This is my Built Model that Predicts Survival Rate on the RMS Titanic

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Importing necessary packages

In [ ]:
```
#Importing all necessary packages to be used in manipulating the data

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sb
```

1. Load & read the titanic datasets

In [ ]:
```
#Reading the Titanic datasets
df = pd.read_csv("/content/Titanic-Dataset.csv")

#To preview the dataset
#Also shows the number of rows and columns in the datset
df
```

Out[ ]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN
...	...	...	...	...	...	...	...	...	...	...	...
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	NaN
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	B42
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4500	NaN
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C148
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7500	NaN

891 rows × 12 columns

In [ ]:
```
#Reading the last 10 rows from the titanic datasets
df.tail(10)
```

Out[ ]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin
881	882	0	3	Markun, Mr. Johann	male	33.0	0	0	349257	7.8958	NaN
882	883	0	3	Dahlberg, Miss. Gerda Ulrika	female	22.0	0	0	7552	10.5167	NaN
883	884	0	2	Banfield, Mr. Frederick James	male	28.0	0	0	C.A./SOTON 34068	10.5000	NaN
884	885	0	3	Sutehall, Mr. Henry Jr	male	25.0	0	0	SOTON/OQ 392076	7.0500	NaN
885	886	0	3	Rice, Mrs. William (Margaret Norton)	female	39.0	0	5	382652	29.1250	NaN
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	NaN
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	B42
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4500	NaN
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C148
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7500	NaN

In [ ]:
```
df.dtypes
```

Out[ ]:
```
PassengerId      int64
Survived         int64
Pclass           int64
Name            object
Sex             object
Age            float64
SibSp            int64
Parch            int64
Ticket          object
Fare           float64
Cabin           object
Embarked        object
dtype: object
```

In [ ]:
```
df.describe()
```

Out[ ]:

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	891.000000	891.000000	891.000000	714.000000	891.000000	891.000000	891.000000
mean	446.000000	0.383838	2.308642	29.699118	0.523008	0.381594	32.204208
std	257.353842	0.486592	0.836071	14.526497	1.102743	0.806057	49.693429
min	1.000000	0.000000	1.000000	0.420000	0.000000	0.000000	0.000000
25%	223.500000	0.000000	2.000000	20.125000	0.000000	0.000000	7.910400
50%	446.000000	0.000000	3.000000	28.000000	0.000000	0.000000	14.454200
75%	668.500000	1.000000	3.000000	38.000000	1.000000	0.000000	31.000000
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.329200

In [ ]:
```
df["Cabin"],df["Fare"]
```

Out[ ]:
```
(0       NaN
 1       C85
 2       NaN
 3      C123
 4       NaN
        ...
 886     NaN
 887     B42
 888     NaN
 889    C148
 890     NaN
 Name: Cabin, Length: 891, dtype: object,
 0       7.2500
 1      71.2833
 2       7.9250
 3      53.1000
 4       8.0500
         ...
 886    13.0000
 887    30.0000
 888    23.4500
 889    30.0000
 890     7.7500
 Name: Fare, Length: 891, dtype: float64)
```

In [ ]:
```
#Give the sum of all values in the columns

df.isna().sum()
```

Out[ ]:
```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         2
dtype: int64
```

In [ ]:
```
#Shows the number of uniqe values in the dataset's columns
df.nunique()
```

