

# Customer Churn Analysis Project

## Exploratory Data Analysis Documentation

### 1. Project Objective

The main goal of this analysis is to figure out why customers are leaving the telecom service (churn). We are looking at various factors such as customer demographics, the services they use, their contract types, and billing information. By understanding these patterns, we aim to:

- Spot the main reasons behind customer churn.
- See how different groups of people use our services.
- Compare how customers behave with different SIM operators.
- Find ways to improve customer retention and reduce business loss.

### 2. Tools Used

To analyze the data, we used the following tools:

- **Python:** The programming language used for the analysis.
- **Pandas:** For organizing and cleaning the data.
- **NumPy:** For numerical calculations.
- **Matplotlib & Seaborn:** For creating the visual charts and graphs.
- **Environment:** Jupyter Notebook / Local Python Environment.

### 3. About the Dataset

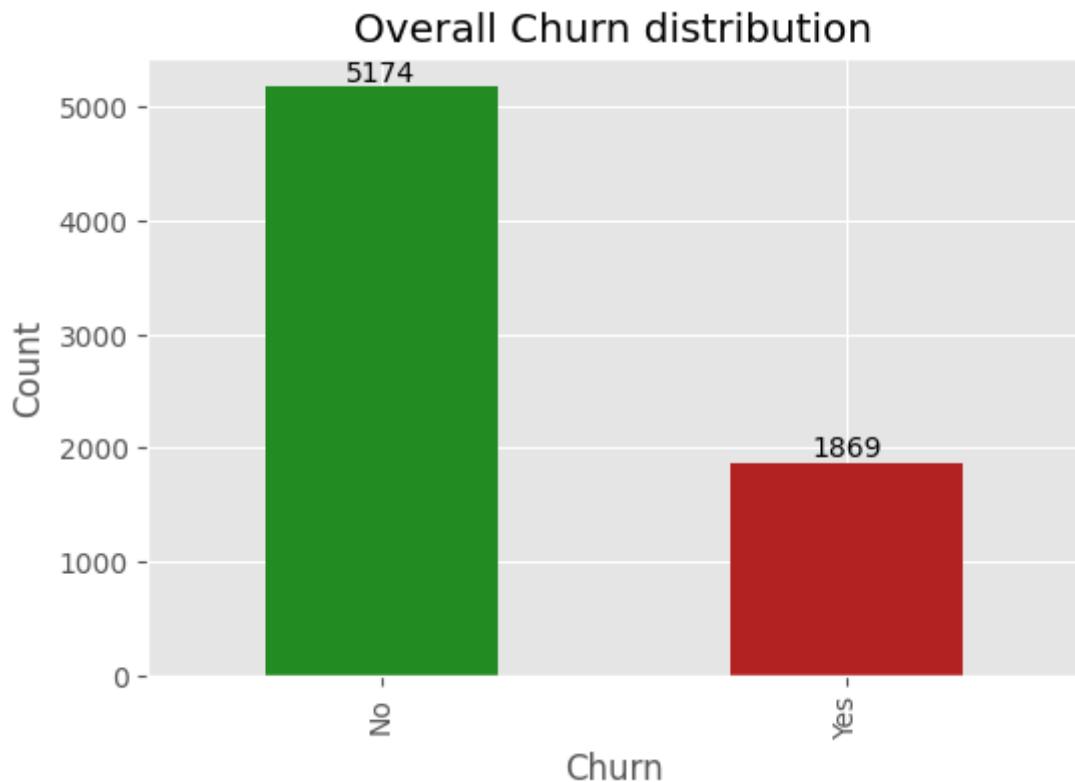
The dataset includes details about each customer. Key information includes:

- **Churn:** Did the customer leave? (Yes/No)
- **Demographics:** Gender, Senior Citizen status, Region.
- **Services:** Internet type, Phone service, TV, Movies, etc.
- **Account Details:** Contract type, Payment method, Monthly charges, Tenure columns.
- **SIM Info:** Which operator SIM is being used.

## 4. Visual Analysis & Key Insights

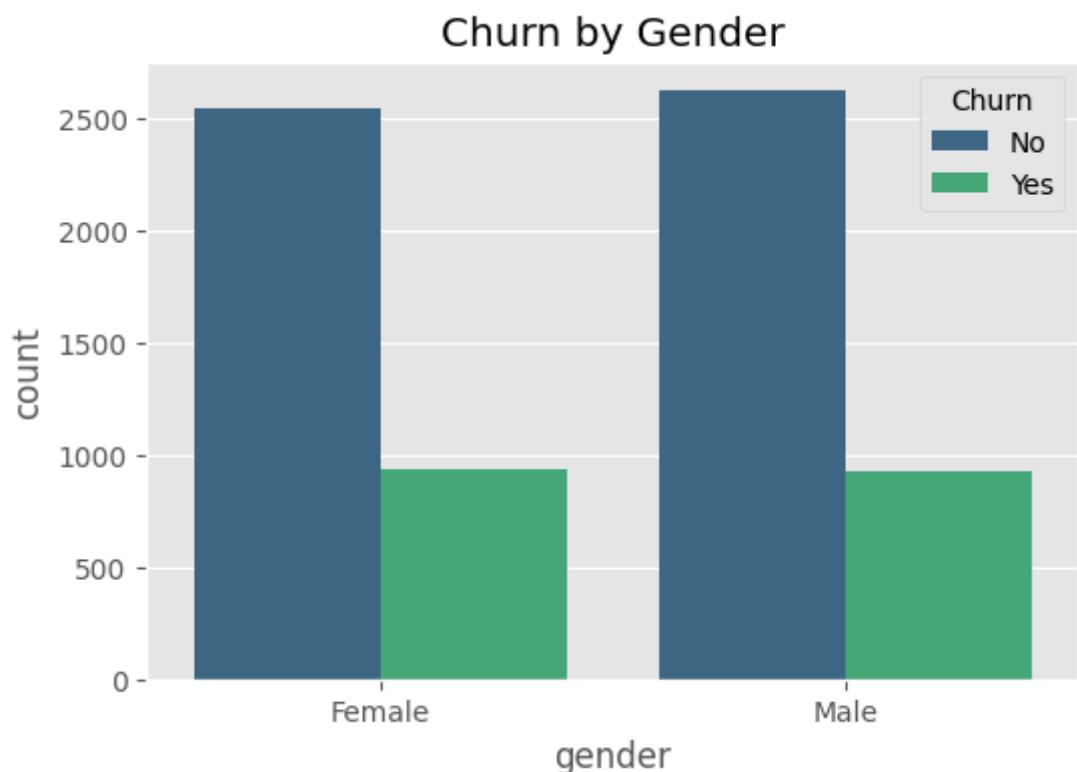
Below are the graphs we generated to understand the data, along with what we learned from them.

