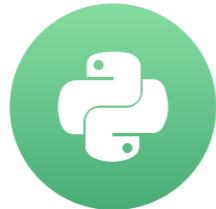


Welcome to the course

PREDICTING CUSTOMER CHURN IN PYTHON



Mark Peterson

Senior Data Scientist, Alliance Data

Churn Analytics





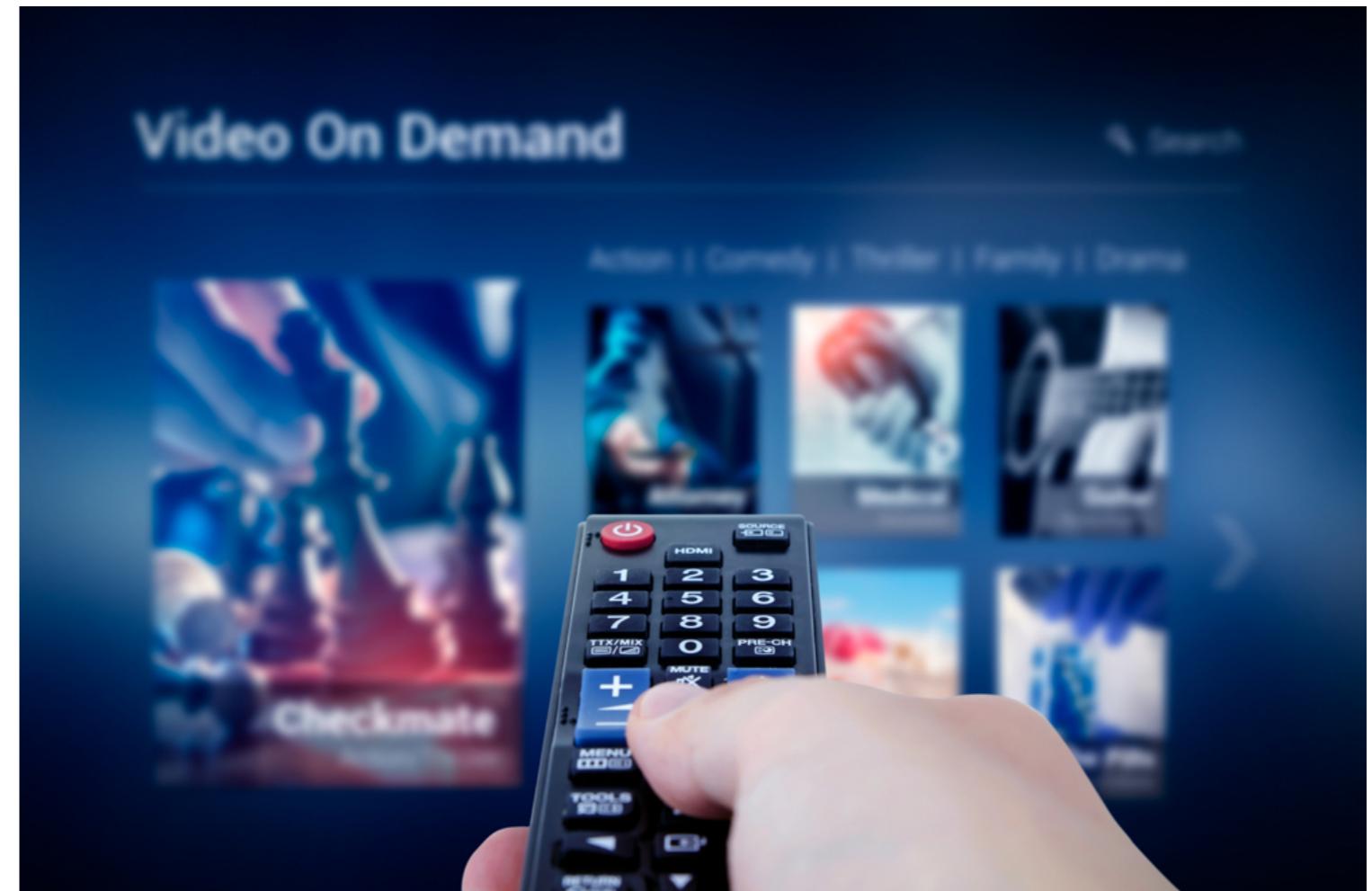
Customer churn

When an existing customer stops doing business with a company

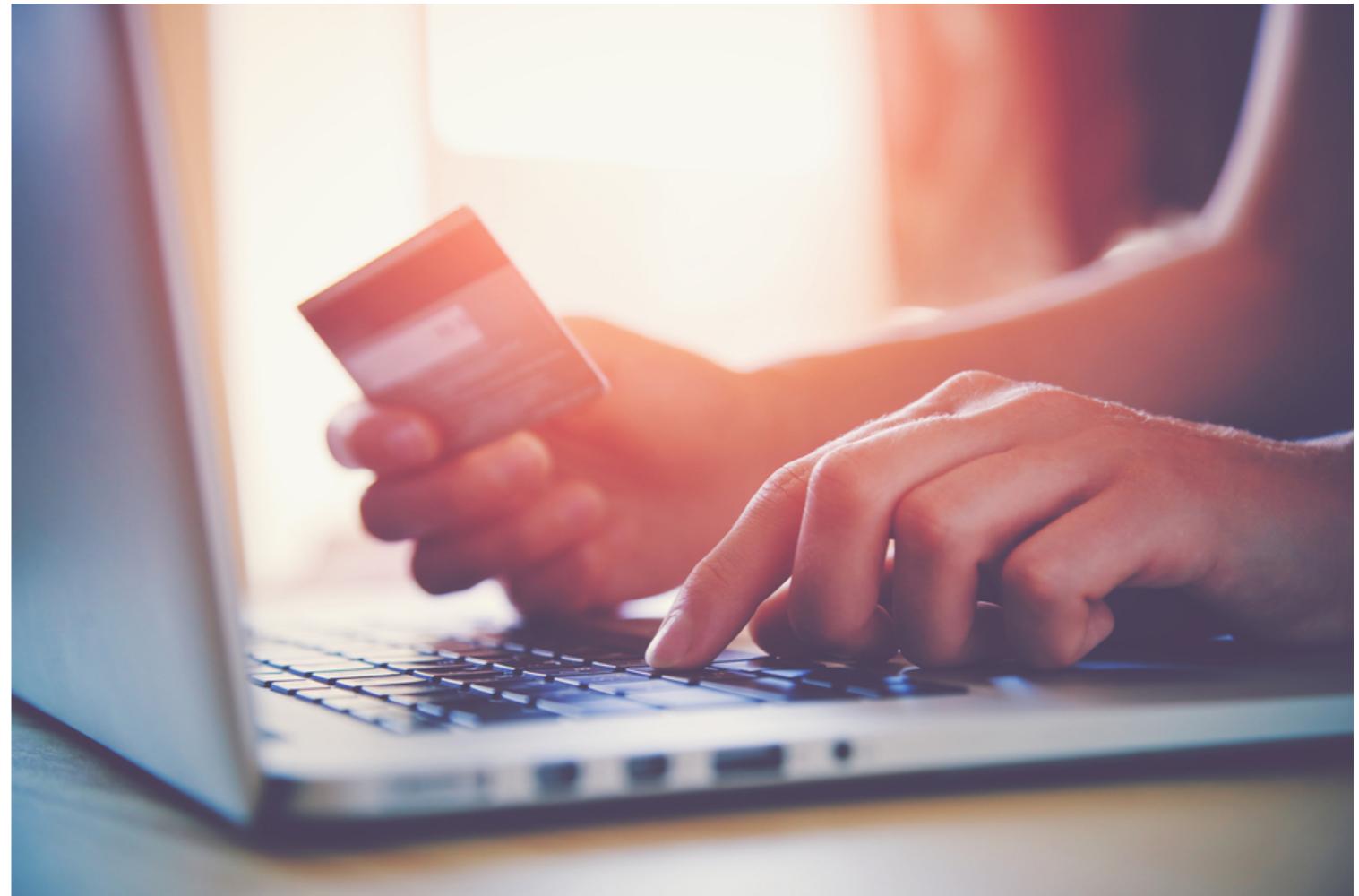
Contractual churn



Voluntary churn



Non-contractual churn



Involuntary churn: Credit card expiration



Involuntary churn: Utilities turned off



Utilizing your experience

- Customer
 - Lack of usage
 - Poor Service
 - Better Price
- Domain/industry knowledge

Telco Churn Dataset

Description	Value
Records	3333
Features	21
Continuous	15
Categorical	6

Features of interest

- Voice mail
- International calling
- Cost for the service
- Customer usage
- Customer churn

How churn is defined here

Customer cancelling their cellular plan at a given point in time

- "no"
- "yes"

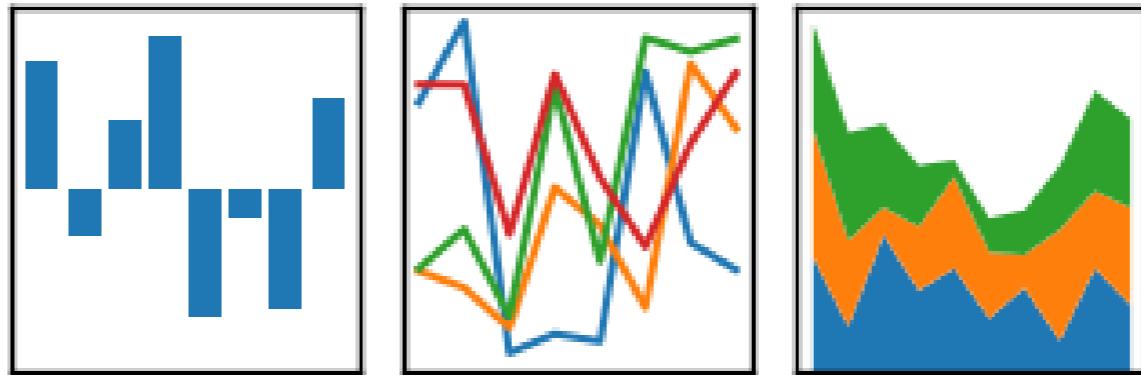
Exploratory data analysis using pandas

- Understand the features of the dataset
- Compute summary statistics

Exploratory data analysis using pandas

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



pandas Foundations

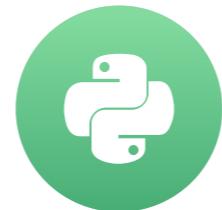
- `df.head()`
- `df.describe()`
- `df.mean()`

Let's explore the data!

PREDICTING CUSTOMER CHURN IN PYTHON

Grouping and summarizing data

PREDICTING CUSTOMER CHURN IN PYTHON



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Churners and non-churners

```
print(telco[ 'Churn' ].value_counts())
```

```
no      2850
```

```
yes     483
```

```
Name: Churn, dtype: int64
```

Model outcomes

Two classes:

- 'yes' : Customer will churn
- 'no' : Customer will not churn

Differences between churners and non-churners

- Do churners call customer service more often?
- Does one state have more churners compared to another?

Grouping and summarizing data

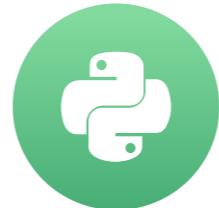
- `.groupby()`

Let's group and summarize!

