Customer Churn Analysis

Identifying Key Drivers of Customer Churn:
An Analytical Study of SpeedyCall's
Customer Data

Case Study

IS 3005

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Introduction

Customer churn is a critical challenge faced by businesses in the telecommunication industry, directly impacting revenue and growth. Identifying factors and customer behaviours that influence customer churn is crucial as it helps the company to focus on those areas and address them to retain customers. This study analyzes customer data from SpeedyCall, a U.S.-based telecommunication company, to identify key factors contributing to customer churn. The analysis aims to provide actionable insights to help the company retain customers and improve their overall experience by exploring patterns in demographics, service usage, and subscription types.

Objectives:

- To identify significant factors and behavioral patterns associated with customer churn in SpeedyCall.
  - To analyze how demographic factors, such as seniority and gender, influence customer churn at SpeedyCall.
  - To determine whether there is a significant difference in monthly spending between customers who churn and those who do not.
  - To examine if customers on monthly plans churn at a higher rate compared to those on yearly contracts.
  - To explore the relationship between customer tenure and churn.
  - To investigate how the presence or absence of additional services, such as tech support, impacts churn.
- To provide data-driven recommendations for improving customer satisfaction and reducing churn.

Abstract

This study focuses on understanding the key drivers of customer churn in SpeedyCall, a U.S.-based telecommunications company, by analyzing customer demographics, service usage patterns, and subscription types.

This analysis leverages exploratory data techniques to identify demographic variables of customers who churned, such as gender, seniority, whether they have dependants or not, and whether they have a partner or not, as it helps the company identify the specific customer segment that has a high chance of churning.

In service usage analysis we aim to analyse how customer usage patterns are associated with churn. By analyzing factors such as 'tenure', 'Internet Service', 'Payment Method', 'Monthly Charges' and 'Tech Support', the goal is to identify usage trends that distinguish customers who leave the service from those who remain. Understanding these patterns can provide valuable insight into customer needs and preferences, helping to address the issues that cause customer dissatisfaction.

The subscription type analysis section aims to analyse how the subscription pattern of customers is associated with churn. By analyzing contract types of customers we can gain information about what contract type has more influence on churn. Also, we can find out what are the reasons behind it and what factors influence it.

Data

This dataset contains data from 7043 customers and 21 features. For this analysis, we use a subset of those features to perform exploratory data analysis. Following are the features we are using in this study.

- **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

- **InternetService** - Customer's internet service provider (DSL, Fiber optic, No)

- **Contract** - The contract term of the customer (Month-to-month, One year, Two year)

- **TechSupport** - Whether the customer has tech support or not (Yes, No, No internet service)

- **PaymentMethod** - The customer's payment method (Electronic check, Mailed check, Bank   transfer (automatic), Credit card (automatic))

- **MonthlyCharges** - The amount charged to the customer monthly

- **Churn** - Whether the customer churned or not (Yes or No)

Data Analysis

The dataset used in this study contains detailed information on 7,043 SpeedyCall customers, including their demographics, subscription details, and service usage patterns. Among these customers, 1,869 (approximately 26.5%) have churned, indicating a significant segment is at risk of leaving the service. Therefore it's a priority to analyse and find out what causes the high churn rate.

The analysis focuses on exploring customer attributes in three ways. That is analyse customer demographic variables, service usage patterns and subscription patterns to identify trends and patterns associated with churn.
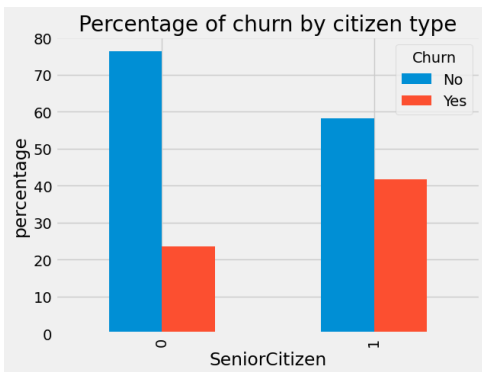
Demographic Variables Analysis