### 1. Overall Churn Count



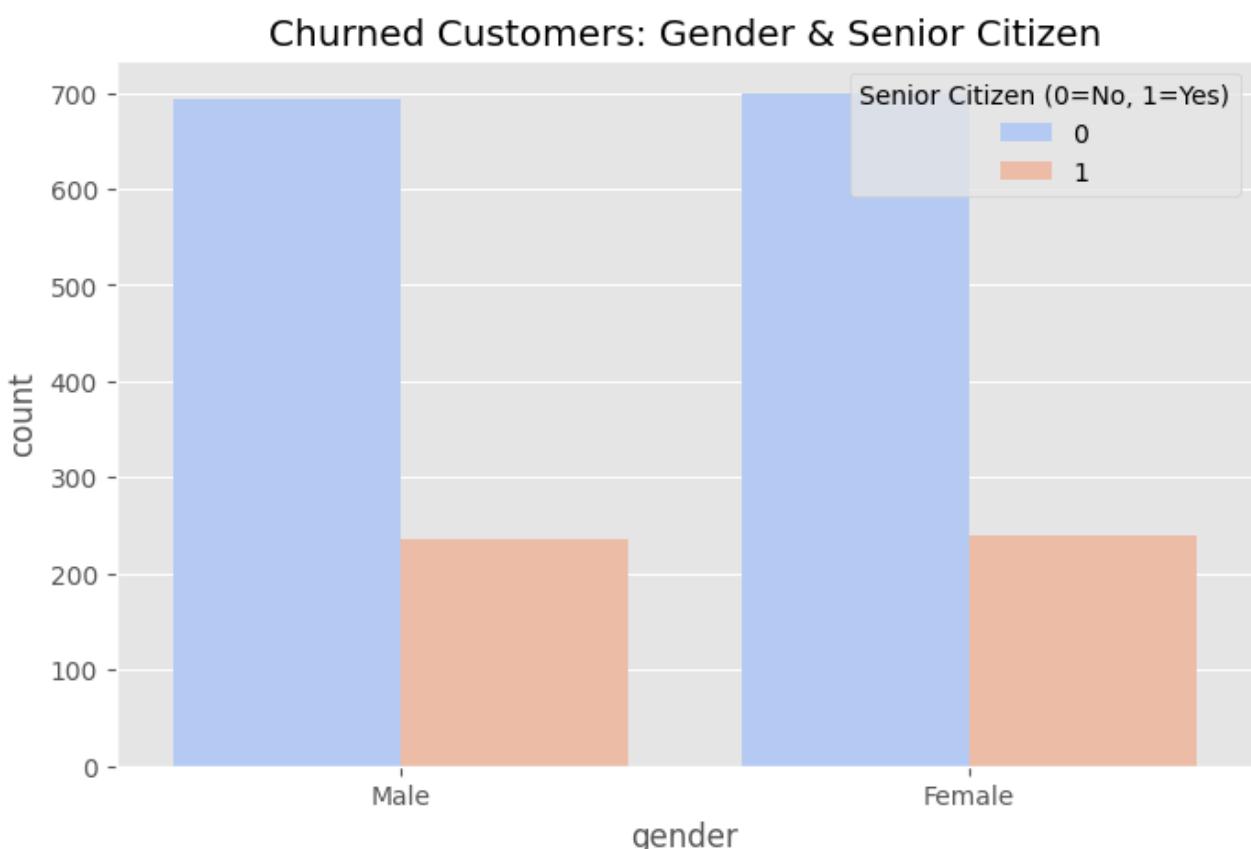
**Insight:** Most customers are staying, but a significant number are leaving. This confirms that churn is an issue we need to address.

### 2. Churn by Gender



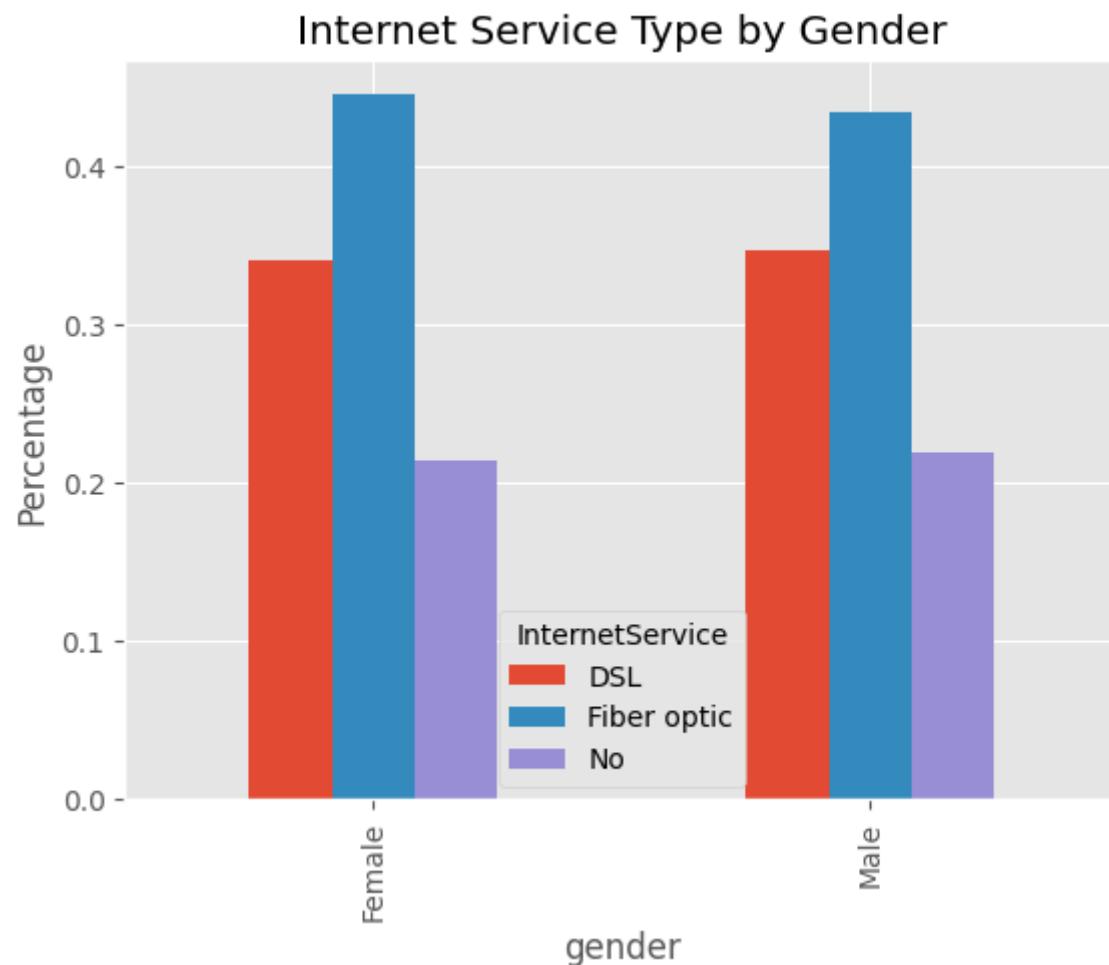
**Insight:** Both men and women churn at similar rates. Gender alone doesn't seem to be the main reason for leaving.

### 3. Churn: Gender & Senior Citizens



**Insight:** Senior citizens tend to churn more often than younger customers, regardless of gender. This suggests older customers might face specific issues.

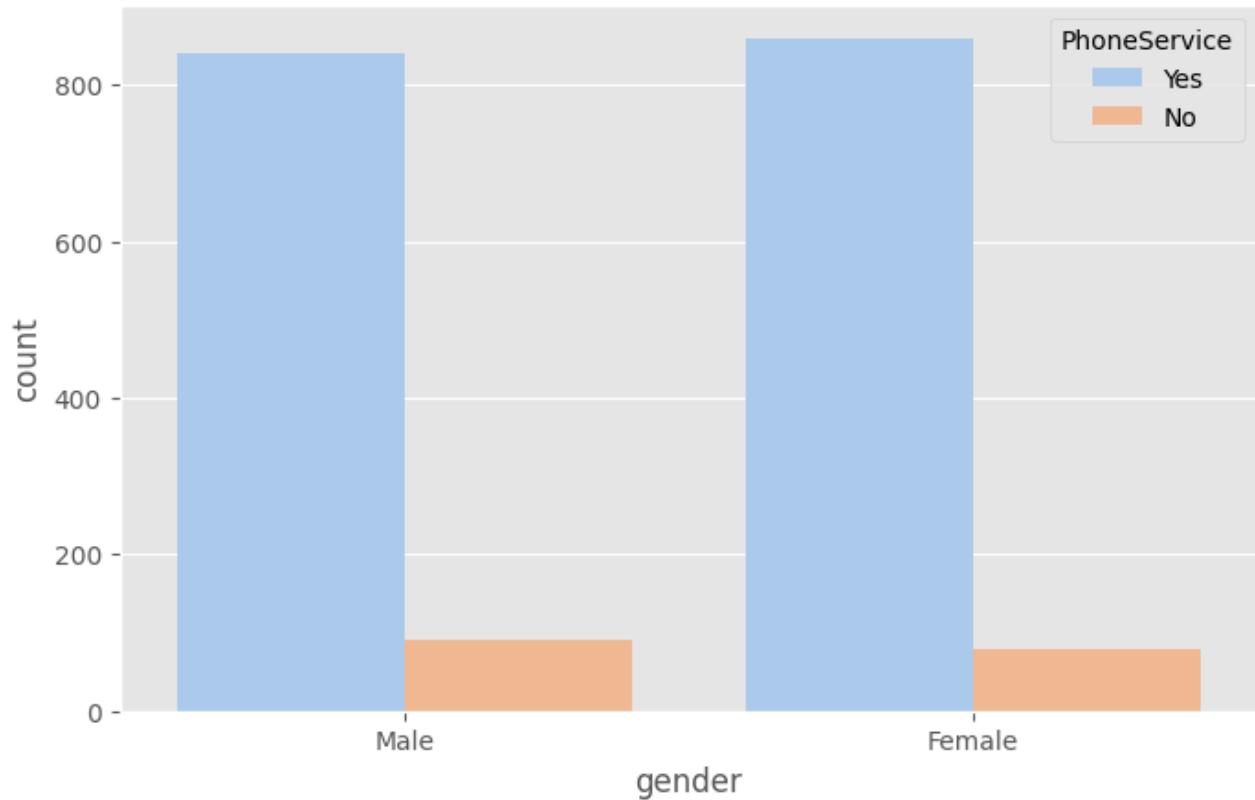
#### 4. Internet Choices by Gender



**Insight:** Fiber optic is very popular among all genders. However, high-speed internet users are also often the ones who churn, perhaps due to price or connection quality.