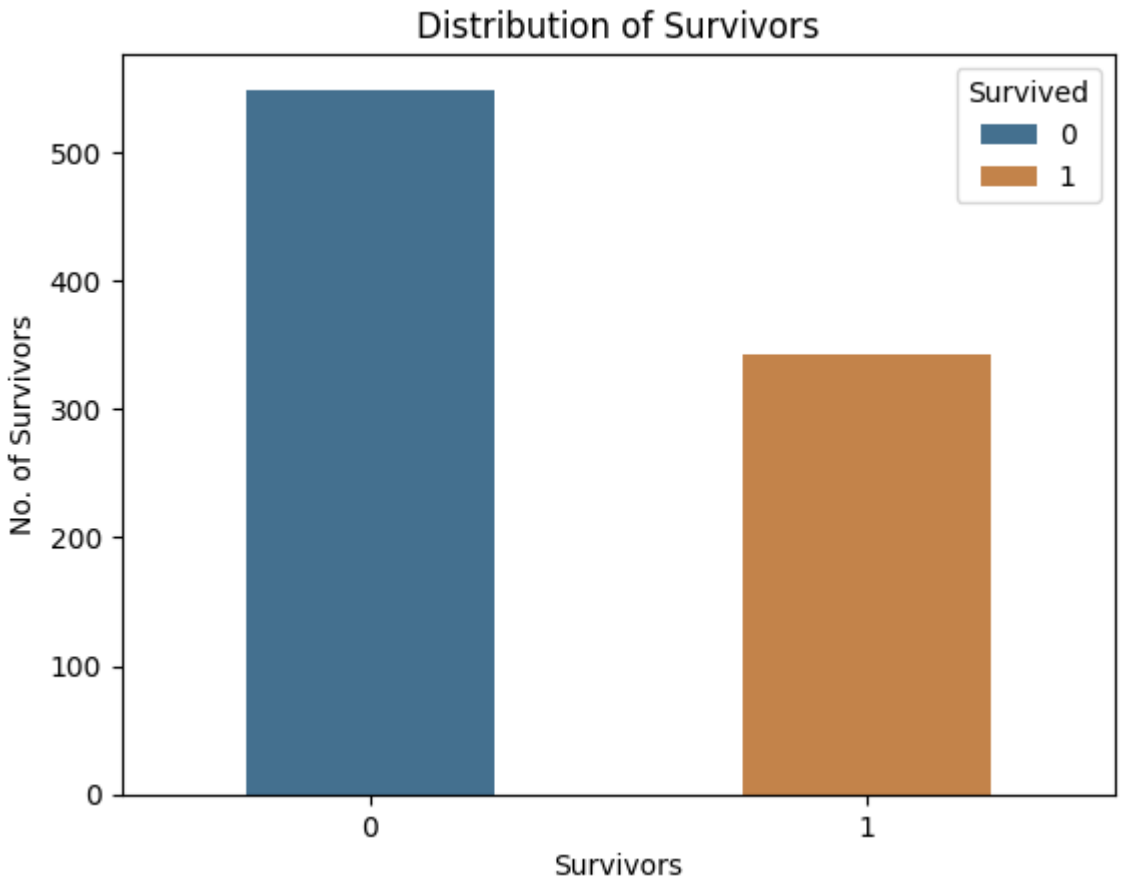
Out[ ]:
```
PassengerId    891
Survived         2
Pclass           3
Name           891
Sex              2
Age             88
SibSp            7
Parch            7
Ticket         681
Fare           248
Cabin          147
Embarked         3
dtype: int64
```

In [ ]:
```
#Shows the unique values from the survived columns of the dataset

df["Survived"].value_counts()
```

