



# Customer Churn Predictions: Telecom Sector

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# Problem Statement

- Customer retention is a key driver of growth and long term profits of business.
- Retained customers are messengers of better services and are brand ambassadors to create new leads.
- Churned customers reflects poor image of services and can lead to revenue loss.
- Retaining customers is cost effective as compared to creating new customers.

# Problem Statement

- Churned Customers: Customers who decided to end relationship with company because of:
  - Bad Customer Service
  - Bad Onboarding
  - Bad experience
- Prior prediction of customers who may churn, can help in taking steps to avoid revenue loss.
- Predict a customer behavior through building a model to retain customers.

# Data used

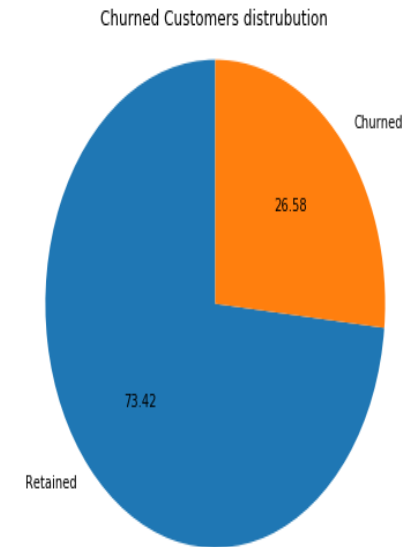
- IBM Sample Data set which contains:
  - Customers who churn last month
  - Services each customer signed for: Phone, Multiple Lines, internet, streaming TV and movies
  - Additional services: Online Security, Online Backup, Device Protection, Tech Support.
  - Payment System and Contract agreement of Customers.
  - Customer demography: Age, Gender, and if they have partners or dependents

# Dataset description

- Clean dataset with only 11 missing data in TotalPayment which is cleaned by replacing it with zero.
- Data collection of 7043 customers.
- Mean monthly charges of customers using services is 64 dollars.
- There are 3 numerical columns: Tenure, MonthlyCharges and TotalCharges. All other variables are categorical.

# Exploratory Data Analysis

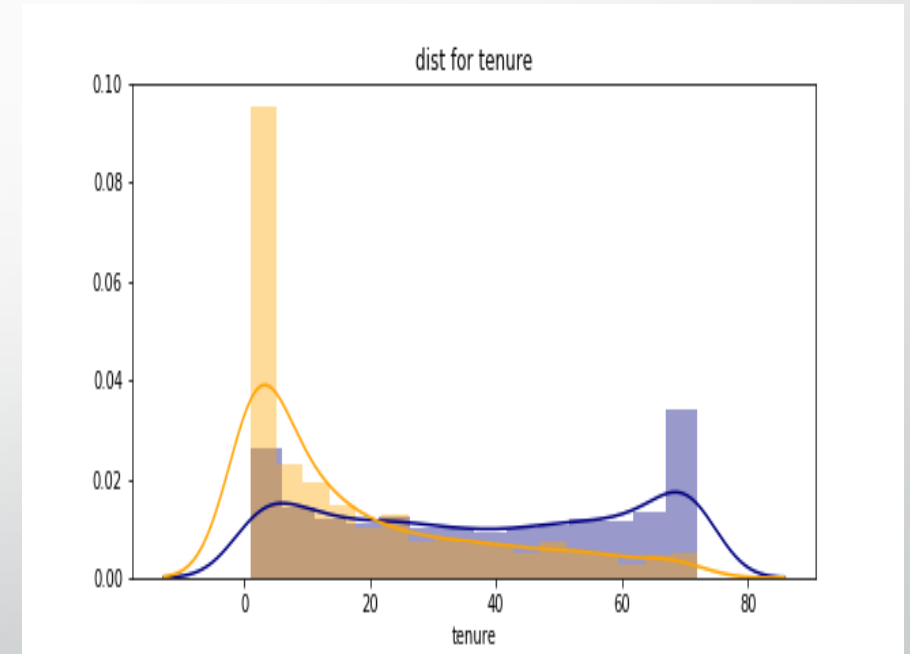
- Total numbers of Customers who churned are: 26.58%
- Total number of retained customers: 73.42%
- Accepted level of churning: 5%
- By this means, customers churned in this dataset is above the benchmark of accepted level.
- It becomes more obvious to look deeply into this problem to ensure company's profitability.



# Exploratory Data Analysis

## Tenure of customers using services

- Nearly 10% of customers churned within 10 years of using services.
- This means that customers unhappy with the services prefer to drop out of using services earlier.
- This may be because of poor services, bad support or due to offering of better services from competitors.

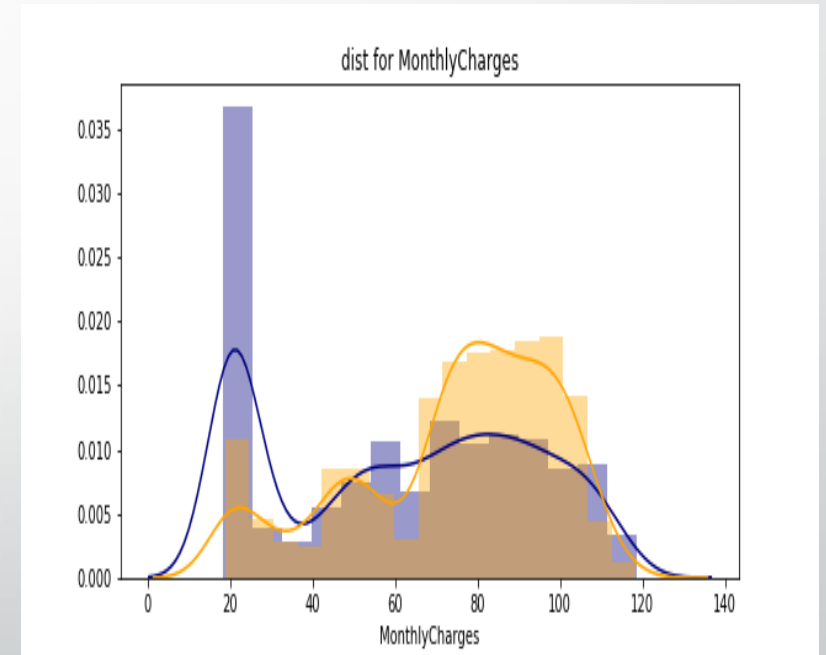


- Orange distribution: Churned Customers
- Blue distribution: Retained Customers

# Exploratory Data Analysis

## Monthly charges paid by customers

- No. of customers who churned are on average paying higher monthly charges.
- No. of customers who paid high monthly charges ~ more than \$ 60 is comparatively less.
- It is possible that customers who churned has high usage of services and due to high charges dropped out from using services.