#### 5. Phone Service vs Churn

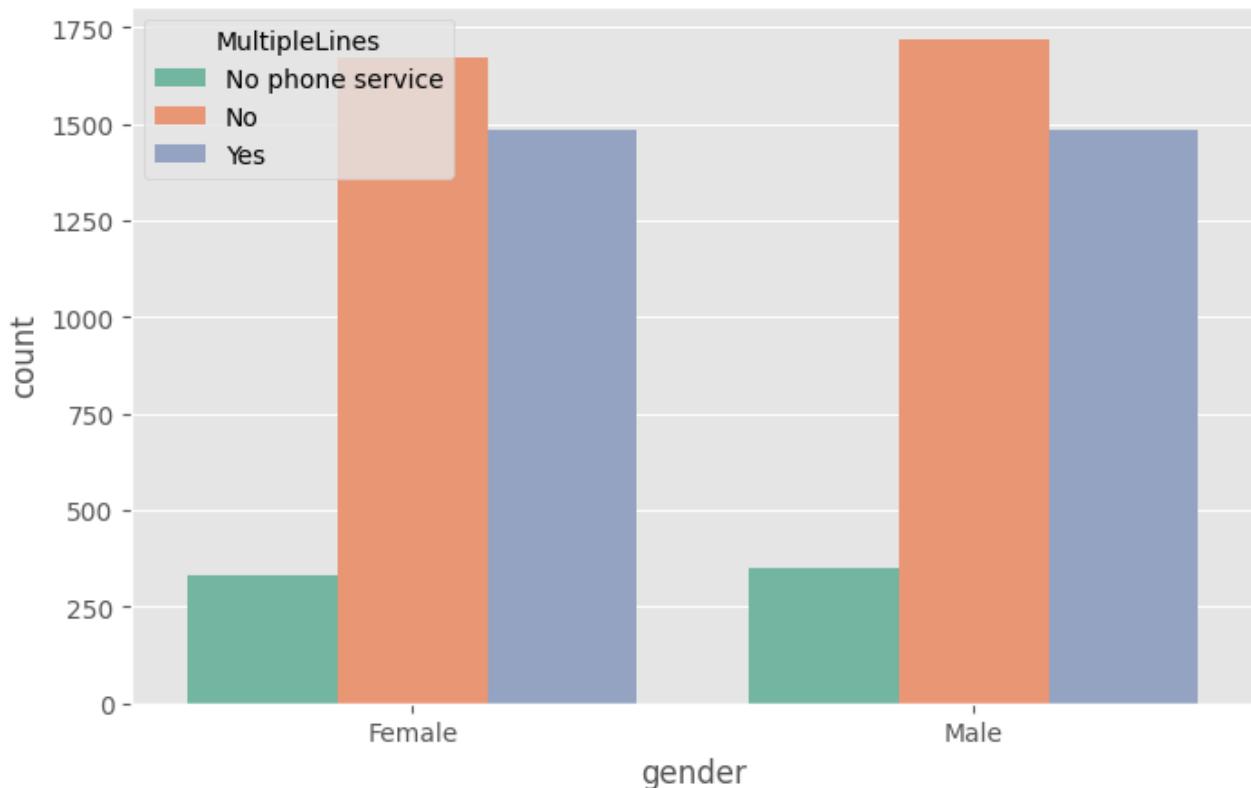
### Phone Service Usage (Churned Customers)



**Insight:** Most people who left did have phone service. This means the lack of phone service isn't the problem; it's likely something else.