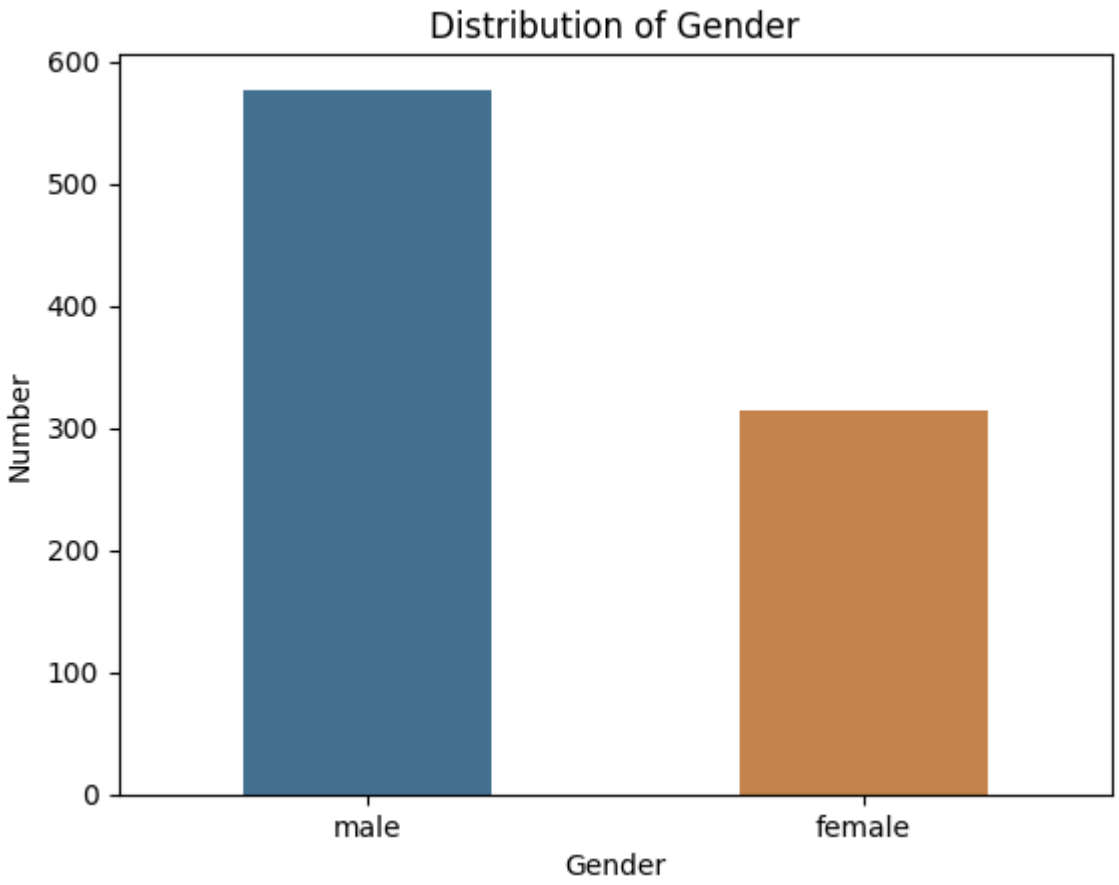
Out[ ]:
```
0    549
1    342
Name: Survived, dtype: int64
```

2. Plot Graphs

In [ ]:
```
ax = sb.countplot(data = df, x = "Survived", hue = "Survived", width = 0.5, saturation

ax.set_title('Distribution of Survivors')
ax.set_xlabel('Survivors')
ax.set_ylabel('No. of Survivors')

plt.show()
```