Gender
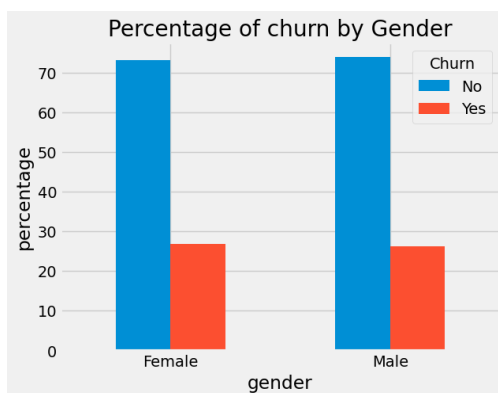
Churn	No	Yes
gender		
Female	73.08%	26.92%
Male	73.84%	26.16%

Here we can see both genders have the same percentage of churning meaning that gender is not influencing the churn

Senior Citizen

Churn	No	Yes
SeniorCitizen		
0	76.4%	23.6%
1	58.3%	41.7%

It is observed that 41.7% of senior citizens leave the service. This is a considerably high percentage. To identify the reasons behind the high percentage of churn among senior citizens, further analysis will be conducted.
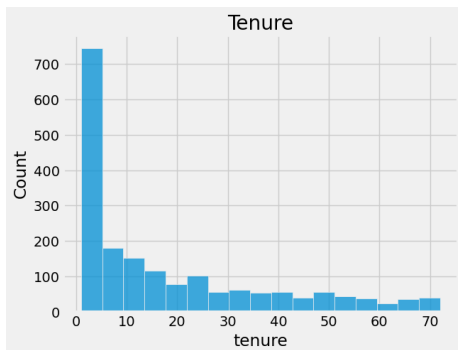
Partner and Dependent
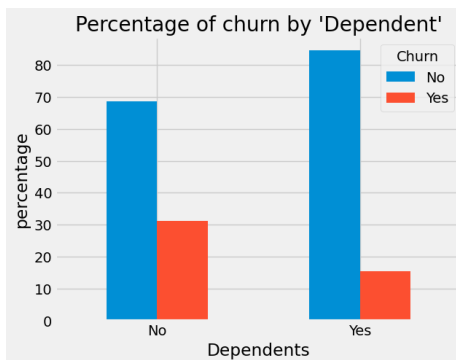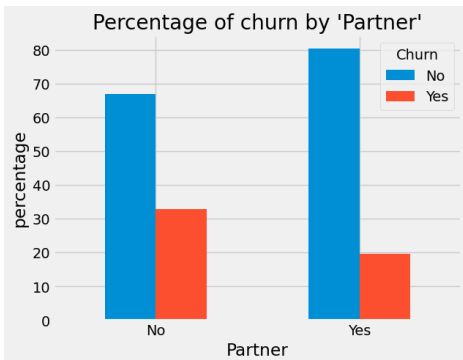
Here we can observe that customers with no partners and dependents have more tendency to churn. It might be an indicator of young individuals' tendency to leave the service.
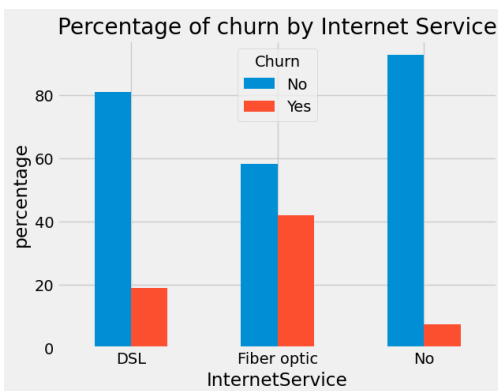
Service Usage Analysis

Tenure

This histogram depicts the tenure (number of months the customer has stayed with the company) of churned customers. We can observe a clear majority of churned customers have a tenure of less than 5 months. This is strong evidence that new customers tend to leave the company compared to long-standing customers.