## 6. Multiple Lines by Gender

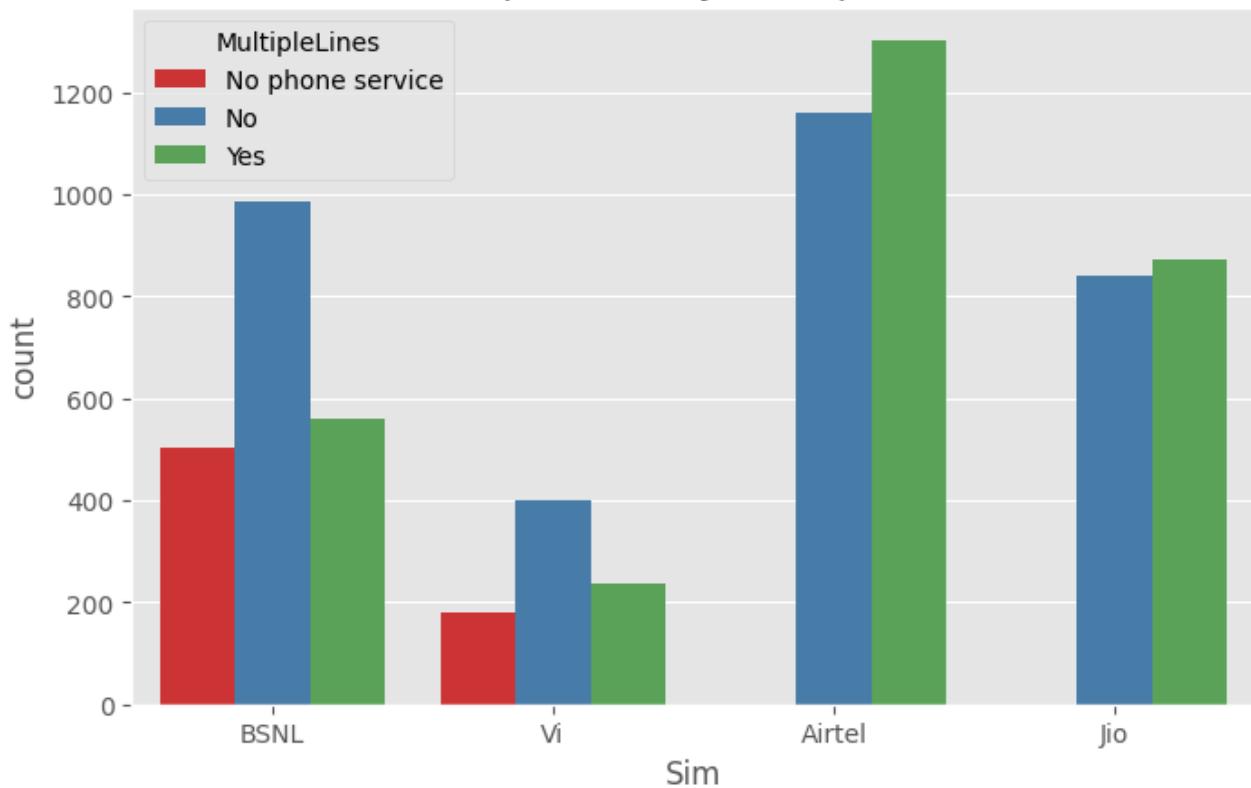
### Multiple Lines Usage by Gender



**Insight:** Usage of multiple lines is fairly balanced between genders.

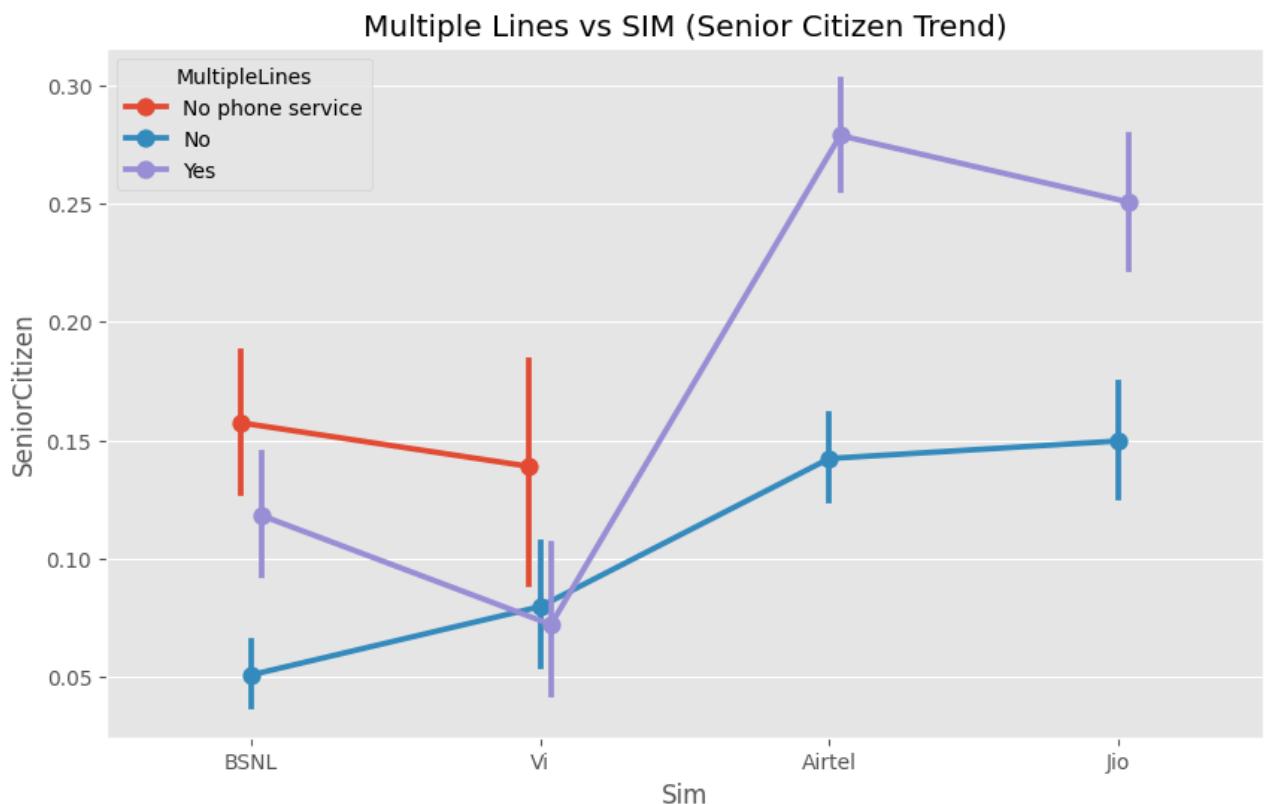
## 7 & 8. Multiple Lines and SIM Operators

### Multiple Lines by SIM Operator



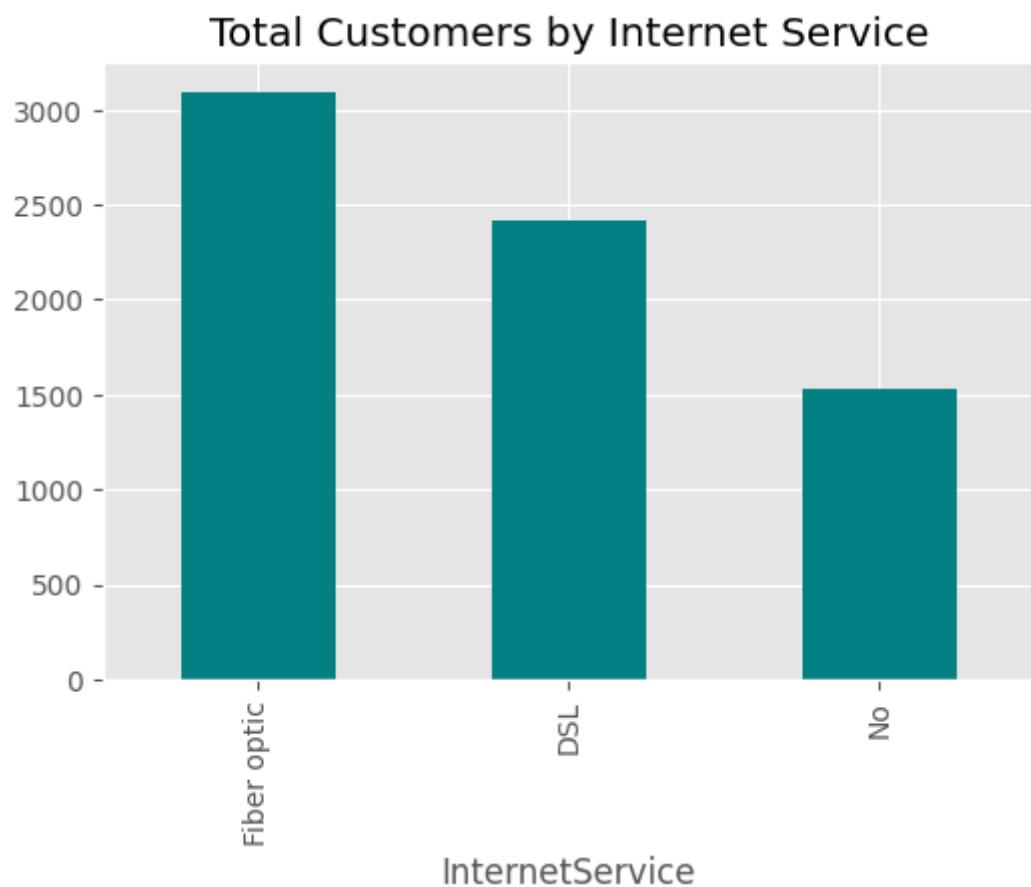
**Insight:** Different SIM operators have very different patterns for multiple line usage, likely due to the specific plans they offer.