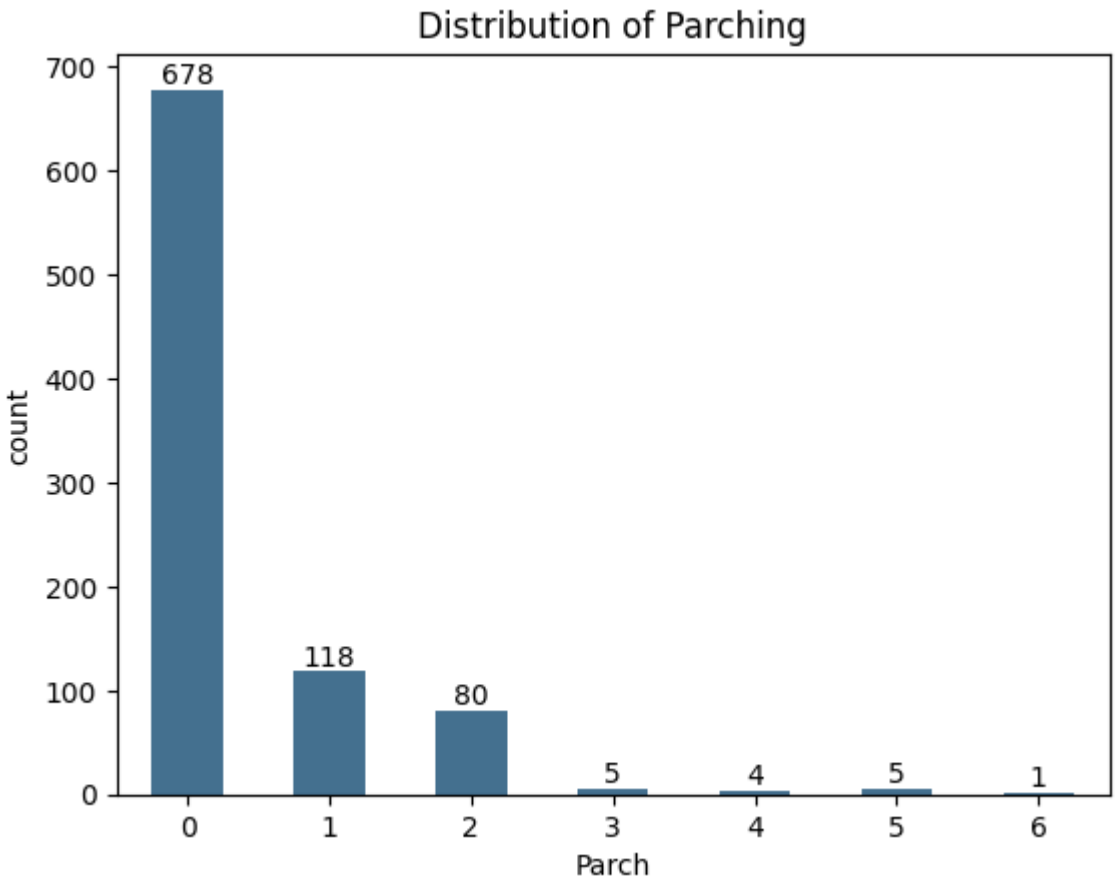


In [ ]:
```
ax = sb.countplot(data = df, x = "Sex", hue = "Sex", width = 0.5, saturation = 0.5)
ax.set_title('Distribution of Gender')
ax.set_xlabel('Gender')
ax.set_ylabel('Number')
plt.show()
```