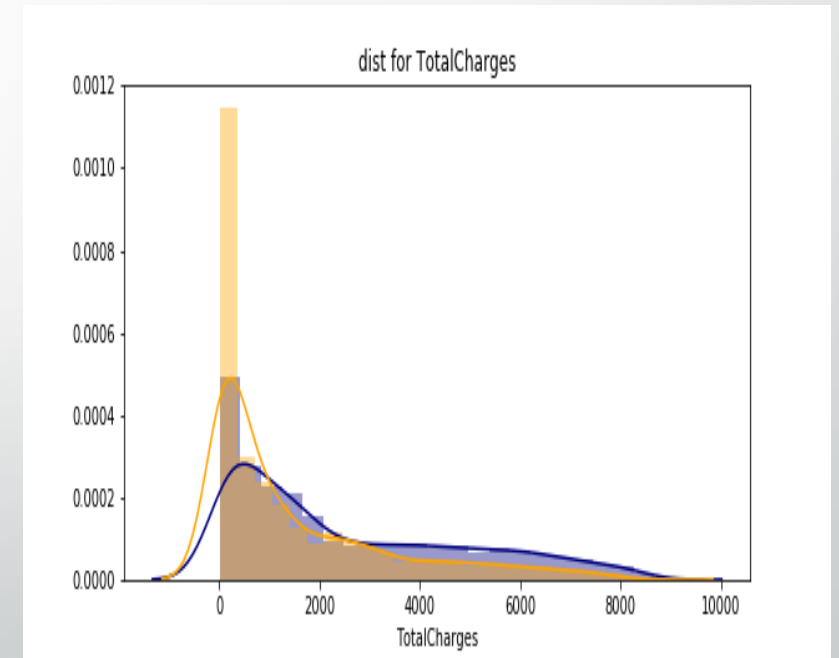
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# Exploratory Data Analysis

## Total charges paid by customers

- Total charges plot superimpose the interpretation from previous slides.
- Due to high charges paid by customers, they churned from using the services as compared to retained customers.



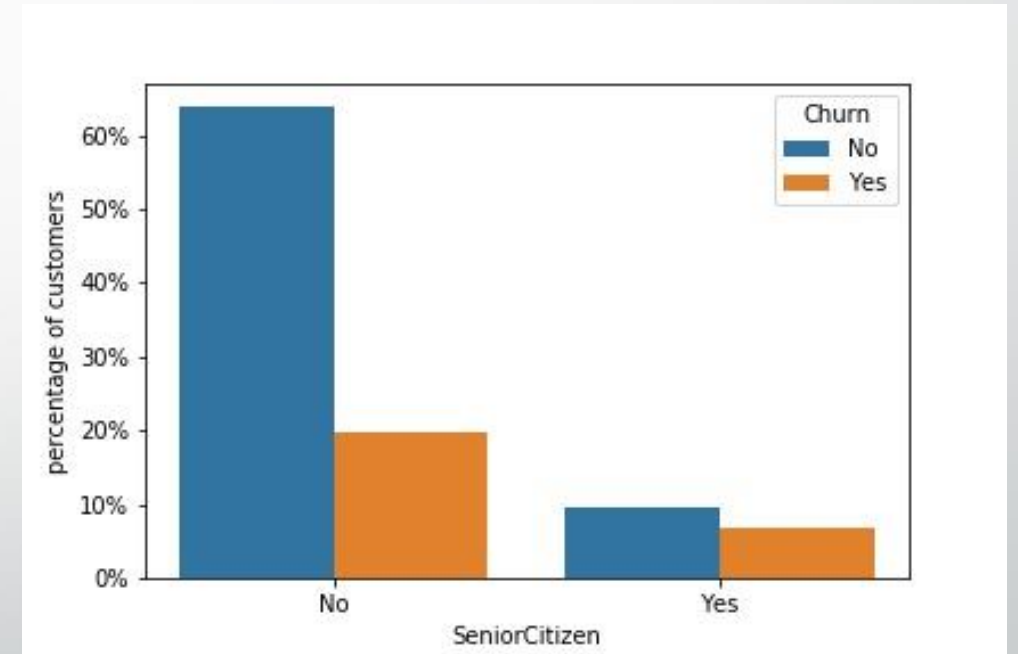
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# Exploratory Data Analysis

## Demographic impact on Customer Retention

### Senior Citizen

- Non-senior citizens are more non-likely to churning from using the services.
- Senior Citizens distribution doesn't give the clear idea, and their comparison points out that senior citizens are equal likely to churn.
- Senior-citizens take informed decision and may drop out due to: Poor services, high charges, poor support.