## 9. Multiple Lines & Senior Citizens



**Insight:** Senior citizens generally use fewer multiple lines, preferring simpler setups.

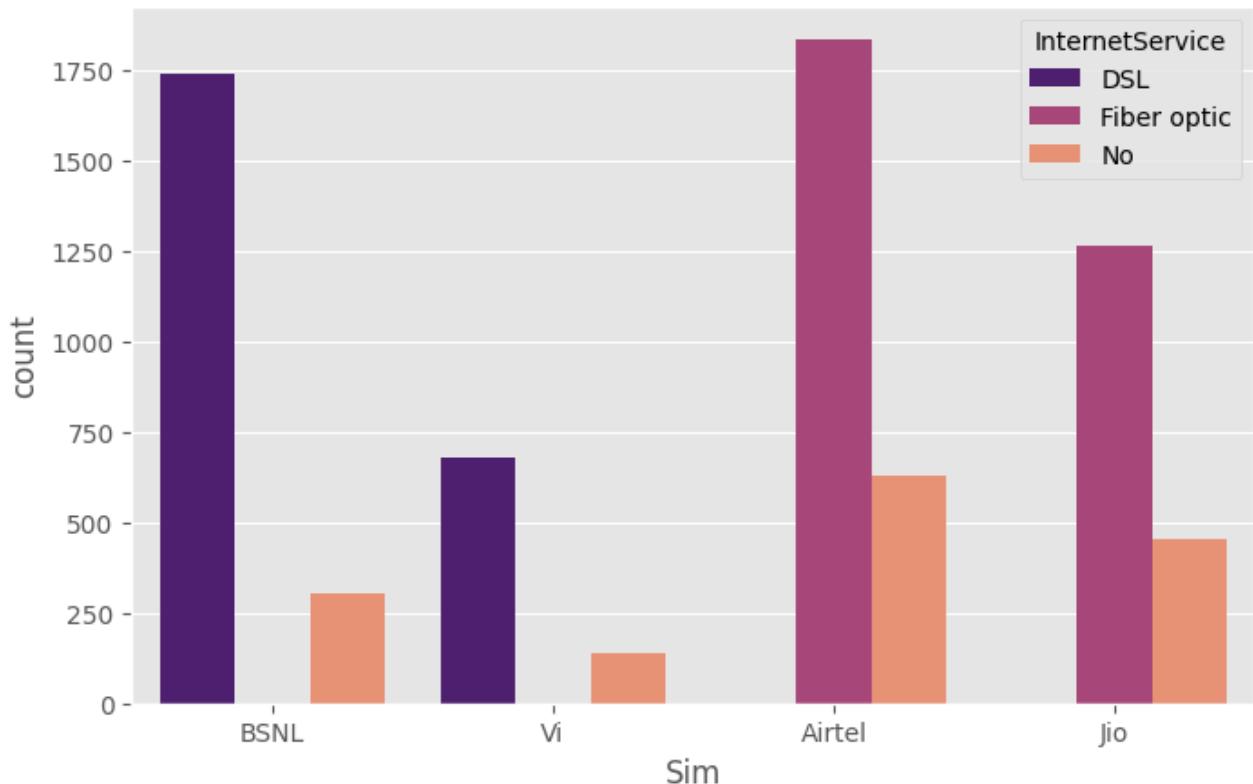
## 10. Internet Service Popularity



**Insight:** Fiber optic is the most subscribed service, showing a high demand for speed.

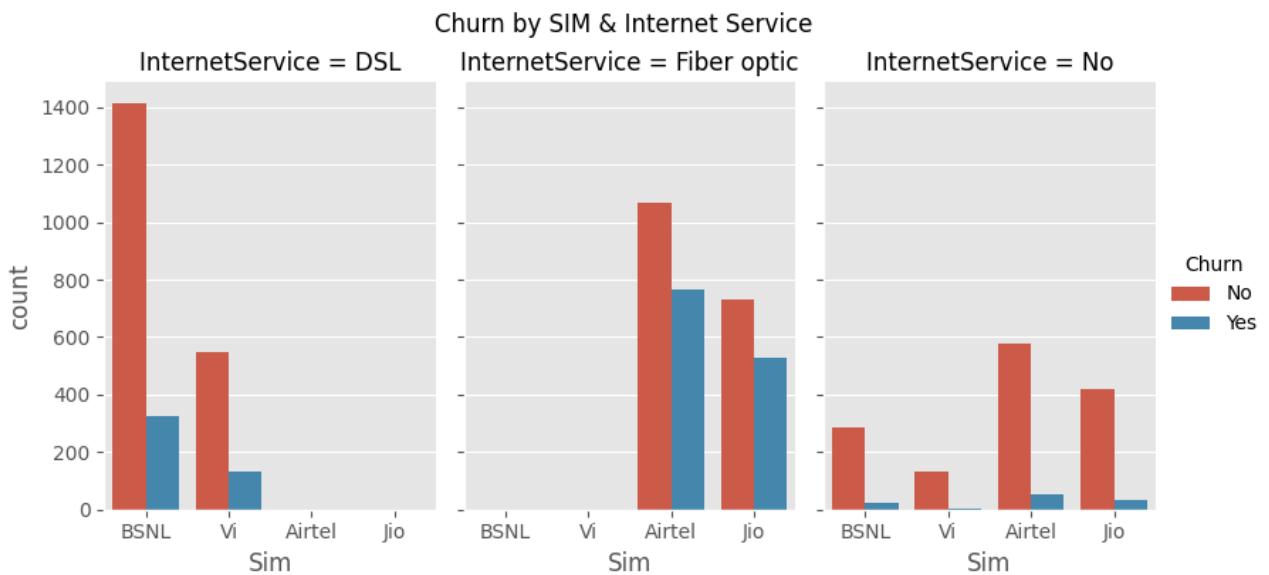
## 11 & 12. Internet Service by Operator

## Internet Service by SIM Operator



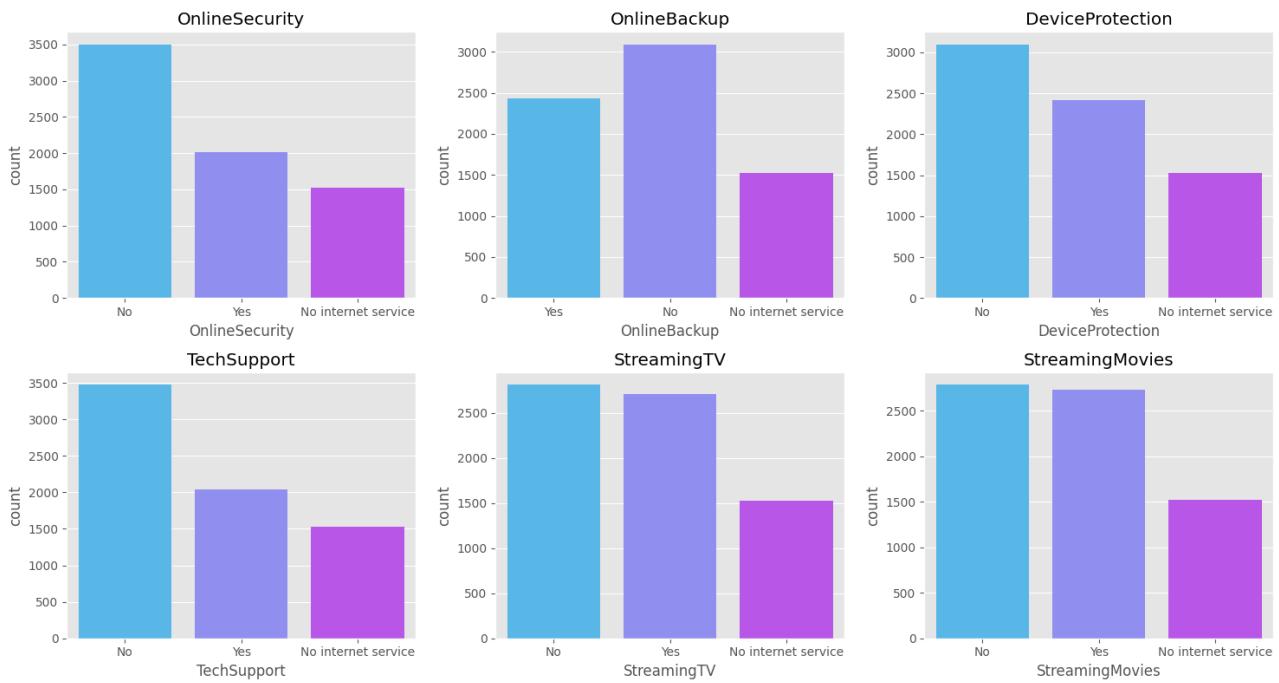
**Insight:** Some operators are clearly preferred for specific internet types.

## 13. Churn by Internet Service



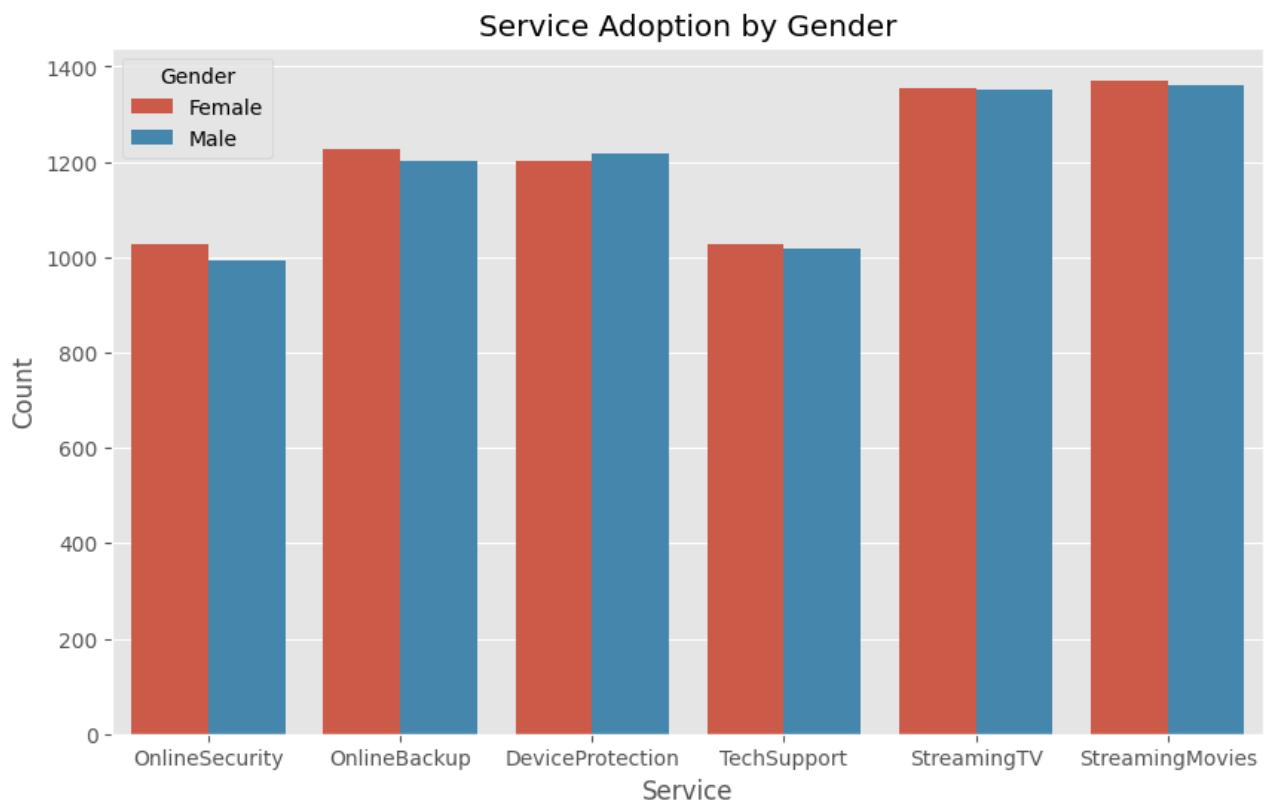
**Insight:** Fiber optic users show higher churn rates in some cases, which is a critical area to investigate.