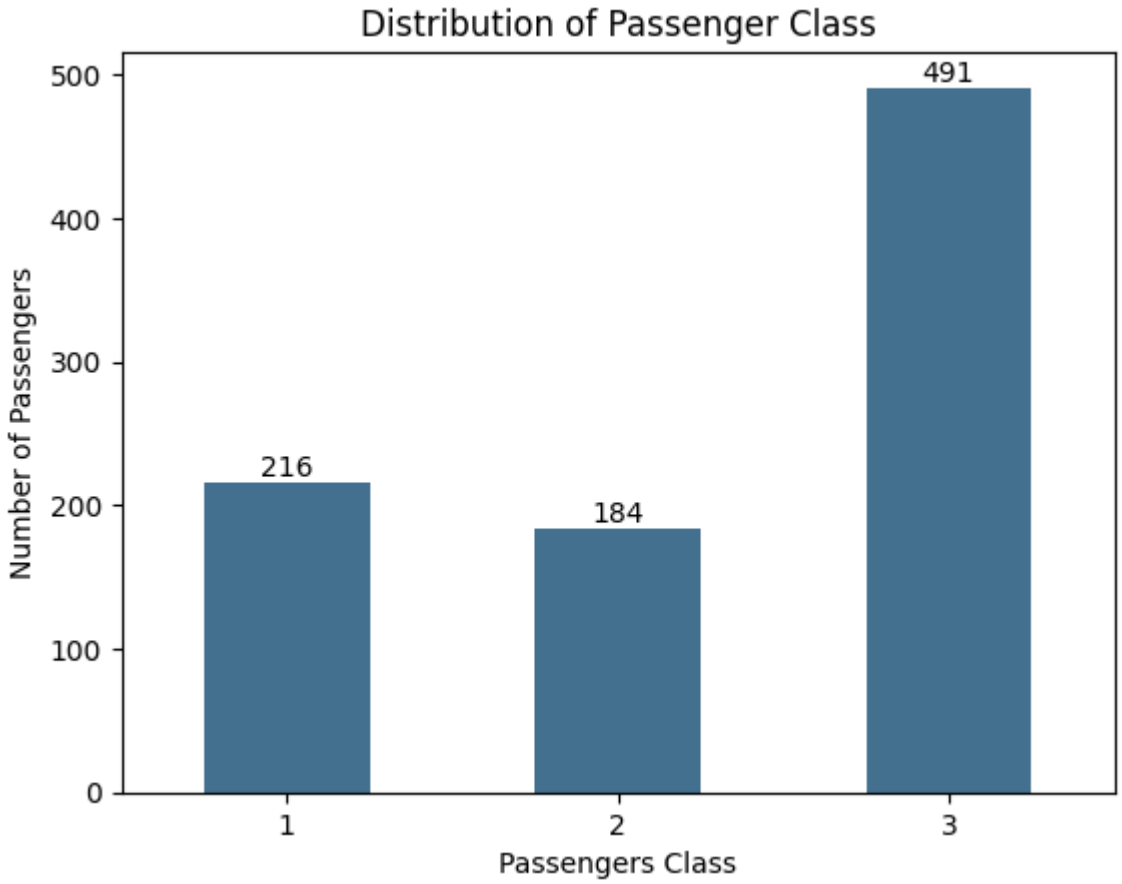
In [ ]:

```
ax = sb.countplot(data = df, x = "Parch", width = 0.5, saturation = 0.5)
ax.set_title('Distribution of Parching')

for label in ax.containers:
    ax.bar_label(label)

plt.show()
```