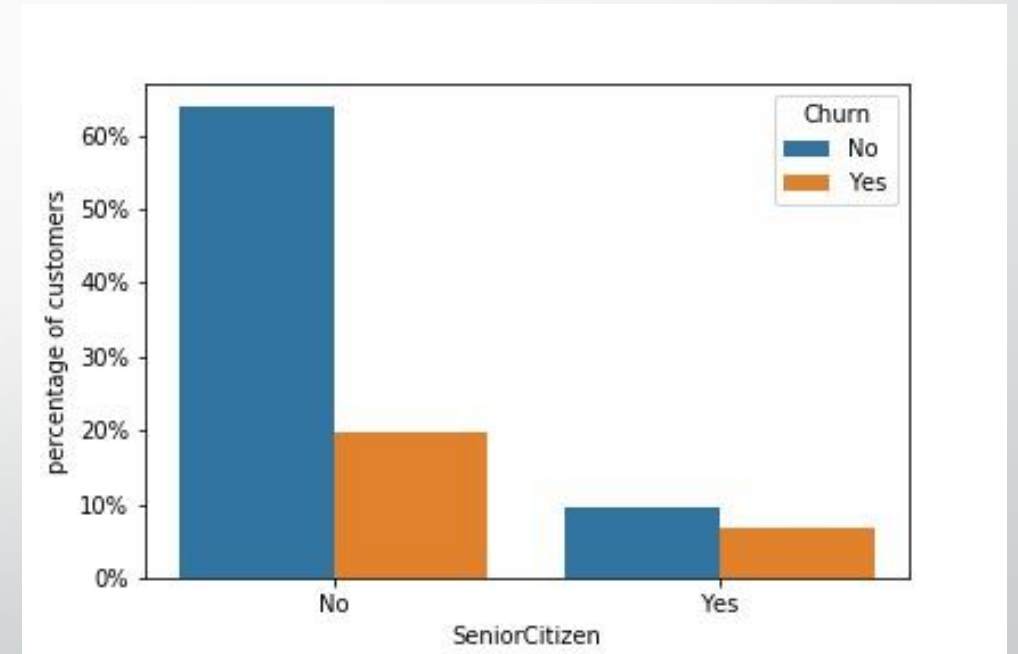
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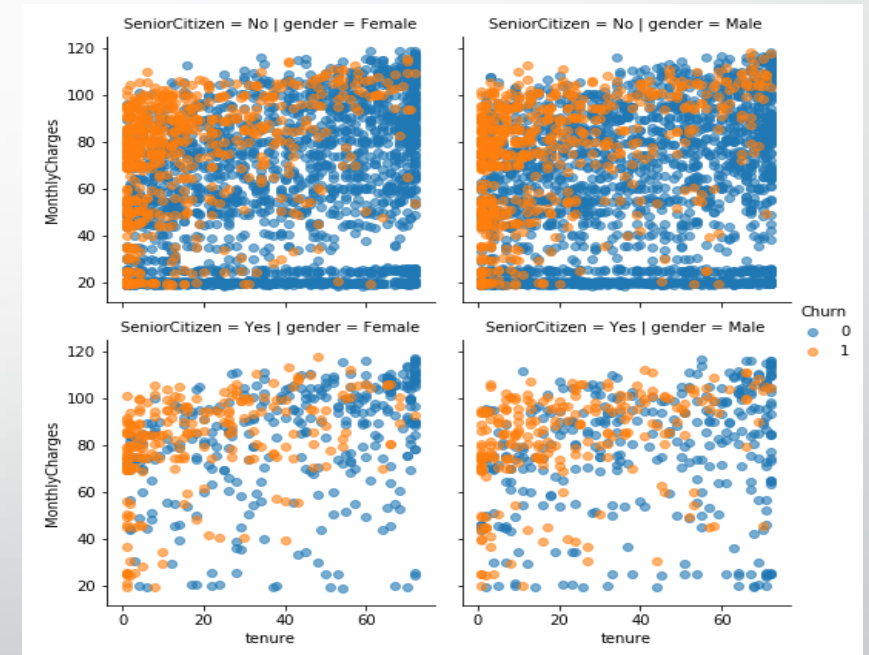
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# Exploratory Data Analysis

## Demographic impact on Customer Retention

### Senior Citizen

- Senior citizens who churned used for few years and the monthly charges they paid for services are high.
- This pattern is seen in both genders: female or male.
- While non-senior citizens who churned also shows the same pattern: High Monthly Charges and hence less tenure of using services.



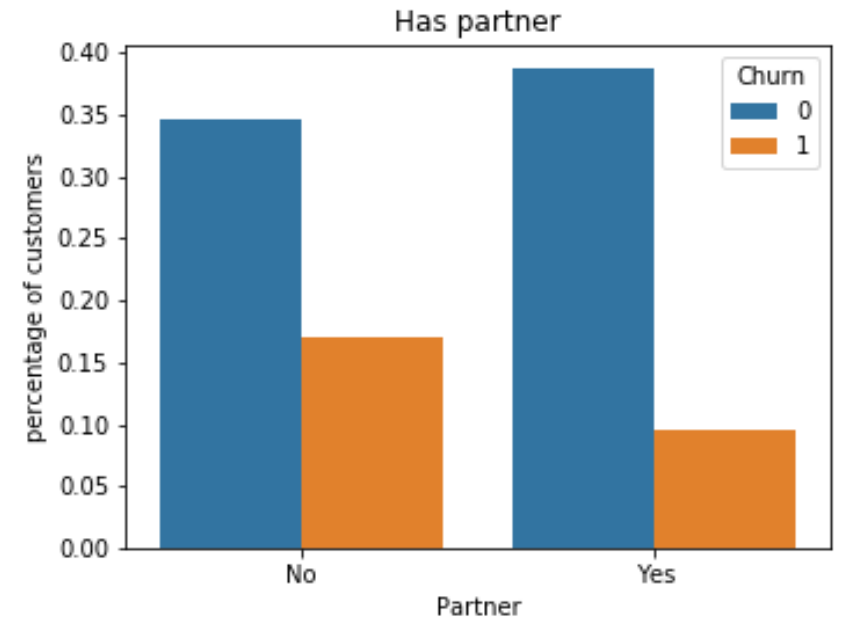
- Orange distribution: Churned Customers
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# Exploratory Data Analysis

## Demographic impact on Customer Retention

### Partners and Dependents

- Customers without partners are more likely to churn.
- This maybe because of customers with partners might have opted for bundle which might result in less charges or due to avoid connectivity uncertainty.



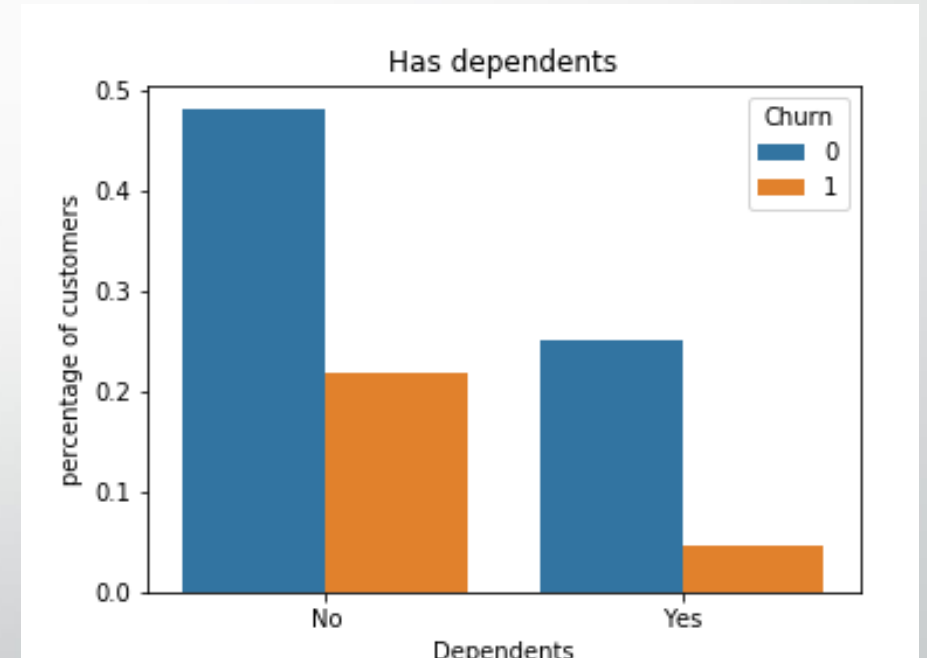
- Orange distribution: Churned Customers
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# Exploratory Data Analysis

## Demographic impact on Customer Retention

### Partners and Dependents

- Customers without dependents are more likely to churn.
- Similar pattern between partners and dependents churning data indicates towards distributed benefits.
- Details of bundle services provided by Company is not provided. However, it could be estimated.



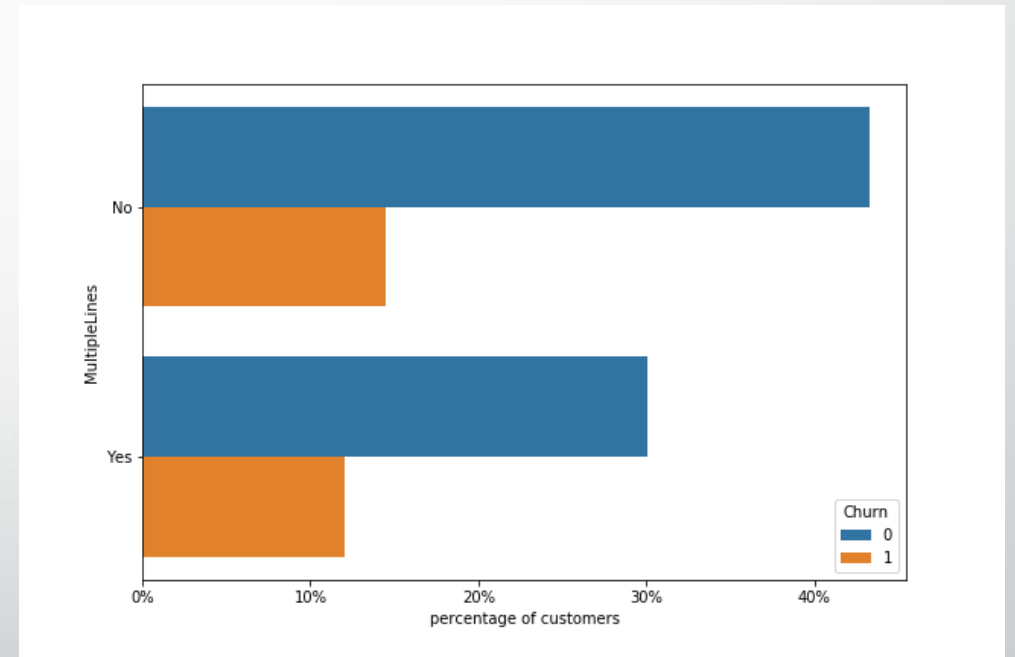
- Orange distribution: Churned Customers
- Blue distribution: Retained Customers

# Exploratory Data Analysis

## Service provided by Service-provider

### Phone service

- Service-provider is providing telephone services with an option: Single Line and MultipleLines.
- Maximum of customers are not using multiple lines. Many of these customers do not even have phone.
- It is also visible that customers with multiple lines are more likely to churn. However, distribution is not having much difference with multiple lines or non multiple lines.



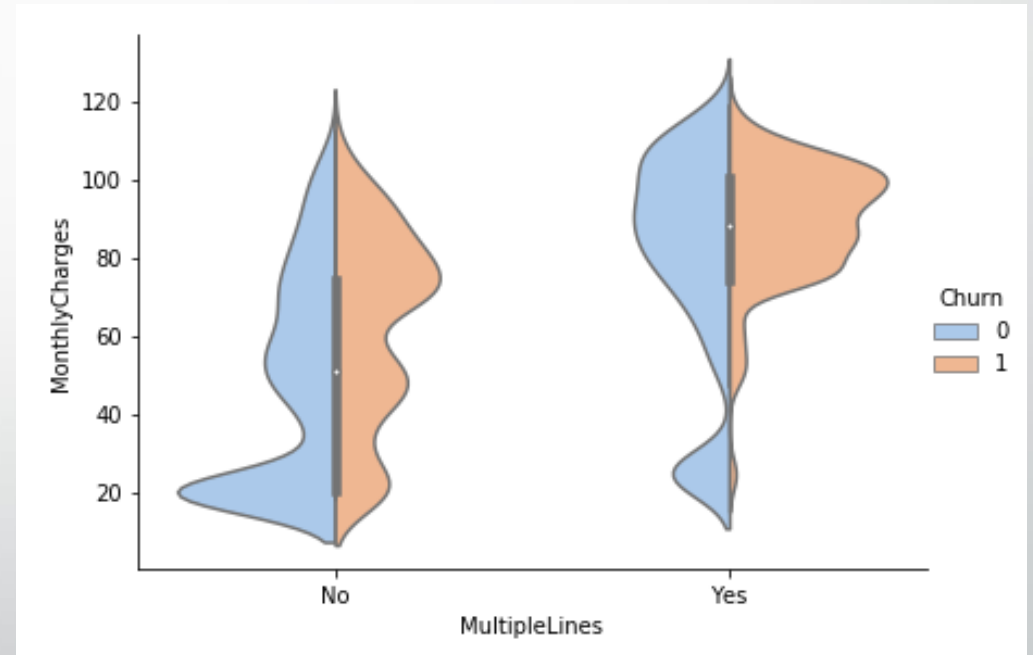
- Orange distribution: Churned Customers
- Blue distribution: Retained Customers

# Exploratory Data Analysis

## Service provided by Service-provider

### Phone service

- Charges paid by customers using multiple lines are high.
- Moreover, customers who churned due to having multiple line is because of high monthly charges.
- Customers not having MultipleLines have normally distributed churn distribution.
- There are other reasons of churning of customers who don't have multiple lines.



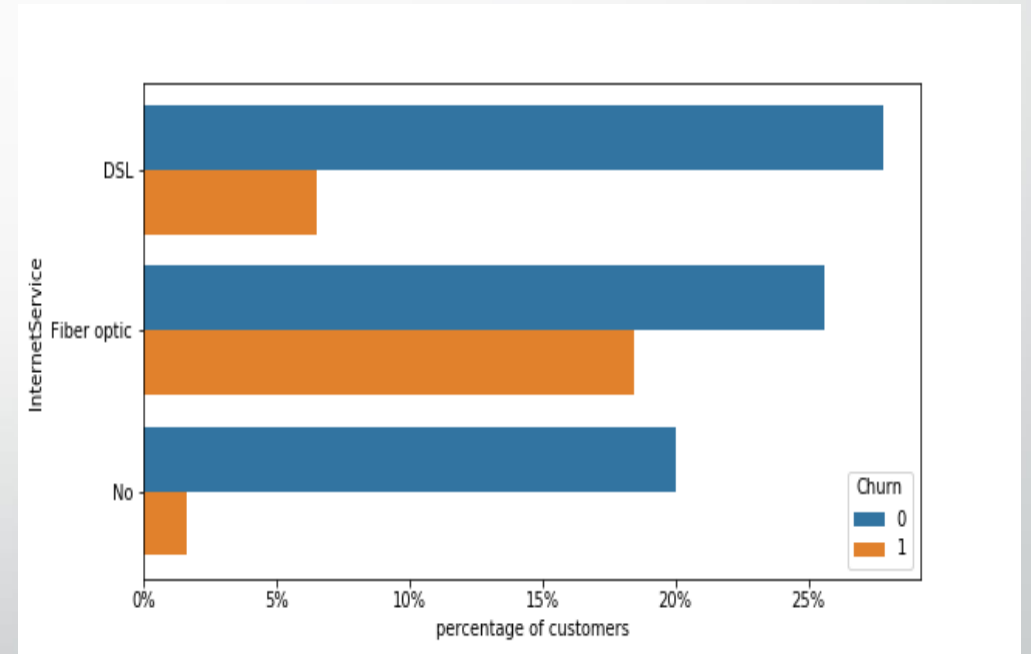


# Exploratory Data Analysis

## Service provided by Service-provider

### Internet service

- Provider is providing 2 type of Internet Services: DSL and Fiber Optic
- However, customers using Fiber Optic is having high churn than DSL. This is really surprising!
- It is probably because of high charges paid by users of Fiber Optic.



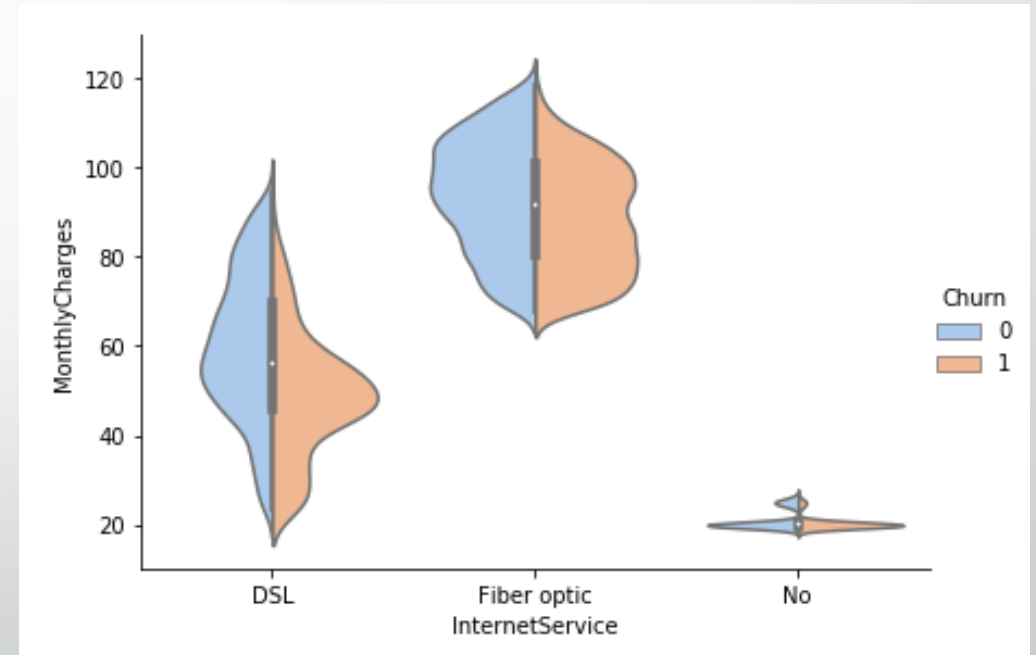
- Orange distribution: Churned Customers
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# Exploratory Data Analysis

## Service provided by Service-provider

### Internet service

- As estimated, Fiber Optic usage results in high monthly charges and hence, provides a strong assertion of churning of customers.



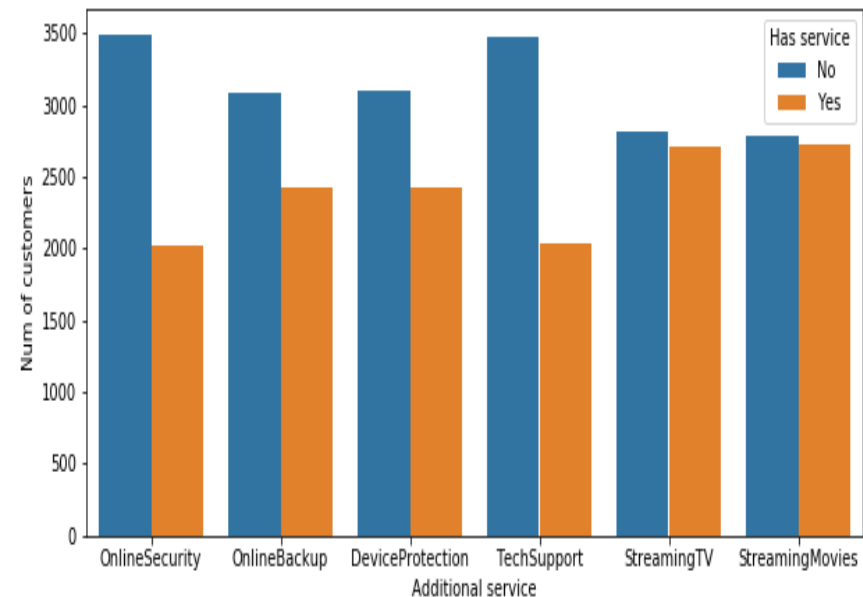
- Orange distribution: Churned Customers
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# Exploratory Data Analysis

## Service provided by Service-provider

### Additional Services

- Service Provider provides additional services to improve customer experience and cater to needs.
- Service provided by customers are: Online Security, Online Backup, Device Protection, Tech Support, Streaming TV, Streaming Movie.



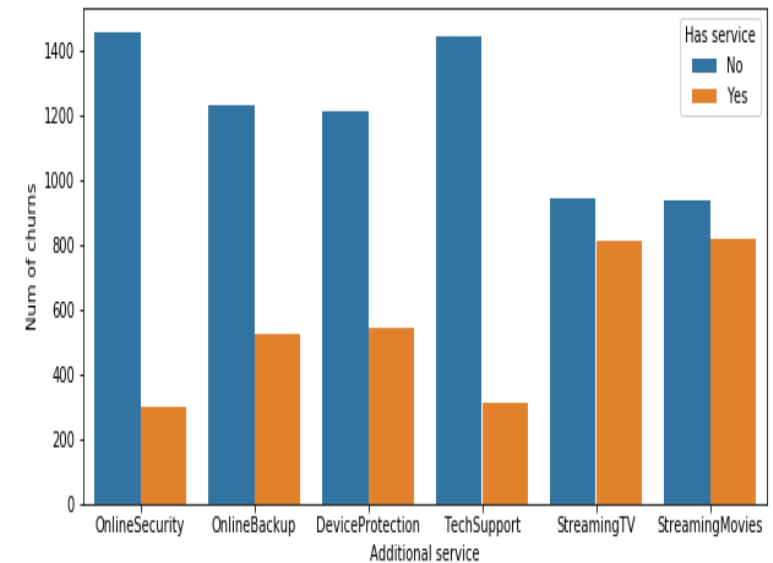
- Orange distribution: Customers using Services
- Blue distribution: Customers not using Services

# Exploratory Data Analysis

## Service provided by Service-provider

### Additional Services

- Customers using Streaming TV and Streaming Movies are churned more from Services as compared to other kind of services.
- Online Backup and Device Protection follows. It is because these customers have stopped using Internet services.

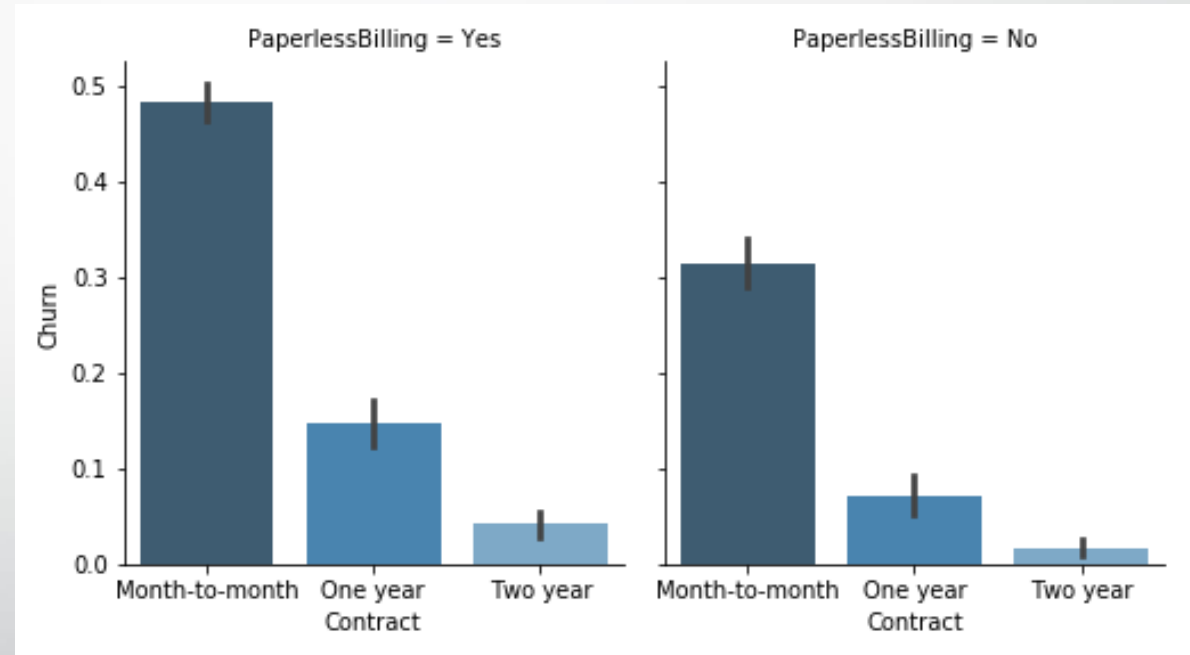


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# Exploratory Data Analysis

## Payment Method

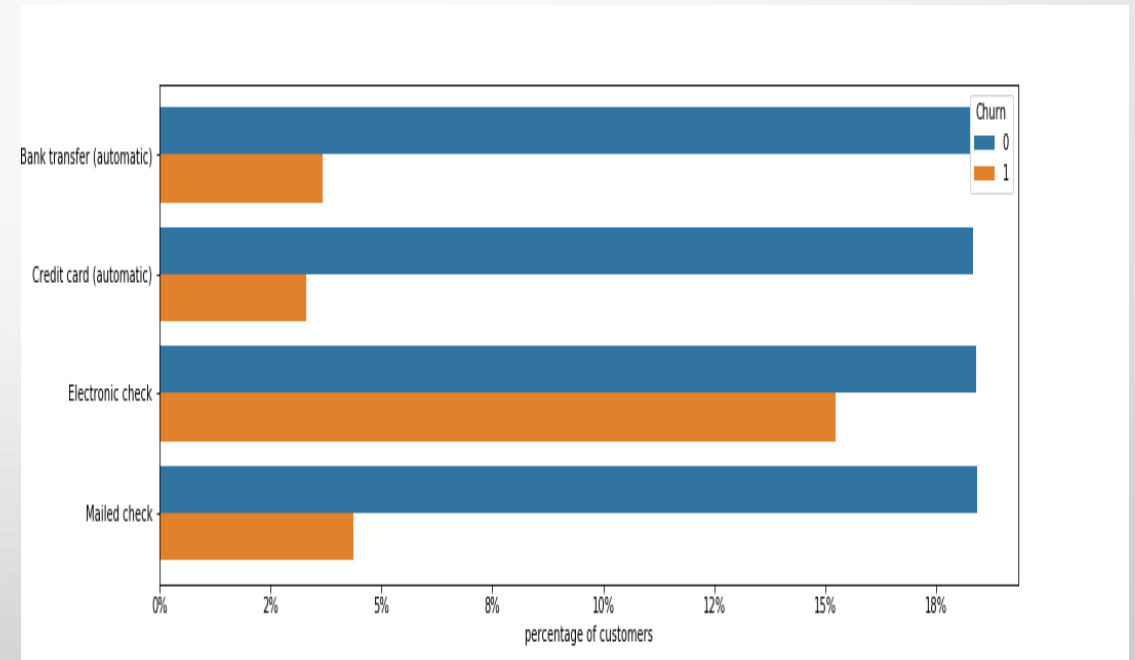
- Service Provider provides an option of paperless billing.
- It provides billing option : Month to Month basis, 1 month contract or 2 year contract
- Customers who opted to pay on month to month basis churn more readily as compared to contracts.
- It is possibility due to higher flexibility to continue with the services.
- Contract customers are in bond to continue services and are less likely to leave services.



# Exploratory Data Analysis

## Payment Method

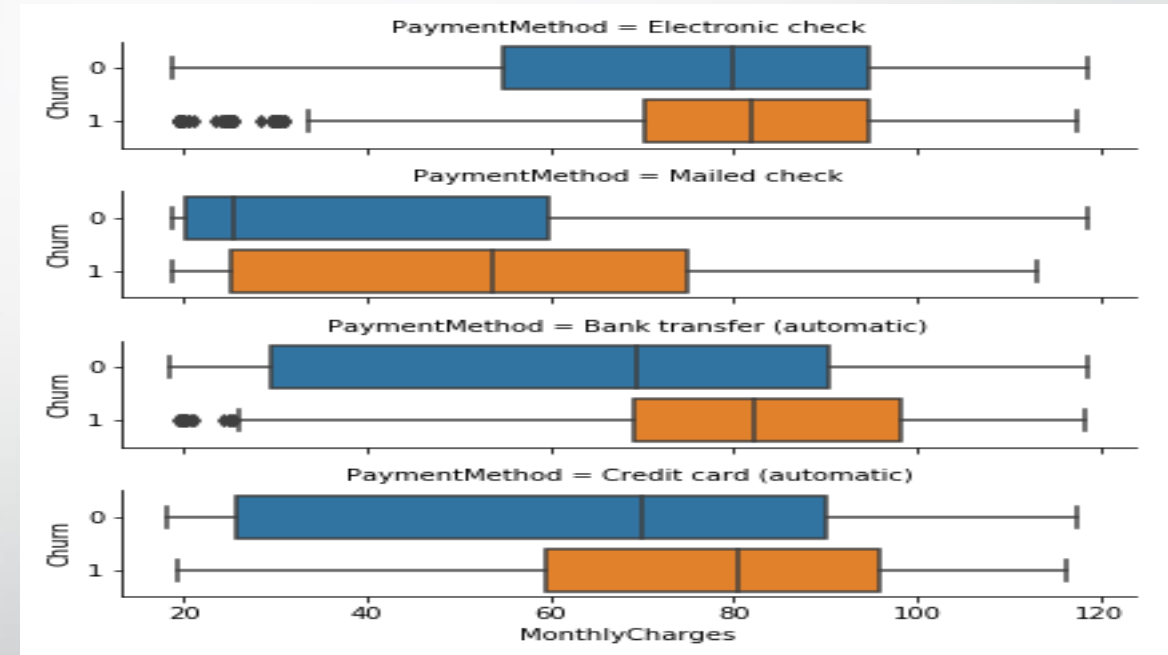
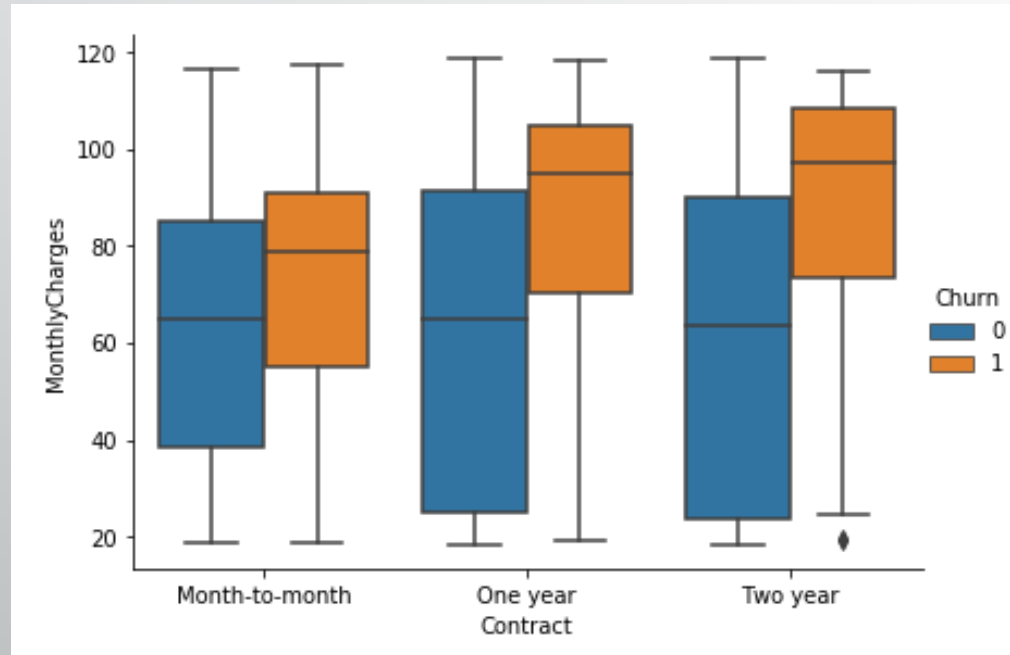
- Customers pay by four methods: Bank Transfer, Credit Card, Electronic Check, Mailed Check.
- Customers paying through Bank transfer and credit card have allowed automatic deduction and make save transaction and revenue.
- While customers with Electronic check and mailed check have flexibility and thus are more likely to churn from using services and stop payment.



- Orange: Churned Customers
- Blue: Non-churned customers

# Exploratory Data Analysis

## Payment Method



- Orange: Churned Customers
- Blue: Non-churned customers

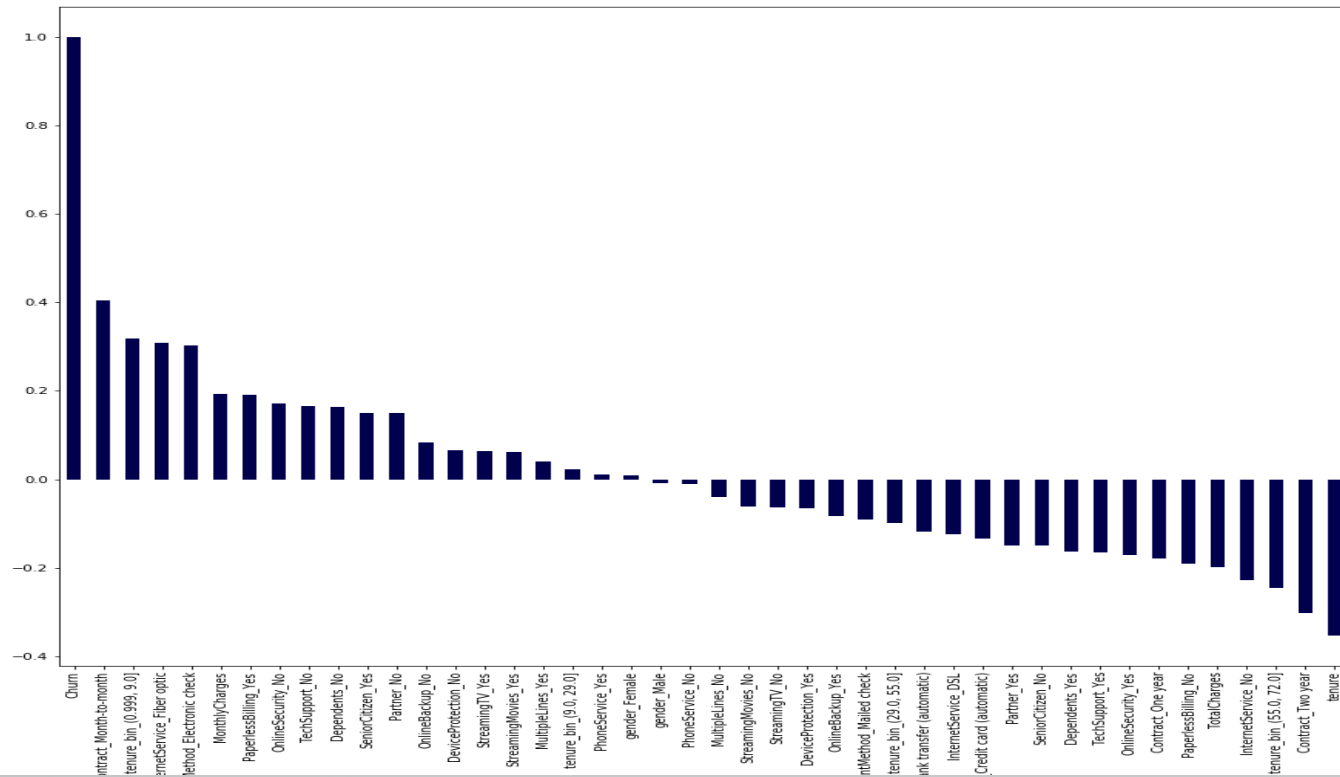
# Exploratory Data Analysis

## Payment Method

- Customers with long term contracts: 1 year or 2 year have high monthly charges and are more likely to be satisfied with services and thus, less likely to churn .
- Customers who are paying by Credit Card or Bank transfer through automatic route also incur higher monthly charges. It is probably because, they do not have to worry about pricing and are less likely to churn due to high charges of service provider.
- These high charged customers are valuable for company's revenue and should be focused upon to avoid any churning to reduce revenue loss.
- Customer with monthly payment and who has flexibility to pay or default due to payment by cheque more like churn. These customers are low paying and are more price sensitive.



# Feature Correlation



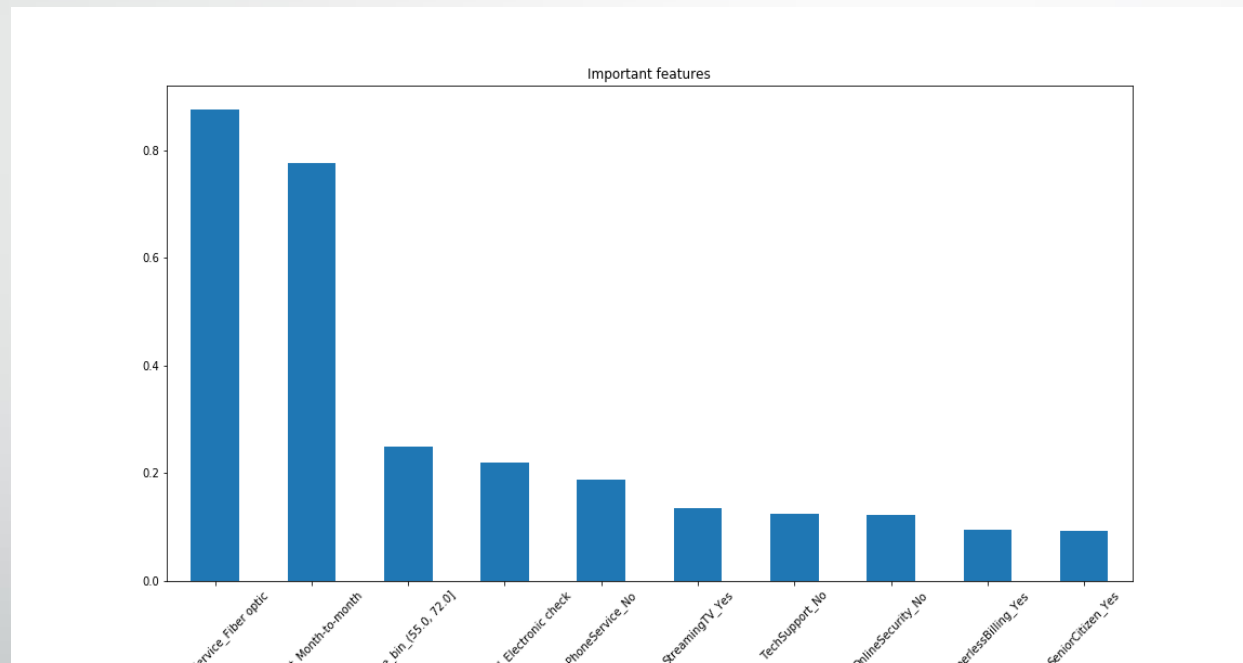
# Feature Correlation

- Feature Correlation with churned customers, shows that more likely churned customers are due to:
  - Month to month contract
  - Customers who use services for less than 9 weeks
  - Fiber Optic Internet Services
  - Electronic check payment method
  - Month to month payment method
  - Monthly Charges

# Prediction Model

- Data split into train and test set: 30% test set
- Model used: Logistic Regression
- Dataset scaled using Min-Max Scaler.
- Accuracy of model: 80.6%

# Prediction Model





**THANK YOU**