PREDICTING CUSTOMER CHURN IN PYTHON

Exploring your data using visualizations

PREDICTING CUSTOMER CHURN IN PYTHON



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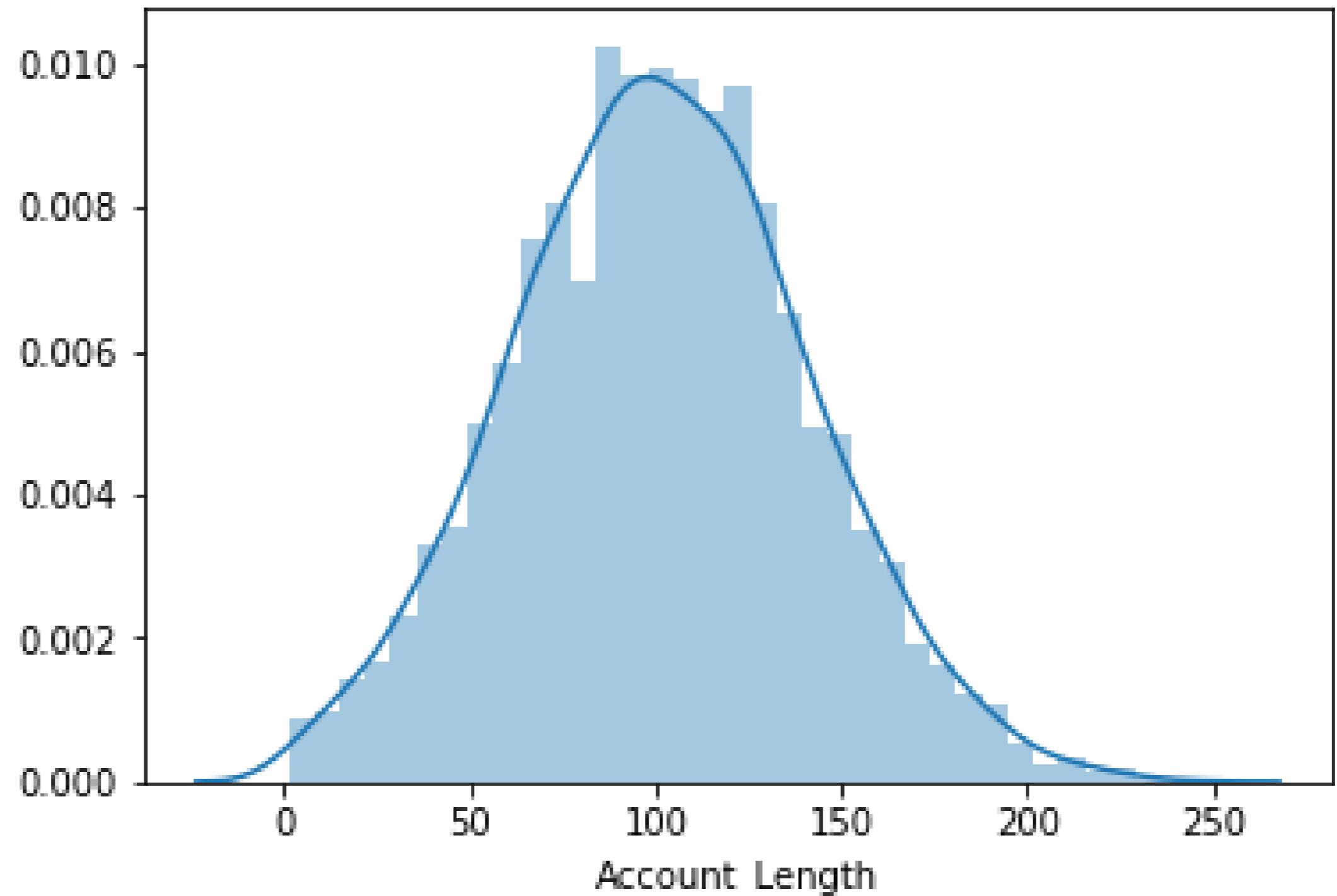
Visualizing data in Python

- `seaborn` library allows you to easily create informative and attractive plots
- Builds on top of `matplotlib`

Visualizing the distribution of account lengths

- Important to understand how your variables are distributed

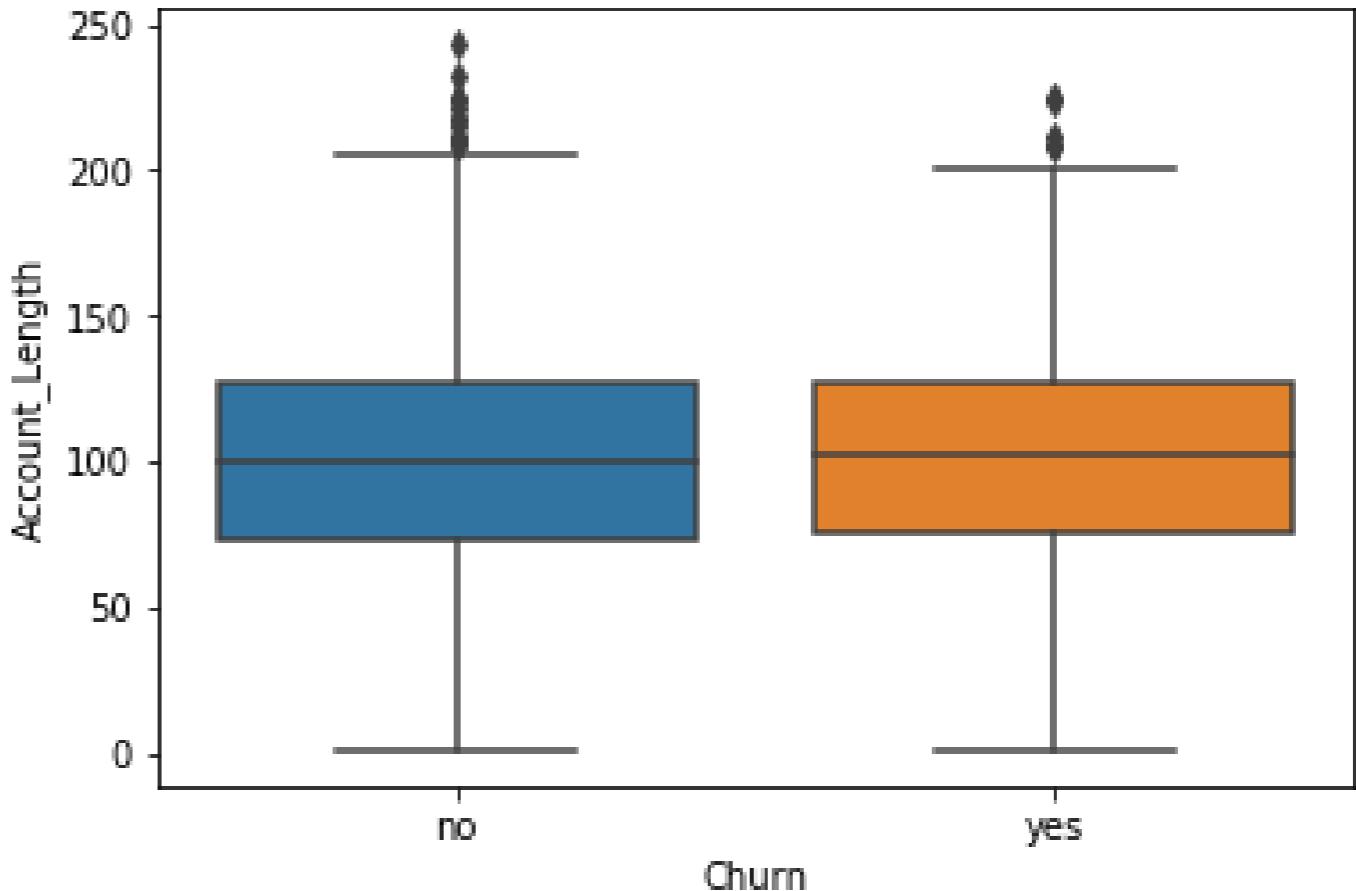
```
import matplotlib.pyplot as plt  
import seaborn as sns  
  
sns.distplot(telco['Account_Length'])  
  
plt.show()
```