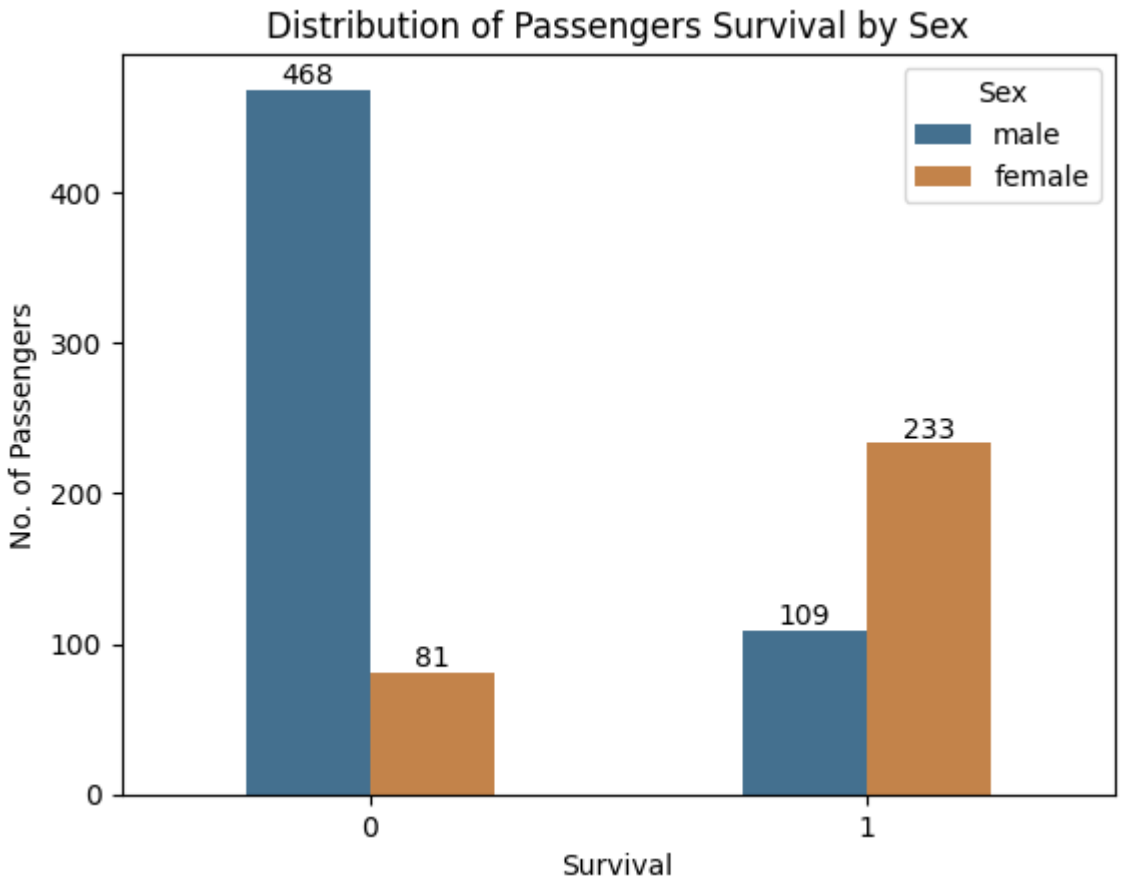


In [ ]:

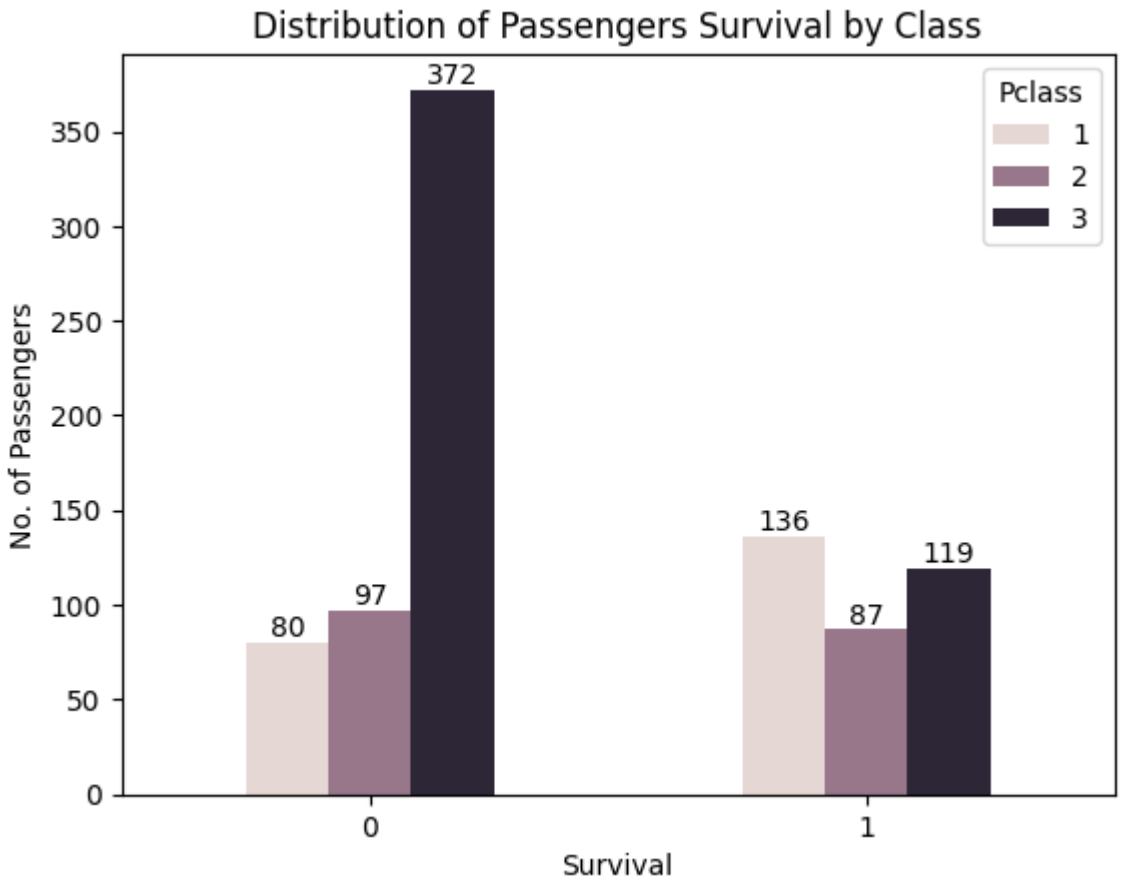
```
ax = sb.countplot(data = df, x = "Pclass", width = 0.5, saturation = 0.5)
ax.set_title('Distribution of Passenger Class')
ax.set_ylabel('Number of Passengers')
ax.set_xlabel('Passengers Class')

for label in ax.containers:
    ax.bar_label(label)

plt.show()
```