Internet Service

Churn	No	Yes
InternetService		
DSL	81.04%	18.96%
Fiber optic	58.11%	41.89%
No	92.60%	7.40%

Here we can observe that 41.9% of customers who use fiber optic have churned. It's a notably high percentage. This might be an indicator of customer dissatisfaction with fiber optic service. This can be because of high monthly charges for fiber optic service or any other technical issue with that service.

Payment Method
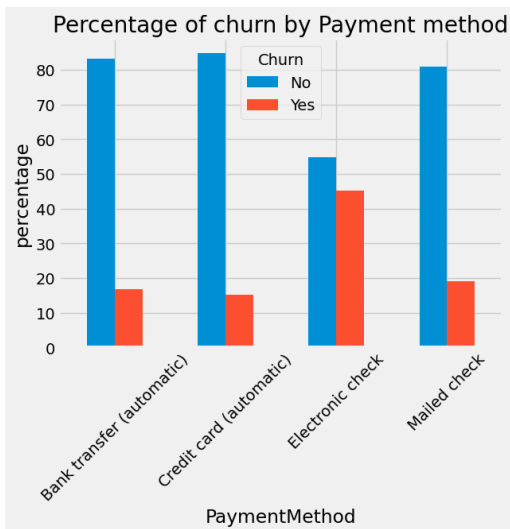
Churn	No	Yes
PaymentMethod		
Bank transfer (automatic)	83.29%	16.71%
Credit card (automatic)	84.76%	15.24%
Electronic check	54.71%	45.29%
Mailed check	80.89%	19.11%

Here we can observe customers who use 'Electronic check' as their payment method have a high churn percentage. In this case, 45.3% which is considerably high. This could suggest potential issues with the 'Electronic Check' payment method or indicate the influence of other underlying factors.

Monthly Charges
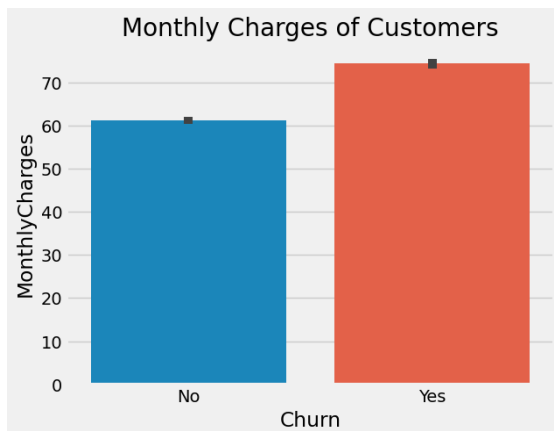

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Welch Two Sample t-test

data:  df_yes$MonthlyCharges and df_no$MonthlyCharges
t = 18.408, df = 4135.8, p-value < 2.2e-16
alternative hypothesis: true difference in means is greater than 0
95 percent confidence interval:
 11.99855      Inf
sample estimates:
mean of x mean of y
 74.44133  61.26512
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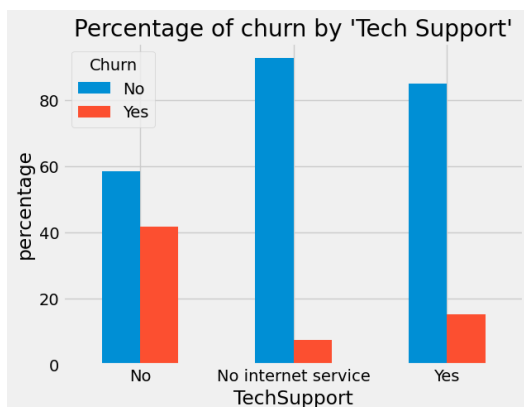
Here we can see the average monthly charges of churned customers are higher than those who did not. We can confirm it using the two-sample t-test as it rejects the null hypothesis of 'True difference in means is equal to 0' (since the p-value is less than 0.05). This can be evidence that high monthly charges lead the customers to churn.