Differences in account length

- Box plot

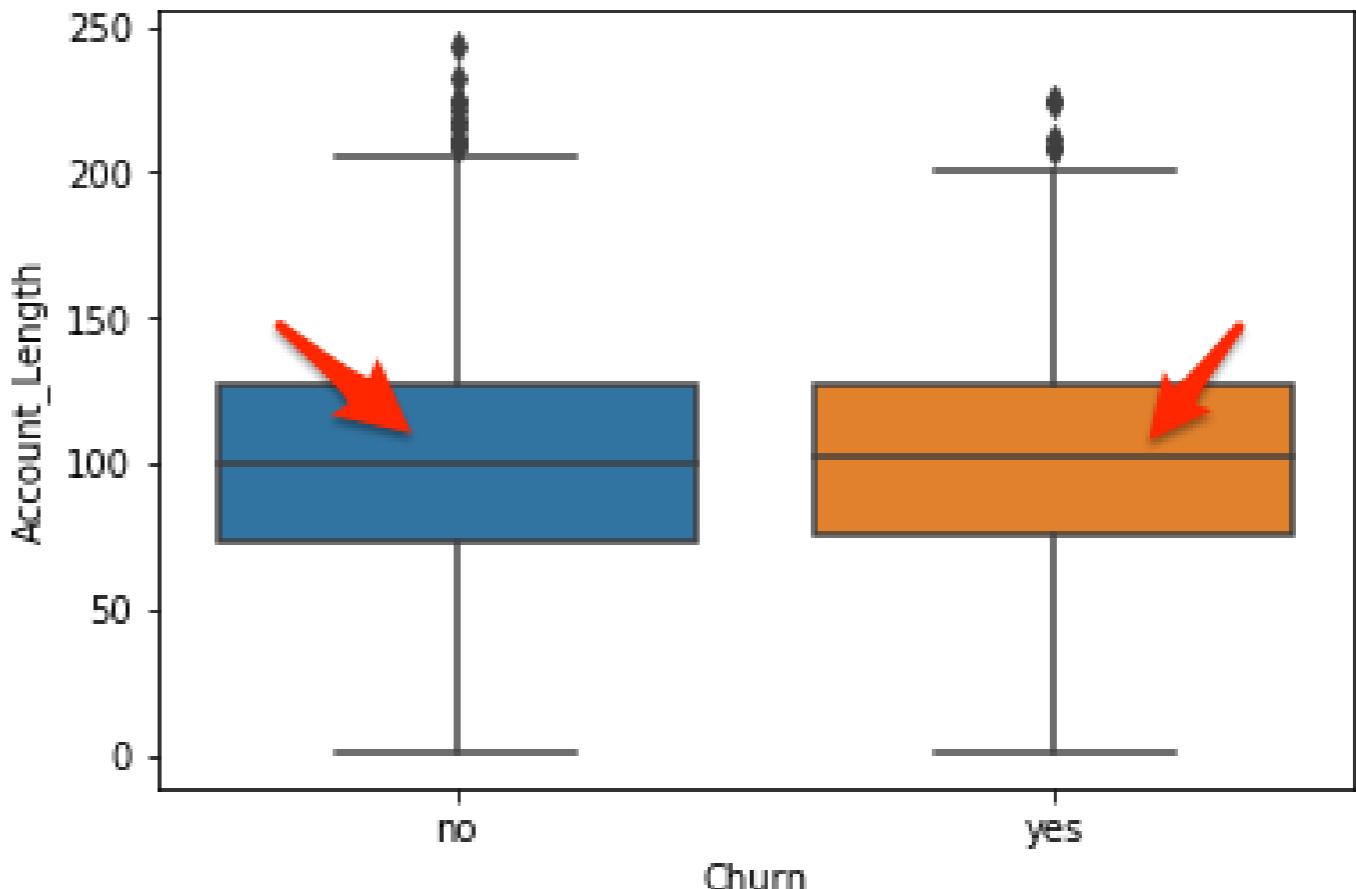
```
sns.boxplot(x = 'Churn',  
            y = 'Account_Length',  
            data = telco)  
  
plt.show()
```



Differences in account lengths

- Box plot

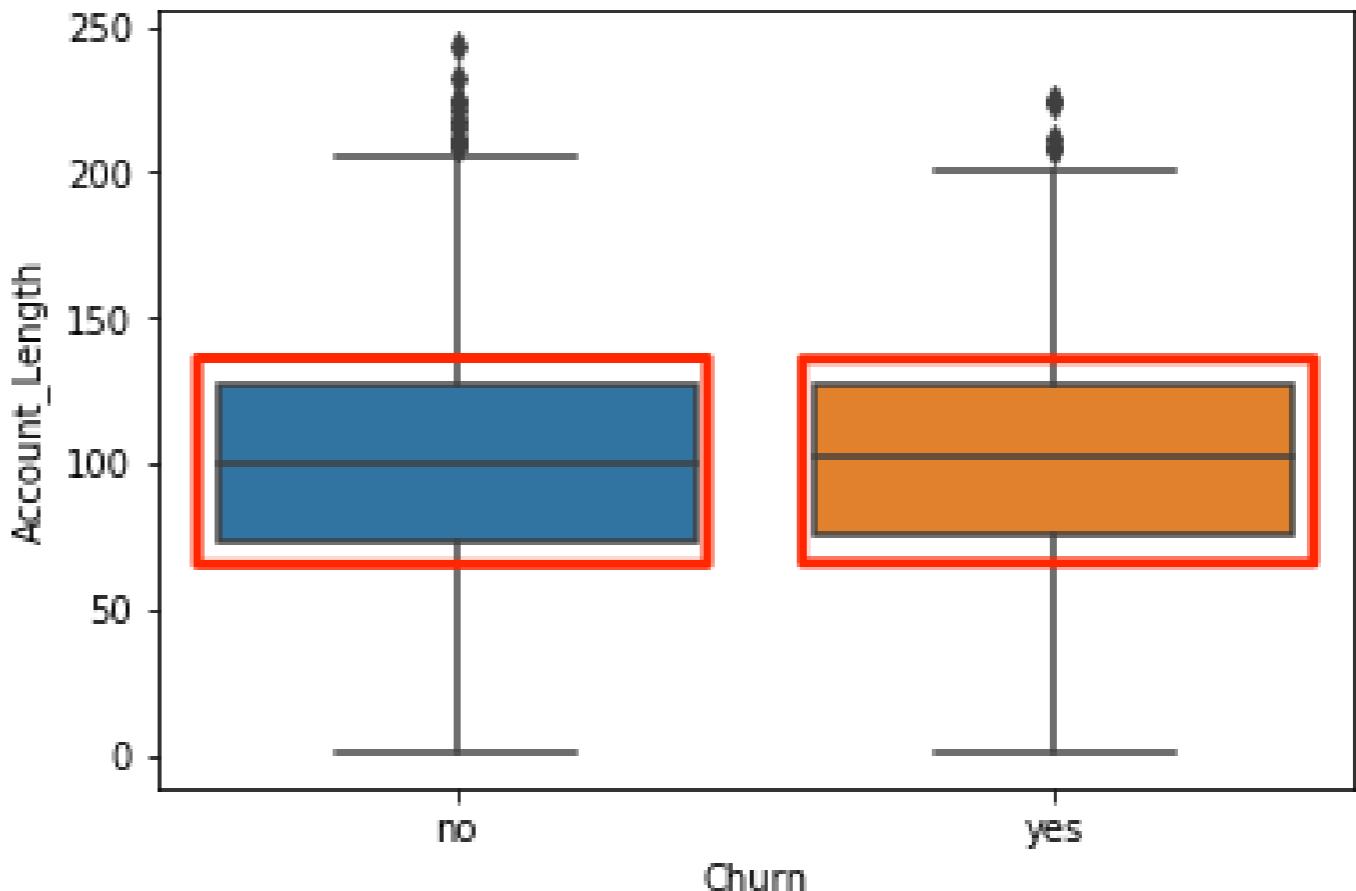
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            y = 'Account_Length',  
            data = telco)  
  
plt.show()
```



Differences in account lengths

- Box plot

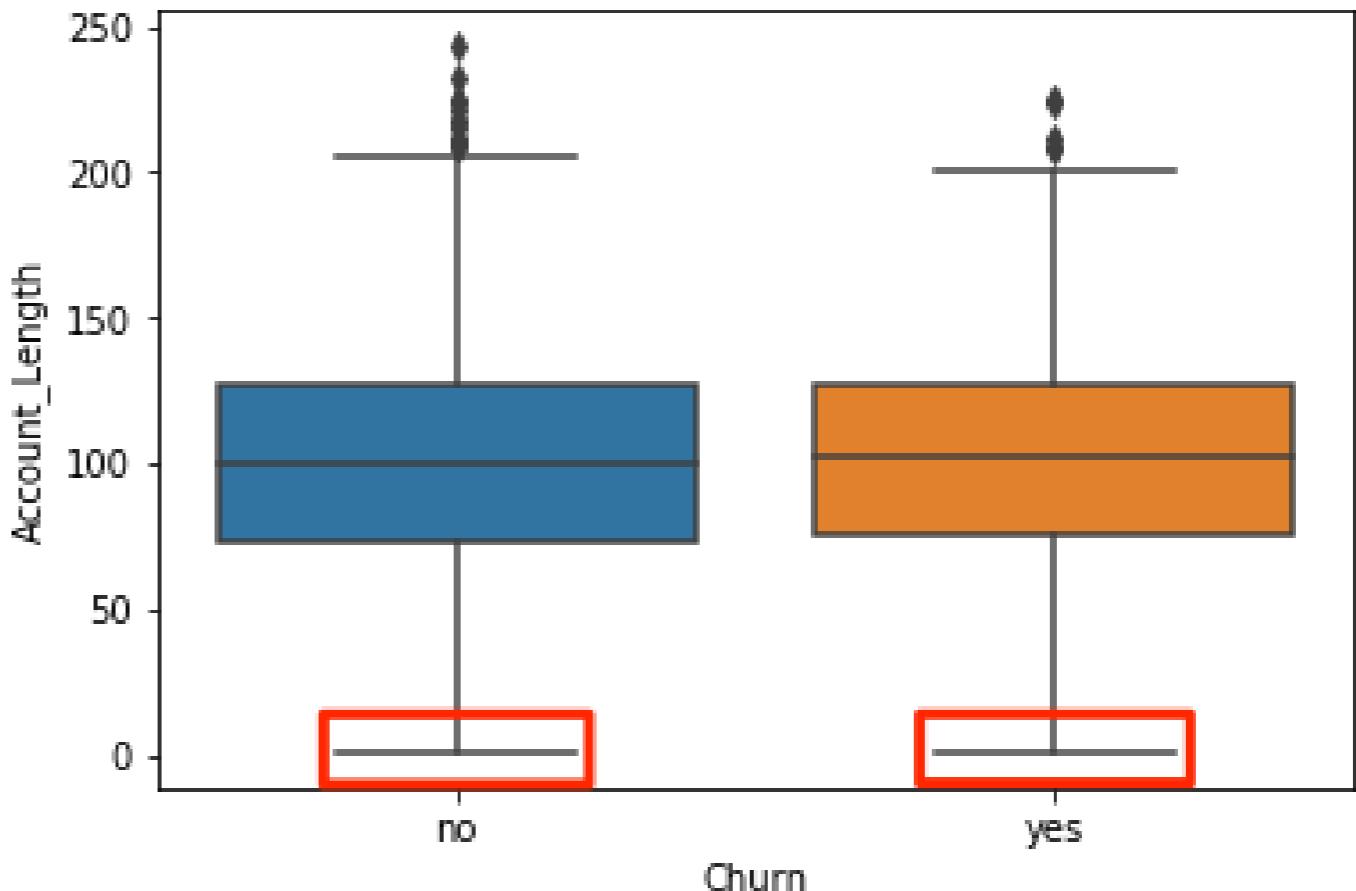
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            data = telco)  
  
plt.show()
```



Differences in account lengths

- Box plot

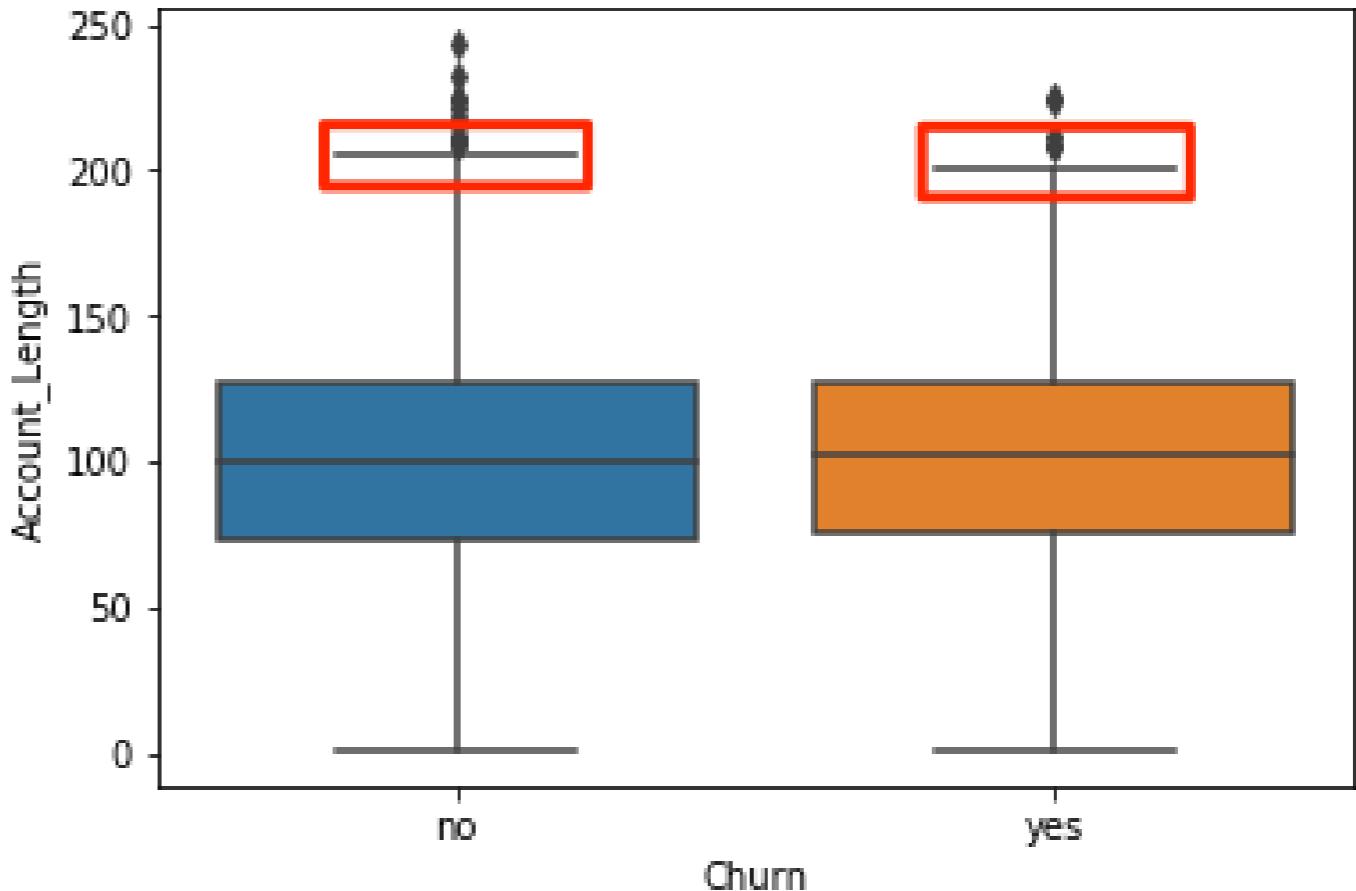
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            data = telco)  
  
plt.show()
```



Differences in account lengths

- Box plot

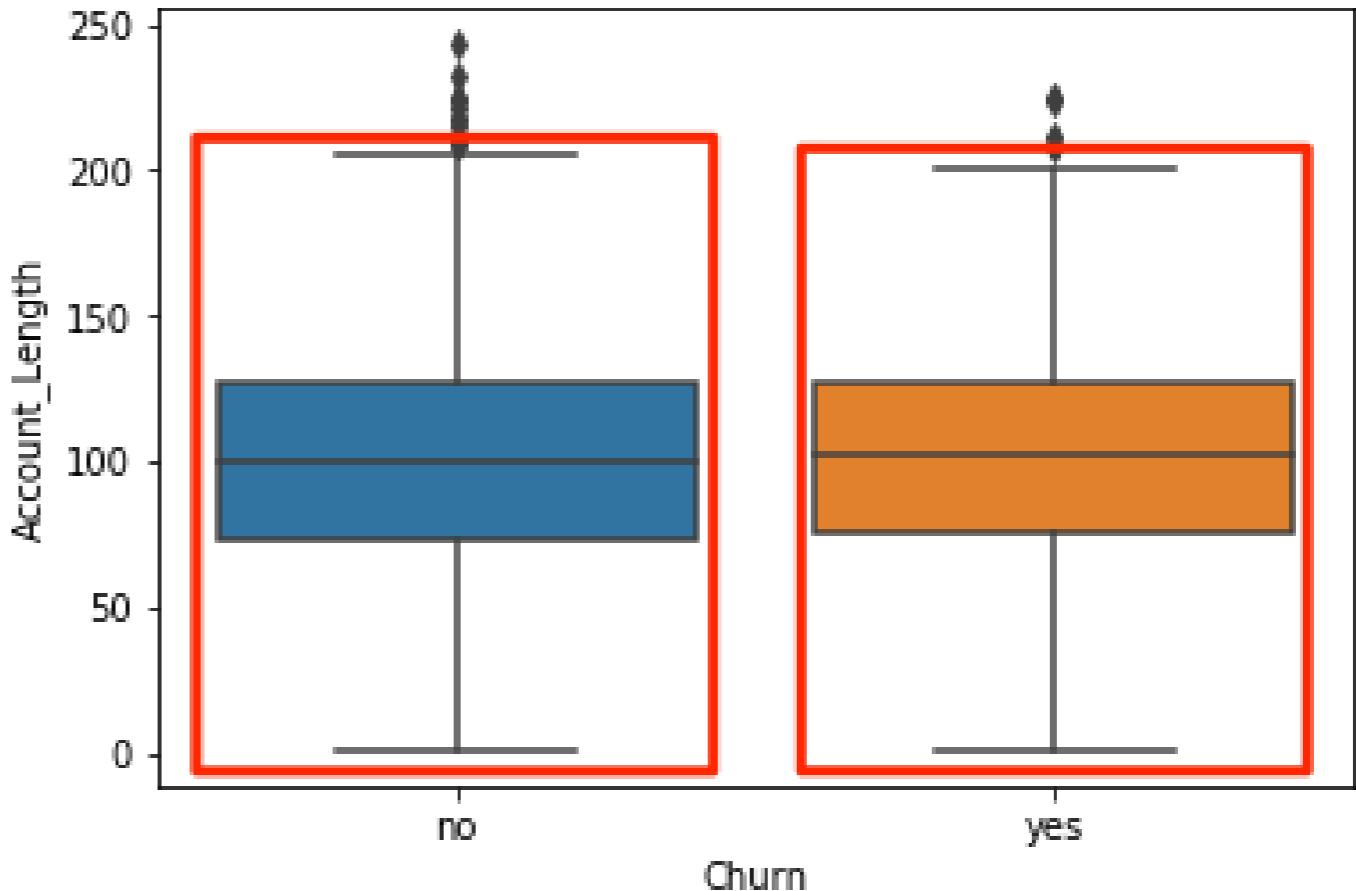
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            y = 'Account_Length',  
            data = telco)  
  
plt.show()
```