## 14. Add-on Services



**Insight:** Services like Tech Support and Online Security are less popular. Customers without these often churn more.

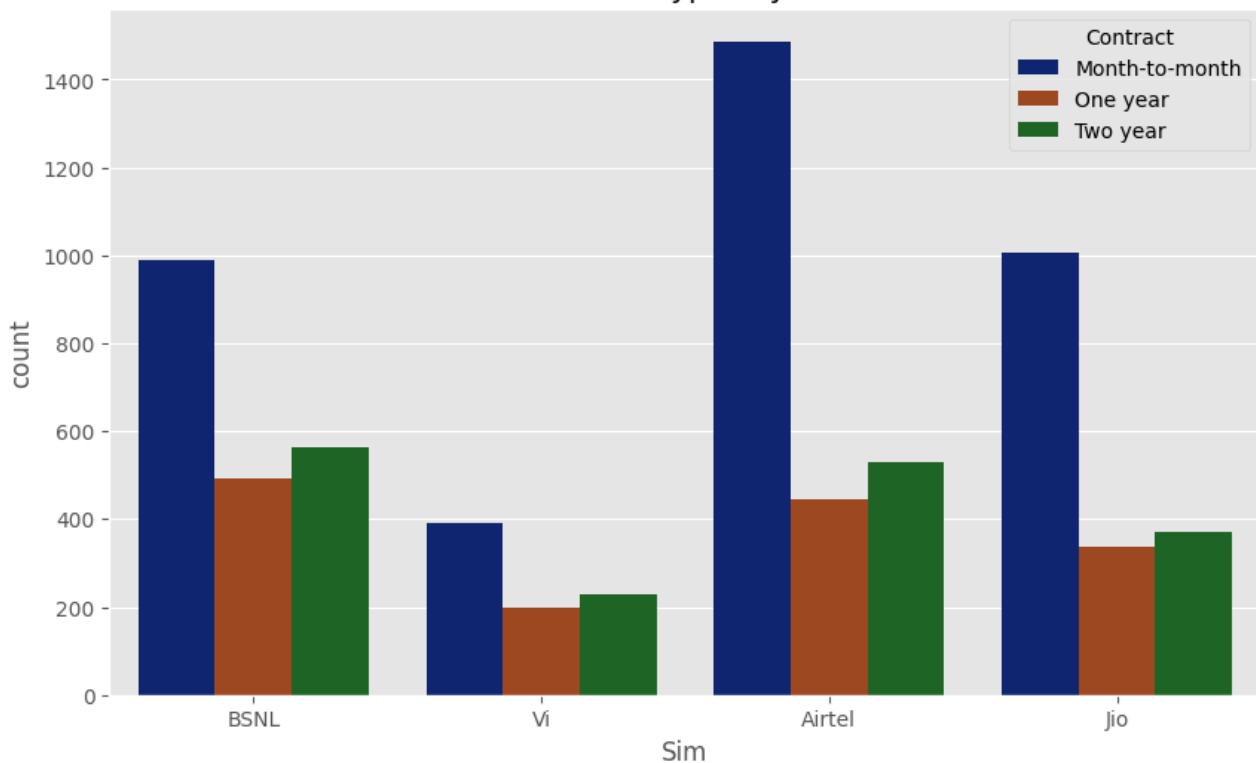
## 15. Services by Gender



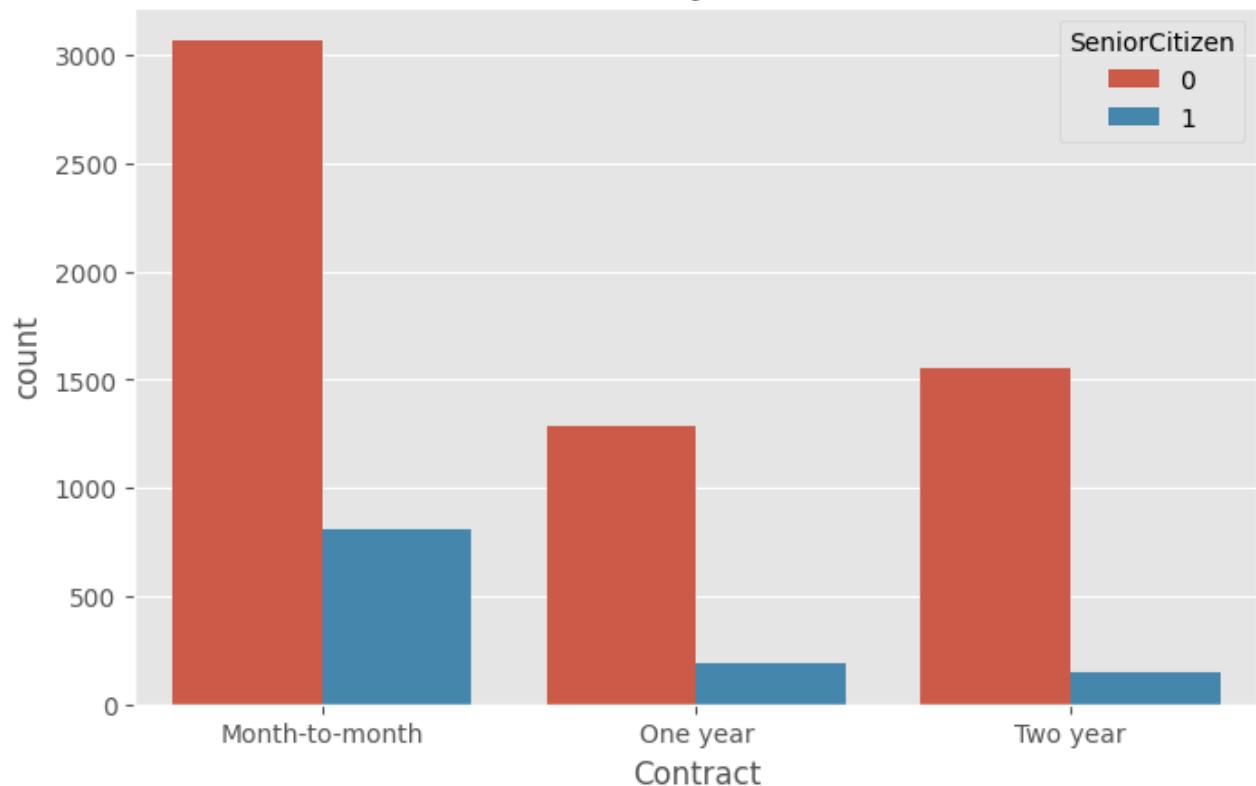
**Insight:** Adoption of extra services is consistent across genders.

## 16 & 17. Contract Types

Contract Types by SIM

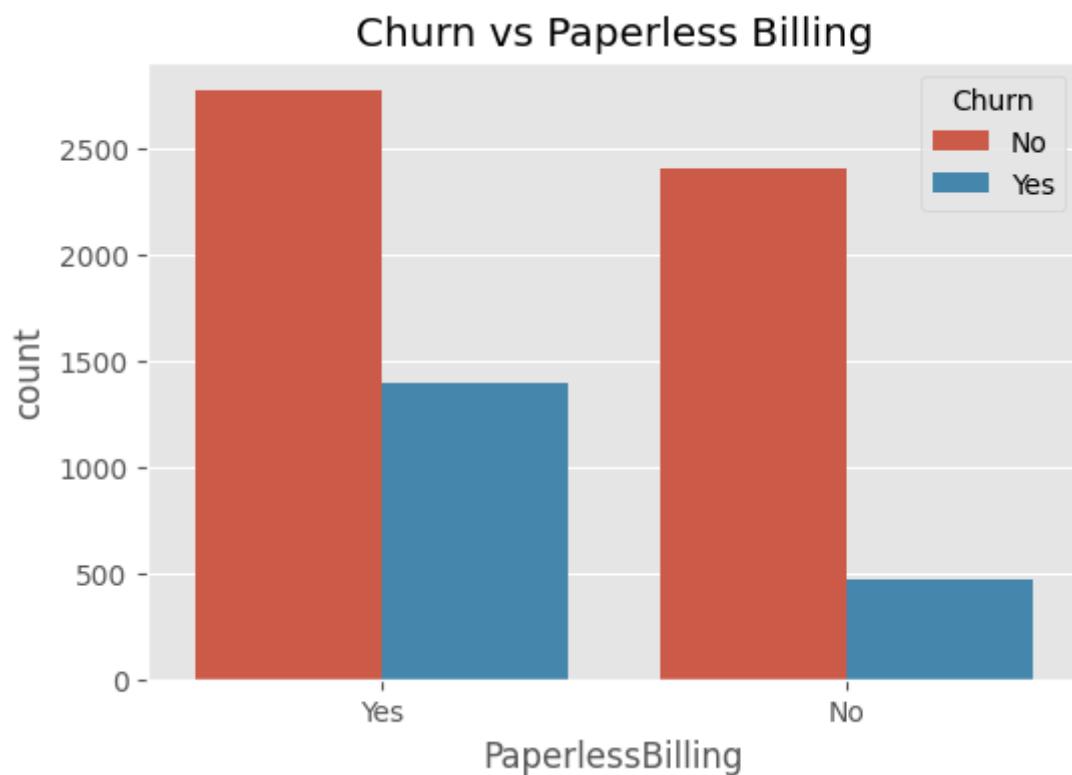


Contract Preference by Senior Citizen Status



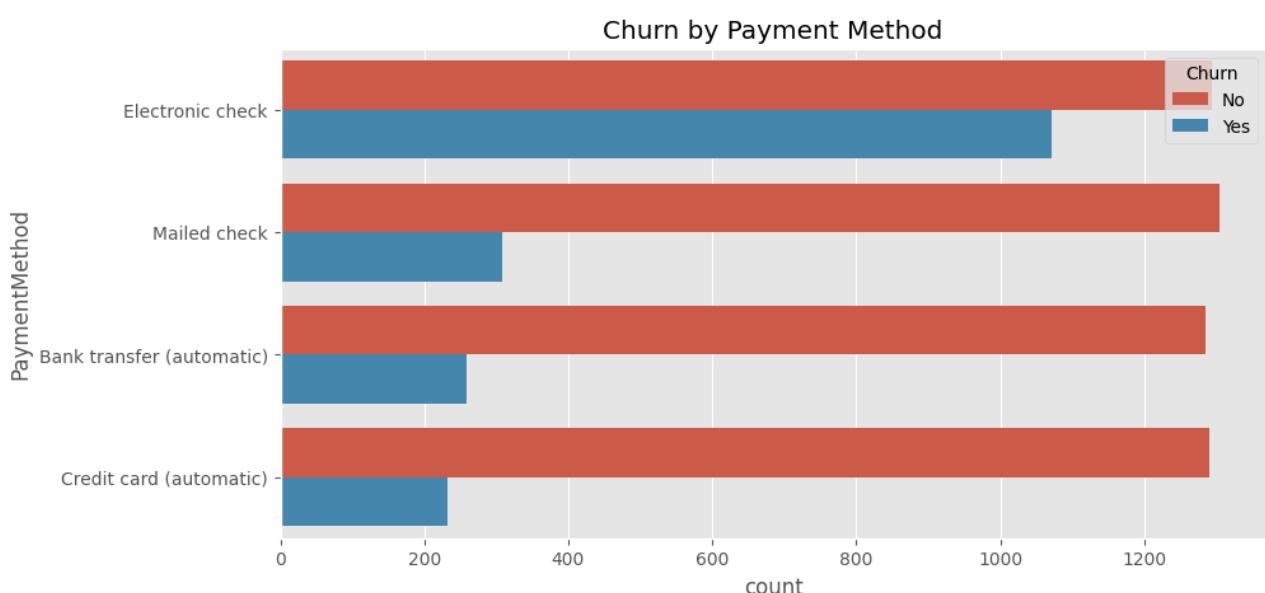
**Insight:** Month-to-month contracts have the highest churn. Long-term contracts help keep customers. Seniors often pick short contracts.

## 18. Paperless Billing



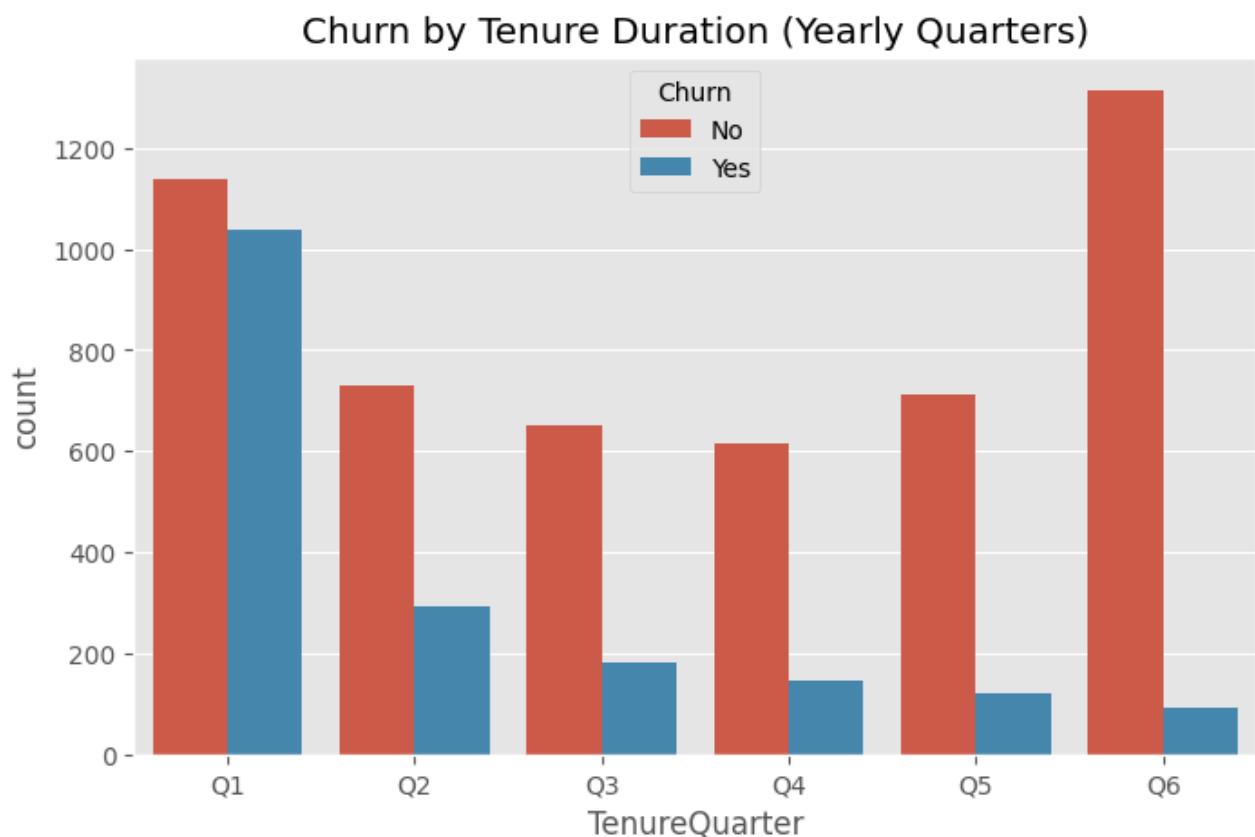
**Insight:** People on paperless billing are more likely to leave, possibly because they find it easier to switch providers digitally.