In [ ]:
```
ax = sb.countplot(data = df, x = "Survived", hue = "Sex", width = 0.5, saturation = 0.
ax.set_title('Distribution of Passengers Survival by Sex')
ax.set_ylabel('No. of Passengers')
ax.set_xlabel('Survival')

for label in ax.containers:
    ax.bar_label(label)

plt.show()
```



In [ ]:
```
ax = sb.countplot(data = df, x = "Survived", hue = "Pclass", width = 0.5, saturation =
ax.set_title('Distribution of Passengers Survival by Class')
ax.set_ylabel('No. of Passengers')
ax.set_xlabel('Survival')

for label in ax.containers:
    ax.bar_label(label)

plt.show()
```



In [ ]:

Importing Model Building Packages

In [ ]:
```
import warnings
warnings.filterwarnings('ignore')

from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression

from sklearn.metrics import *
```

In [ ]:
```
df
```

Out[ ]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN
...	...	...	...	...	...	...	...	...	...	...	...
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	NaN
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	B42
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4500	NaN
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C148
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7500	NaN

891 rows × 12 columns

In [ ]:
```
df2 = df.drop(columns = ["PassengerId", "Name", "Ticket", "Cabin"])
```

In [ ]:
```
df2
```

Out[ ]:

	Survived	Pclass	Sex	Age	SibSp	Parch	Fare	Embarked
0	0	3	male	22.0	1	0	7.2500	S
1	1	1	female	38.0	1	0	71.2833	C
2	1	3	female	26.0	0	0	7.9250	S
3	1	1	female	35.0	1	0	53.1000	S
4	0	3	male	35.0	0	0	8.0500	S
...	...	...	...	...	...	...	...	...
886	0	2	male	27.0	0	0	13.0000	S
887	1	1	female	19.0	0	0	30.0000	S
888	0	3	female	NaN	1	2	23.4500	S
889	1	1	male	26.0	0	0	30.0000	C
890	0	3	male	32.0	0	0	7.7500	Q

891 rows × 8 columns

In [ ]:
```
df2.isnull().sum()
```

Out[ ]:
```
Survived      0
Pclass        0
Sex           0
Age         177
SibSp         0
Parch         0
Fare          0
Embarked      2
dtype: int64
```

In [ ]:
```
df3 = df2.dropna()
```

In [ ]:
```
df3.isnull().sum()
```

Out[ ]:
```
Survived    0
Pclass      0
Sex         0
Age         0
SibSp       0
Parch       0
Fare        0
Embarked    0
dtype: int64
```

In [ ]:
```
#Dropping the Em`barked coluns
df3.drop(columns = ['Embarked'])
```

Out[ ]:

	Survived	Pclass	Sex	Age	SibSp	Parch	Fare
0	0	3	male	22.0	1	0	7.2500
1	1	1	female	38.0	1	0	71.2833
2	1	3	female	26.0	0	0	7.9250
3	1	1	female	35.0	1	0	53.1000
4	0	3	male	35.0	0	0	8.0500
...	...	...	...	...	...	...	...
885	0	3	female	39.0	0	5	29.1250
886	0	2	male	27.0	0	0	13.0000
887	1	1	female	19.0	0	0	30.0000
889	1	1	male	26.0	0	0	30.0000
890	0	3	male	32.0	0	0	7.7500