Differences in account lengths

- Box plot

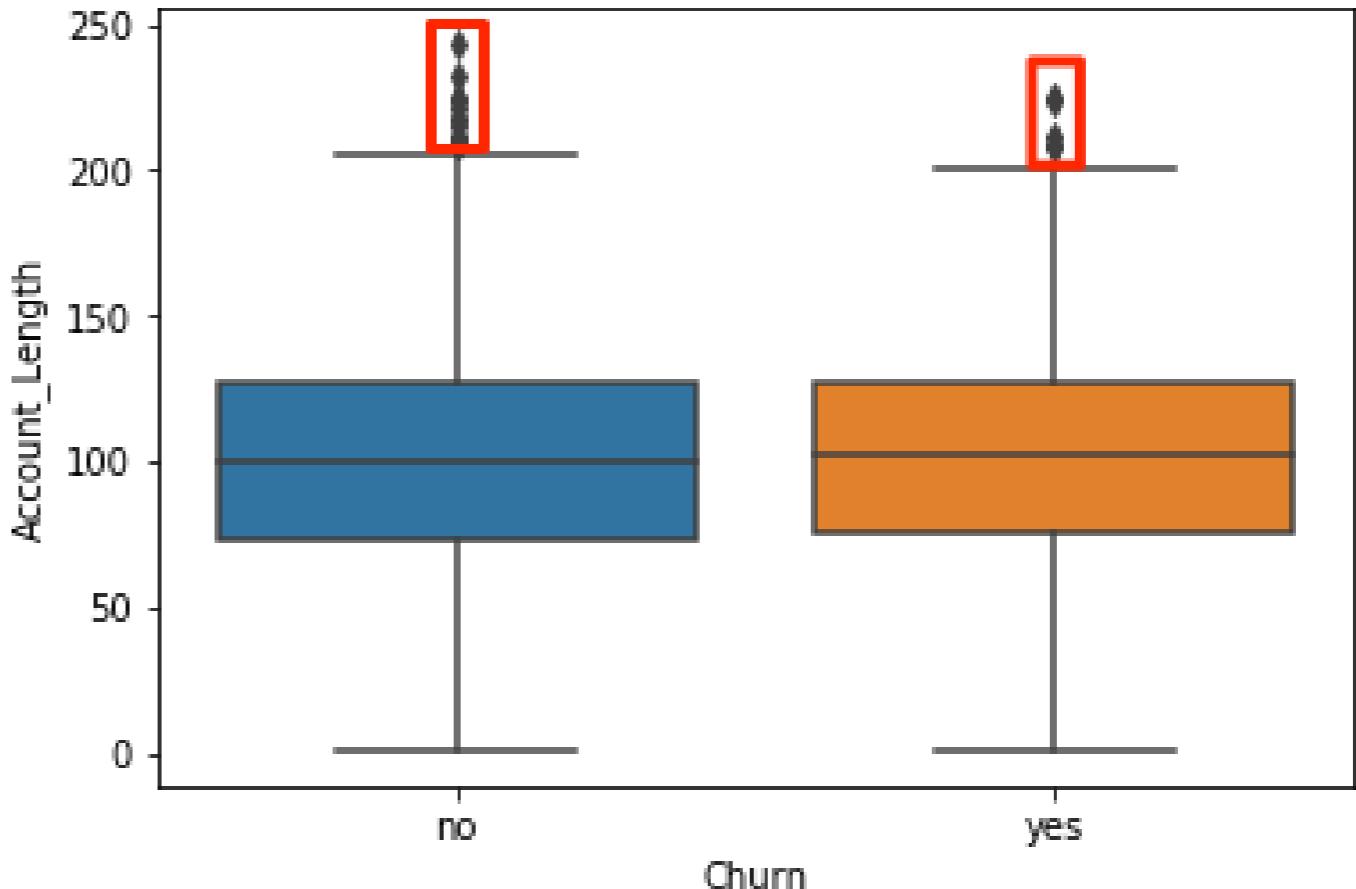
```
sns.boxplot(x = 'Churn',  
            y = 'Account_Length',  
            data = telco)  
  
plt.show()
```



