the customers using paper billing.
- Customers who are paying the bill using electronic cheque are experiencing higher churn rates.