Tech Support

| Churn	No	Yes
TechSupport		
No	58.36%	41.64%
No internet service	92.60%	7.40%
Yes	84.83%	15.17%

We can observe that customers without tech support have more tendency to churn. Out of those who do not have tech support, 41.6% have churned. This suggests that a lack of awareness about the service may ultimately contribute to customers discontinuing it.

Subscription Type Analysis
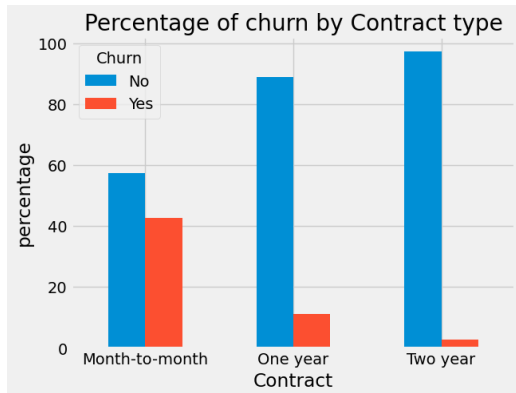
Contract

Churn	No	Yes
Contract		
Month-to-month	57.29%	42.71%
One year	88.73%	11.27%
Two year	97.17%	2.83%
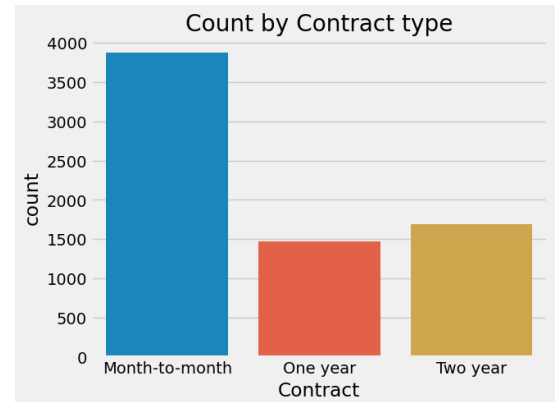
We can observe that the highest percentage of churn was reported in customers who use the month-to-month contract type. In the 2nd bar graph, we can see that the majority of SpeedyCall's customers use the month-to-month contract type. Out of those 42.7% has churned. This suggests that the company should pay attention to the month-to-month contractors to retain them in the service.

Integrated Analysis

This section combines the findings from the demographic analysis, service usage patterns, and subscription types to provide a comprehensive understanding of the factors driving customer churn. This approach not only highlights the key drivers of churn but also lays the foundation for targeted strategies to improve customer retention.

If we are to find out the underlying factors associated with more senior citizens leaving the service, we can see that the majority of senior citizens use 'Electronic Check' as their payment method which has a high percentage of churn. If we further analyse it, we can see out of churned senior citizens 82.6% used fiber optic as their internet service.

SeniorCitizen	0	1
InternetService		
DSL	36.64%	22.68%
Fiber optic	38.38%	72.77%
No	24.98%	4.55%

SeniorCitizen		0		1
Churn	No	Yes	No	Yes
InternetService				
DSL	39.51%	27.35%	27.18%	16.39%
Fiber optic	30.19%	64.90%	65.77%	82.56%
No	30.30%	7.75%	7.06%	1.05%
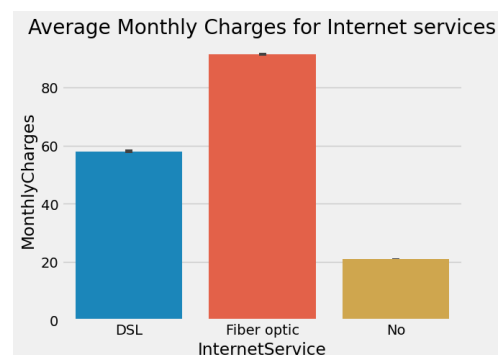
From this, we can conclude that because the majority of senior citizens use fiber optic as their internet service, we observe a high percentage of churn among senior citizens. To find out the reasons for dissatisfaction among fiber optic customers, let's look at the average monthly charges for that service. Here we can clearly see that the average monthly charges for fiber optic service is much higher than for other services. This can be a reason for customer dissatisfaction with fiber optic service.

Now let's analyse what are the underlying factors associated with high churn percentage among the month-to-month contractors.

Contract	Month-to-month	One year	Two year
PaymentMethod			
Bank transfer (automatic)	15.20%	26.54%	33.27%
Credit card (automatic)	14.01%	27.02%	34.28%
Electronic check	47.74%	23.56%	9.91%
Mailed check	23.05%	22.88%	22.54%

Here we can see that 47.7% of month-to-month contractors are 'Electronic Check' payment method users. This may cause to high churn percentage among month-to-month contractors as there is a high churn percentage among the customers who use 'Electronic Check' as their payment method. Or it can be the other way around also. Further details and analysis need to be done on what is really going on here.

InternetService	DSL	Fiber optic	No
PaymentMethod			
Bank transfer (automatic)	36.66%	41.84%	21.50%
Credit card (automatic)	39.03%	39.22%	21.75%
Electronic check	27.40%	67.44%	5.16%
Mailed check	38.03%	16.00%	45.97%

If we take a look at the association between Internet service and Payment method, we can see out of those who use the 'Electronic Check' payment method, 67.4% of them use fiber optic internet service, which has a high churn percentage.

Contract	Month-to-month	One year	Two year
InternetService			
DSL	31.56%	38.70%	37.05%
Fiber optic	54.92%	36.59%	25.31%
No	13.52%	24.71%	37.64%

Also, if we check the association between Internet service and Contract type, 54.9% of fiber optic users are month-to-month contractors. Therefore it seems like all these three factors are associated with each other, influencing one another. The reason for the high churn percentage can be one or more of these factors. It can be due to an issue in 'Electronic Check' payment method that causes dissatisfaction among customers. The company should check if there are continuous customer complaints about the 'Electronic Check' payment method and any drawbacks in this payment method compared to other payment methods.

Also, the company should pay attention to fiber optic service. The high churn percentage among fiber optic users can be due to high monthly charges or any other issues with that service.

InternetService		DSL		Fiber optic		No	
Churn		No	Yes	No	Yes	No	Yes
TechSupport							
No		45.77%	75.16%	62.76%	84.89%	0.00%	0.00%
No internet service		0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Yes		54.23%	24.84%	37.24%	15.11%	0.00%	0.00%

It is observed that 84.9% of churned fiber optic users did not have tech support. This may indicate a lack of awareness about the service, which could ultimately lead to churn. Therefore the company should pay attention to expanding their tech support to customers.

Conclusion

- Gender has no influence on the churn
- It is observed that there's a high churn percentage among senior citizens and we found that it may be due to the majority of senior citizens using fiber optic service which has a high churn percentage.

- Customer dissatisfaction with fiber optic service can be due to its high monthly charges or it can be other issues related to that service. The company should pay attention to addressing these issues to improve customer satisfaction.

- Also found that among the customers who do not have tech support, 41.6% have churned. Suggesting that a lack of awareness about the service could result in customers leaving the service. The company should pay attention to expanding its tech support to customers to retain them in the service.

- The majority of customers use month-to-month contracts. And we discovered that out of them 42.7% has churned.

- Addressing the underlying factors influencing high churn percentage among month-to-month contractors, we found that contract type, internet service type and payment method are associated with each other.

- Analysing these associations it is suspected that there are potential issues related to the 'Electronic Check' payment method. It is recommended that the company should check if there are customer complaints about the 'Electronic Check' payment method or any drawbacks related to this payment method and if there are, address them accordingly. If no such issues are found with this payment method, it can be the high churn percentage of fiber optic service that influences the high churn percentage of this payment method.