Differences in account length

- Box plot

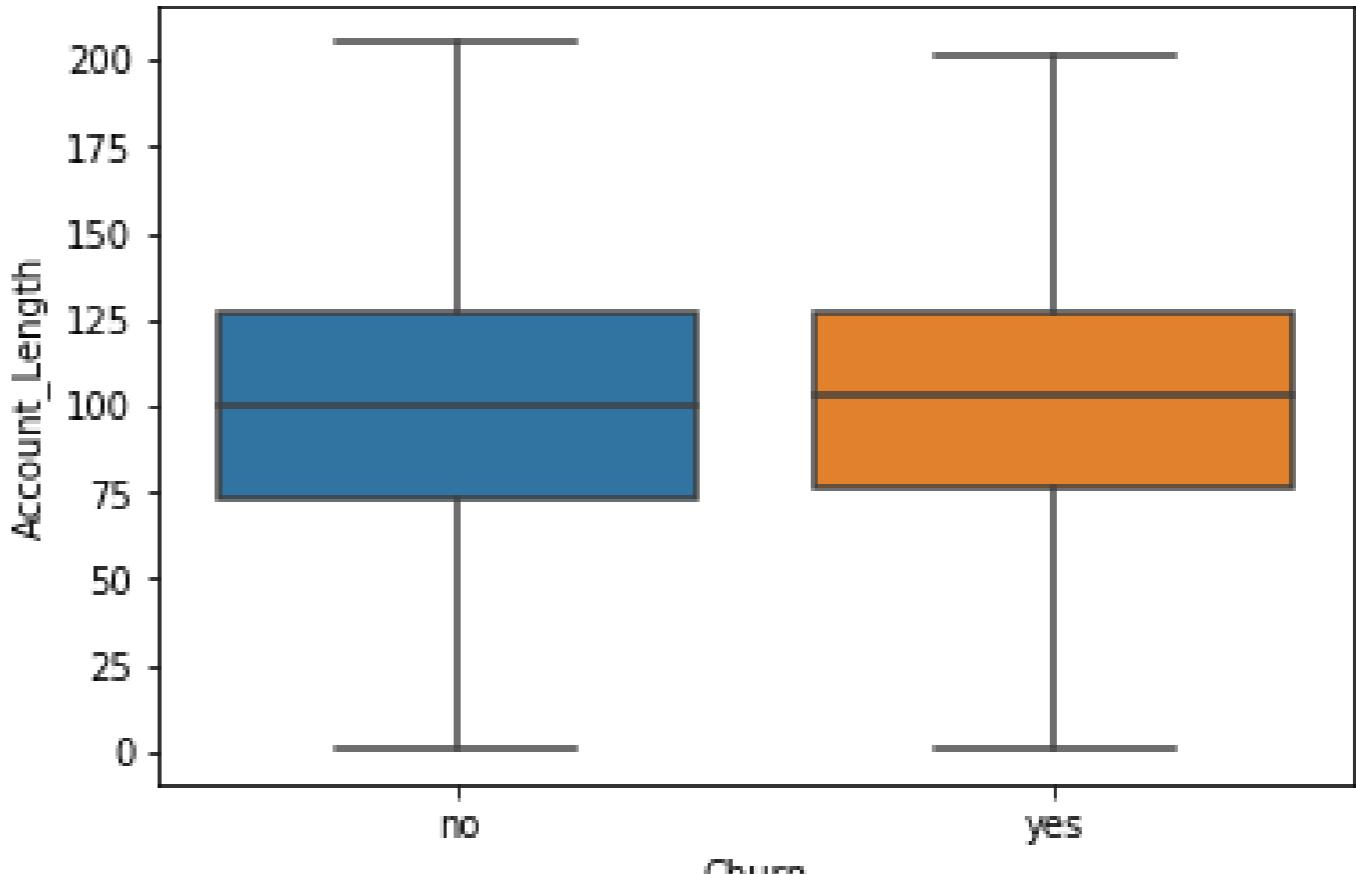
```
sns.boxplot(x = 'Churn',  
            y = 'Account_Length',  
            data = telco)  
  
plt.show()
```



Differences in account length

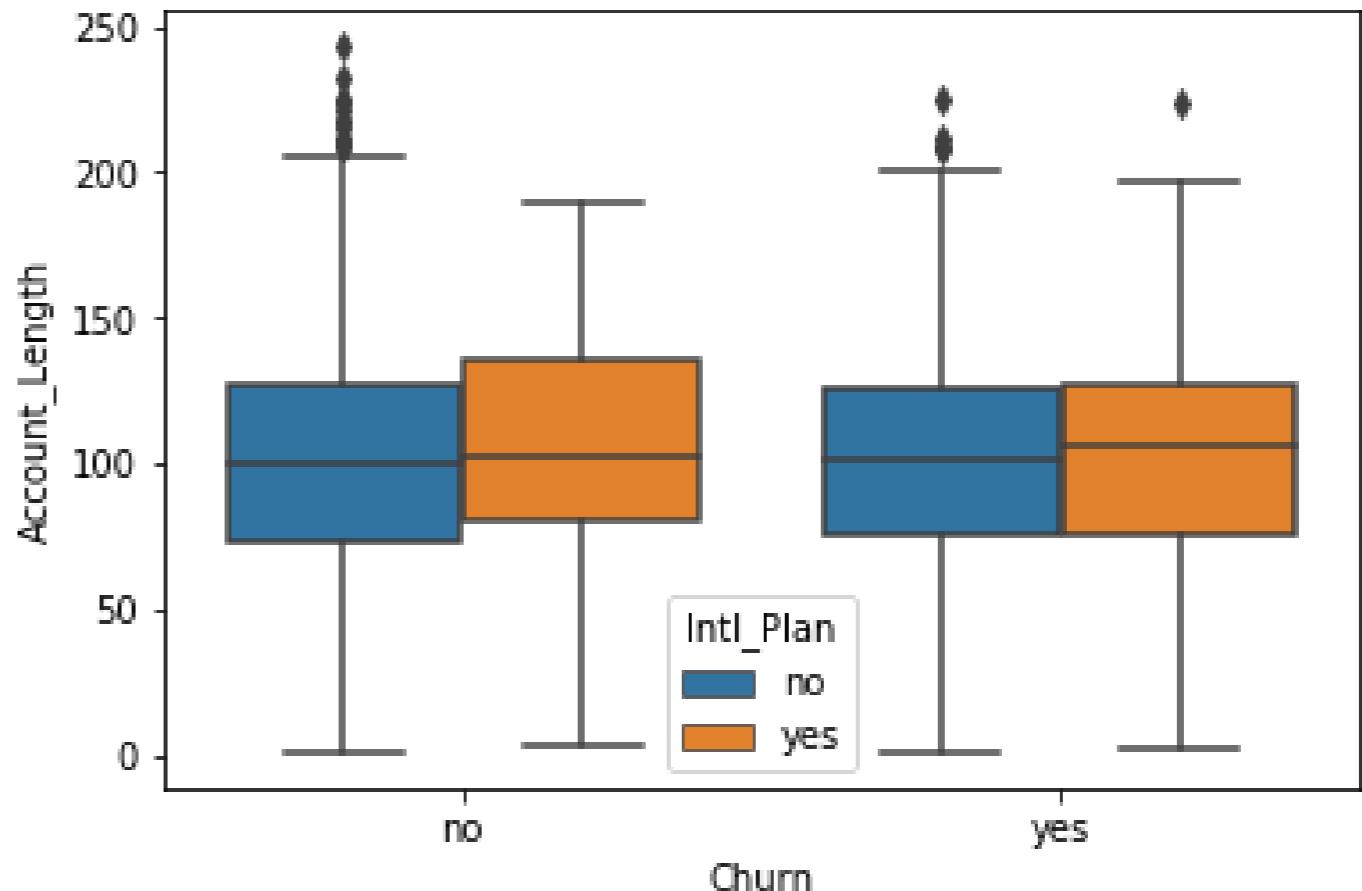
- Box plot

```
sns.boxplot(x = 'Churn',
             y = 'Account_Length',
             data = telco,
             sym=""))
plt.show()
```



Adding a third variable

```
sns.boxplot(x = 'Churn',  
             y = 'Account_Length',  
             data = telco,  
             hue = 'Intl_Plan')  
  
plt.show()
```



Let's make some plots!

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