## 19. Payment Methods



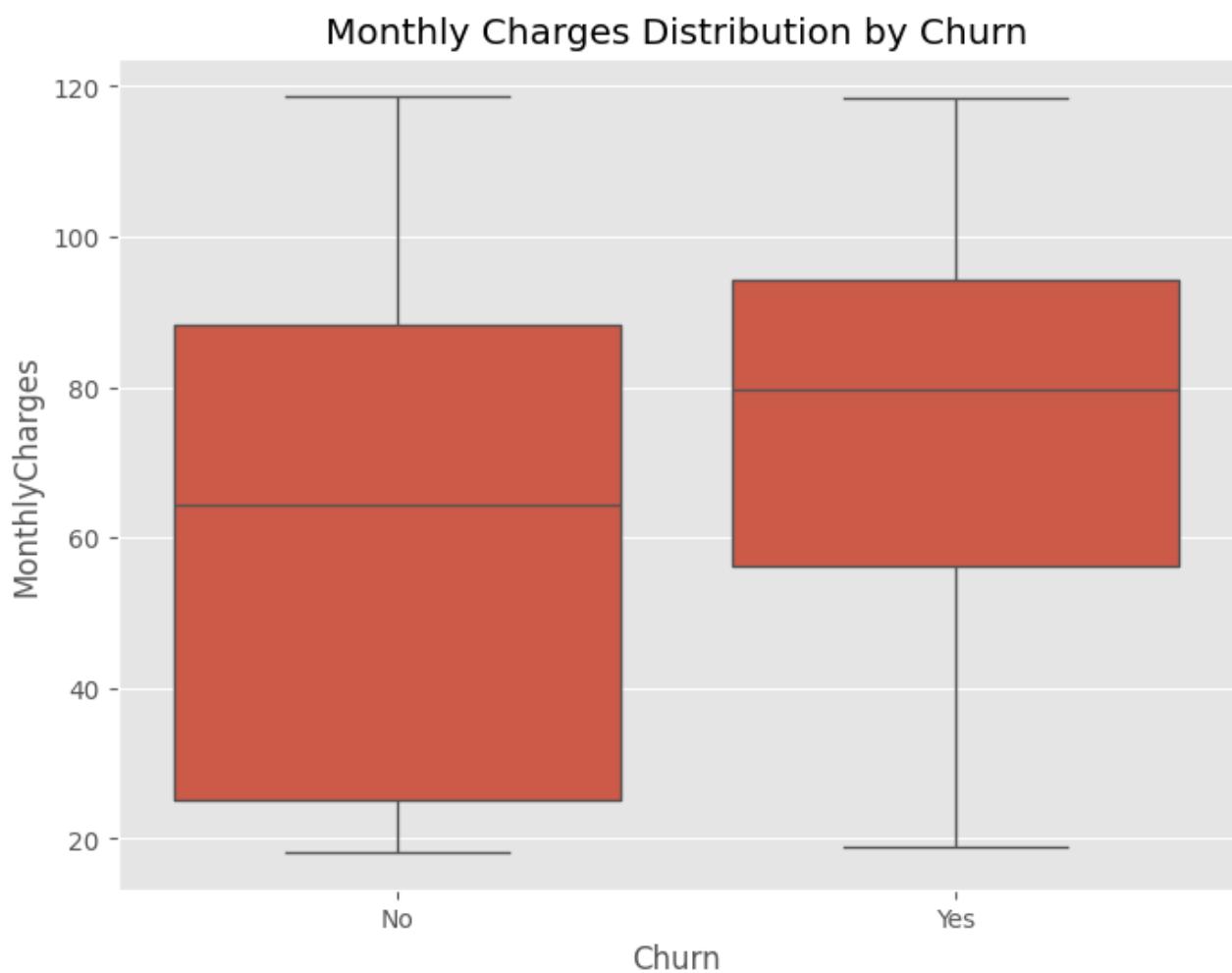
**Insight:** Electronic checks are linked to higher churn. Automatic payments seem to improve retention.

## 20. Tenure (Time with Company)



**Insight:** Churn is highest in the first year (early quarters). If customers stay past this period, they are likely to remain loyal.

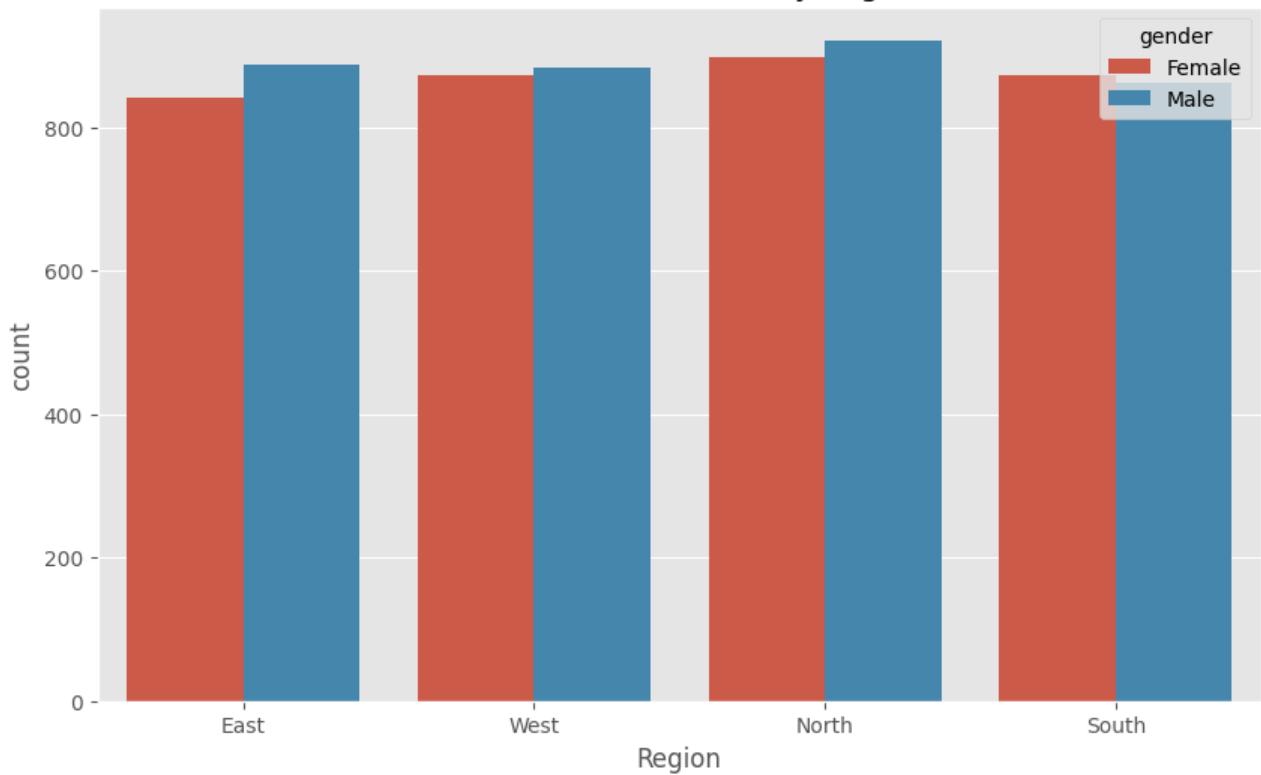
## 21. Monthly Charges



**Insight:** Higher monthly bills are strongly linked to customers leaving. Price sensitivity is a major factor.

## 22. Region Analysis

### Customer Distribution by Region



**Insight:** There are some regional differences, but service quality and price are more important than location itself.

## 5. Conclusion & Recommendations

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Based on our visual analysis, we found several key points:

- **Short Contracts Risk:** Month-to-month contracts are the biggest driver of churn. We should encourage longer-term plans.
- **Price Sensitivity:** High monthly charges correlate with churn. We might need better value bundles.
- **New Customers:** Most people leave early on. Better onboarding in the first few months could help.
- **Senior Citizens:** This group churns often and prefers flexible contacts. Tailored support for them could improve retention.
- **Fiber Optic Issues:** While popular, fiber optic users leave frequently, suggesting potential technical or pricing issues with this specific service.

**Next Steps:** We should focus on improving the experience for new customers and investigating why high-paying fiber optic users are dissatisfied.