712 rows × 7 columns

In [ ]:
```
import pandas as pd
```

In [ ]:
```
df3.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 712 entries, 0 to 890
Data columns (total 8 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   Survived  712 non-null    int64  
 1   Pclass    712 non-null    int64  
 2   Sex       712 non-null    object 
 3   Age       712 non-null    float64
 4   SibSp     712 non-null    int64  
 5   Parch     712 non-null    int64  
 6   Fare      712 non-null    float64
 7   Embarked  712 non-null    object 
dtypes: float64(2), int64(4), object(2)
memory usage: 50.1+ KB
```

In [ ]:
```
#Checking and confirming the dataframe types
df3.dtypes
```

Out[ ]:
```
Survived      int64
Pclass        int64
Sex          object
Age         float64
SibSp         int64
Parch         int64
Fare        float64
Embarked     object
dtype: object
```

In [ ]:
```
#Installing category encoders package
!pip install category_encoders
```

```
import category_encoders as ce

#Using category encorders for the sex column
encoder = ce.OneHotEncoder(cols=['Sex'])
x = encoder.fit_transform(x)
```

```
Collecting category_encoders
  Downloading category_encoders-2.6.3-py2.py3-none-any.whl (81 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 81.9/81.9 kB 2.0 MB/s eta 0:00:00
Requirement already satisfied: numpy>=1.14.0 in /usr/local/lib/python3.10/dist-packag
es (from category_encoders) (1.25.2)
Requirement already satisfied: scikit-learn>=0.20.0 in /usr/local/lib/python3.10/dist
-packages (from category_encoders) (1.2.2)
Requirement already satisfied: scipy>=1.0.0 in /usr/local/lib/python3.10/dist-package
s (from category_encoders) (1.11.4)
Requirement already satisfied: statsmodels>=0.9.0 in /usr/local/lib/python3.10/dist-p
ackages (from category_encoders) (0.14.1)
Requirement already satisfied: pandas>=1.0.5 in /usr/local/lib/python3.10/dist-packag
es (from category_encoders) (1.5.3)
Requirement already satisfied: patsy>=0.5.1 in /usr/local/lib/python3.10/dist-package
s (from category_encoders) (0.5.6)
Requirement already satisfied: python-dateutil>=2.8.1 in /usr/local/lib/python3.10/di
st-packages (from pandas>=1.0.5->category_encoders) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-package
s (from pandas>=1.0.5->category_encoders) (2023.4)
Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from p
atsy>=0.5.1->category_encoders) (1.16.0)
Requirement already satisfied: joblib>=1.1.1 in /usr/local/lib/python3.10/dist-packag
es (from scikit-learn>=0.20.0->category_encoders) (1.3.2)
Requirement already satisfied: threadpoolctl>=2.0.0 in /usr/local/lib/python3.10/dist
-packages (from scikit-learn>=0.20.0->category_encoders) (3.2.0)
Requirement already satisfied: packaging>=21.3 in /usr/local/lib/python3.10/dist-pack
ages (from statsmodels>=0.9.0->category_encoders) (23.2)
Installing collected packages: category_encoders
Successfully installed category_encoders-2.6.3
```

In [ ]:
```
#Splitting the training data to 75% of the dataset and testing data to 25%

x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.25, random_state

#Using logistics regression
lr = LogisticRegression(max_iter = 150)
lr.fit(x_train, y_train)
y_test_pred = lr.predict(x_test)

#testing the accuracy of the model in percentage
accuracy_score(y_test_pred, y_test)*100
```

Out[ ]:
```
83.70786516853933
```

In [ ]:
```
y_test.shape
```

Out[ ]:
```
(178,)
```

In [ ]:
```
x_test.shape
```

Out[ ]:
```
(178, 7)
```

In [ ]: