```
Titanic Survival Predicaton
```

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#Importing the Dependencies

```
import numpy as np import pandas as pd import
matplotlib.pyplot as plt import seaborn as sns from
sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
```

#Data Collection & Processing

```
# load the data from csv file to Pandas DataFrame
titanic_data = pd.read_csv('/content/train.csv')
```

```
# printing the first 5 rows of the dataframe
titanic_data.head()
```

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
				Futrelle, Mrs. Jacques Heath (Lily								

3 4 1 1 female 35.0 1 0 11380353.1000 C123 S
May Peel)

```
# number of rows and Columns titanic_data.shape
     (891, 12)
```

```
# getting some informations about the data titanic_data.info()

     <class 'pandas.core.frame.DataFrame'>
     RangeIndex: 891 entries, 0 to 890
     Data columns (total 12 columns):
      #   Column       Non-Null Count  Dtype
     ---  ------       --------------  -----
     0   PassengerId  891 non-null    int64
     1   Survived     891 non-null    int64
     2   Pclass       891 non-null    int64
     3   Name         891 non-null    object
     4   Sex          891 non-null    object
     5   Age          714 non-null    float64
     6   SibSp        891 non-null    int64
     7   Parch        891 non-null    int64
     8   Ticket       891 non-null    object
     9   Fare         891 non-null    float64
     10  Cabin        204 non-null    object   11  Embarked     889 non-null
         object  dtypes: float64(2), int64(5), object(5) memory usage: 83.7+ KB
```

```
# check the number of missing values in each column titanic_data.isnull().sum()

     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
```

Handling the Missing values

```
# drop the "Cabin" column from the dataframe titanic_data
= titanic_data.drop(columns='Cabin', axis=1)
```

```
# replacing the missing values in "Age" column with mean value
titanic_data['Age'].fillna(titanic_data['Age'].mean(), inplace=True)
```

```
# finding the mode value of "Embarked" column
print(titanic_data['Embarked'].mode())
```

```
     0    S dtype:
     object
```

```
print(titanic_data['Embarked'].mode()[0])
```

```
     S
```

```
# replacing the missing values in "Embarked" column with mode value
titanic_data['Embarked'].fillna(titanic_data['Embarked'].mode()[0], inplace=True)
```

```
# check the number of missing values in each column titanic_data.isnull().sum()
```

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```
PassengerId    0
Survived       0
Pclass         0
Name           0
Sex            0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Embarked       0 dtype:
int64
```

Data Analysis

```
# getting some statistical measures about the data titanic_data.describe()
```

	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
count	891.000000	891.000000	891.000000	891.000000	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	13.002015	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	22.000000	0.000000	0.000000	7.910400
50%	446.000000	0.000000	3.000000	29.699118	0.000000	0.000000	14.454200
75%	668.500000	1.000000	3.000000	35.000000	1.000000	0.000000	31.000000
max	891.000000	1.000000	3.000000	80.000000	8.000000	6.000000	512.329200

```
# finding the number of people survived and not survived
titanic_data['Survived'].value_counts()
```

```
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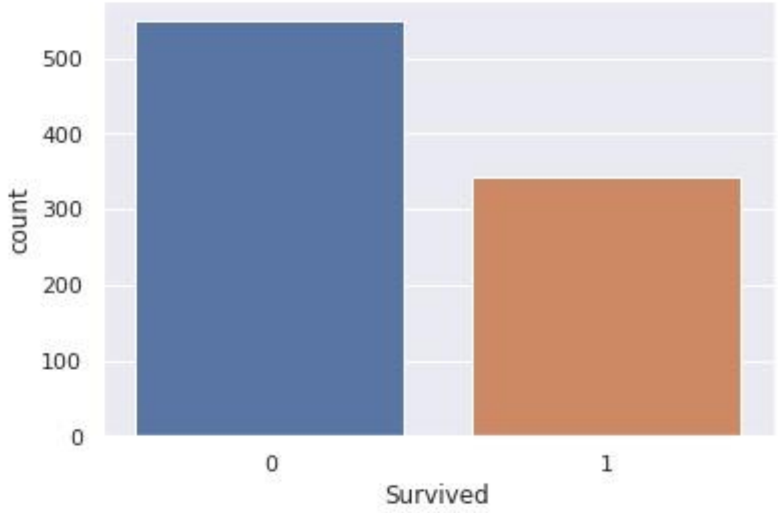
```
0    549
1    342
Name: Survived, dtype: int64
```

Data Visualization

```
sns.set()
```

```
# making a count plot for "Survived" column sns.countplot('Survived',
data=titanic_data)
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg:
FutureWarning
<matplotlib.axes. subplots.AxesSubplot at 0x7fd6c77f16d0>
```

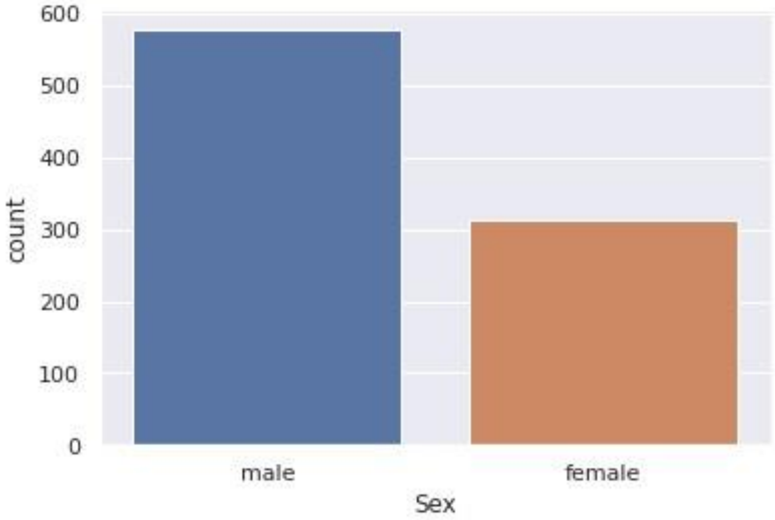


```
titanic_data['Sex'].value_counts()
```

```
     male      577 female
     314
     Name: Sex, dtype: int64
```

```
# making a count plot for "Sex" column sns.countplot('Sex',
data=titanic_data)
```

```
     /usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg:
       FutureWarning
     <matplotlib.axes._subplots.AxesSubplot at 0x7fd6cbeb1d90>
```



```
# number of survivors Gender wise
sns.countplot('Sex', hue='Survived', data=titanic_data) /usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43:
FutureWarning: Pass the following variable as a keyword arg:
       FutureWarning
```

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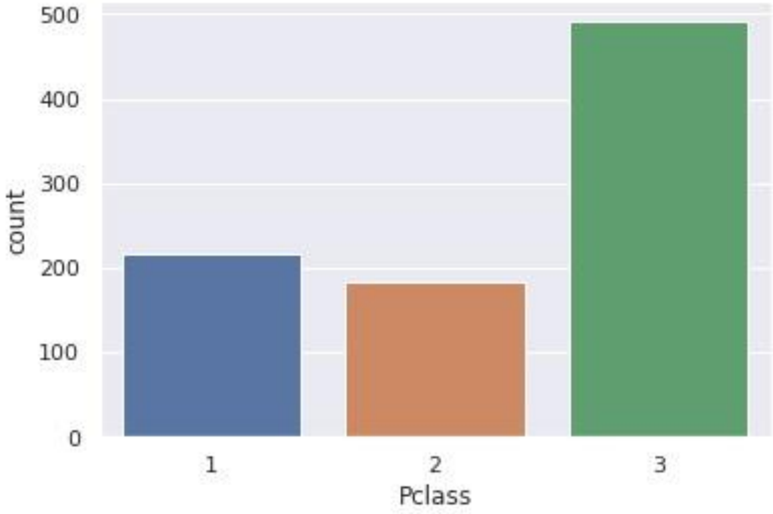
```
    <matplotlib.axes. subplots.AxesSubplot at 0x7fd6c77d0dd0>
```

```
# making a count plot for "Pclass" column
sns.countplot('Pclass', data=titanic_data)
```

```
    /usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg:
      FutureWarning
    <matplotlib.axes. subplots.AxesSubplot at 0x7fd6c5f7bfd0>
```



```
sns.countplot('Pclass', hue='Survived', data=titanic_data)
    /usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarning: Pass the following variable as a keyword arg:
      FutureWarning
```

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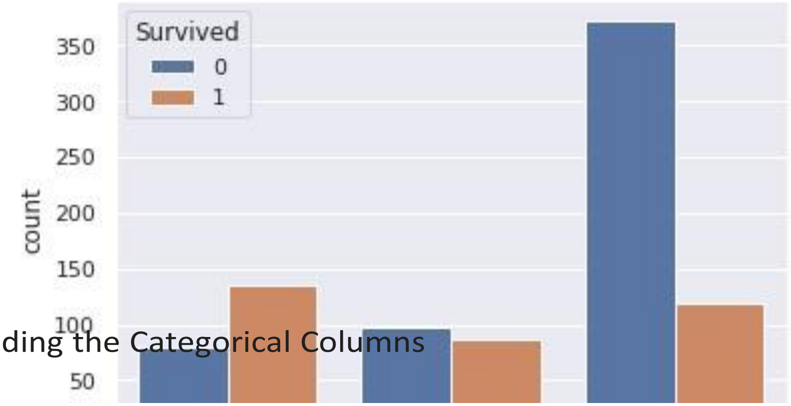
```
<matplotlib.axes. subplots.AxesSubplot at 0x7fd6c7286a90>
```



Encoding the Categorical Columns

```
titanic_data['Sex'].value_counts()
```

```
male      577
female    314
Name: Sex, dtype: int64
```

```
titanic_data['Embarked'].value_counts()
```

```
S    646
C    168
Q     77
Name: Embarked, dtype: int64
```

```
# converting categorical Columns titanic_data.replace({'Sex':{'male':0,'female':1},

'Embarked':{'S':0,'C':1,'Q':2}}, inplace=True)
```

```
titanic_data.head()
```

```
         PassengerId Survived Pclass                                  Name Sex Age SibSp Parch          Ticket        Fare Embarked
```

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0	1	0	3	Braund, Mr. Owen Harris	0	22.0	1	0	A/5 21171	7.2500	0
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	1	38.0	1	0	PC 17599	71.2833	1
2	3	1	3	Heikkinen, Miss. Laina	1	26.0	0	0	STON/O2. 3101282	7.9250	0
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	1	35.0	1	0	113803	53.1000	0

Separating features & Target

```
X = titanic_data.drop(columns = ['PassengerId','Name','Ticket','Survived'],axis=1)
Y = titanic_data['Survived']
```

```
print(X)
```

```
        Pclass  Sex        Age  SibSp  Parch     Fare  Embarked
    0        3    0  22.000000      1      0   7.2500         0
    1        1    1  38.000000      1      0  71.2833         1
    2        3    1  26.000000      0      0   7.9250         0
    3        1    1  35.000000      1      0  53.1000         0
    4        3    0  35.000000      0      0   8.0500         0 ..      ...  ...
           ...    ...    ...     ...     ...
    886      2    0  27.000000      0      0  13.0000         0
    887      1    1  19.000000      0      0  30.0000         0
    888      3    1  29.699118      1      2  23.4500         0
    889      1    0  26.000000      0      0  30.0000         1
    890      3    0  32.000000      0      0   7.7500         2

    891      rows x 7 columns]
```

```
print(Y)
```

```
    0      0
    1      1
    2      1
    3      1
```

```
4      0       ..
886    0
887    1
888    0
889    1
890    0
Name: Survived, Length: 891, dtype: int64
```

Splitting the data into training data & Test data

```
X_train, X_test, Y_train, Y_test = train_test_split(X,Y, test_size=0.2, random_state=2)
```

```
print(X.shape, X_train.shape, X_test.shape)
```

```
(891, 7) (712, 7) (179, 7)
```

Model Training

Logistic Regression

```
model = LogisticRegression()
```

```
# training the Logistic Regression model with training data model.fit(X_train,
Y_train)
```

```
/usr/local/lib/python3.7/dist-packages/sklearn/linear_model/_logistic.py:940: ConvergenceWarning: lbfgs failed to converge (stat
STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html
```

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```
    Please also refer to the documentation for alternative solver options:
        https://scikit-learn.org/stable/modules/linear_model.html#logistic-regression
      extra_warning_msg=_LOGISTIC_SOLVER_CONVERGENCE_MSG)
    LogisticRegression(C=1.0, class_weight=None, dual=False, fit_intercept=True,
    intercept_scaling=1, l1_ratio=None, max_iter=100,
    multi_class='auto', n_jobs=None, penalty='l2',
    random_state=None, solver='lbfgs', tol=0.0001, verbose=0,
    warm_start=False)
```

Model Evaluation

Accuracy Score

```
# accuracy on training data
X_train_prediction = model.predict(X_train)
```

```
print(X_train_prediction)
```

```
[0 1 0 0 0 0 0 1 0 0 0 1 0 0 1 0 1 0 0 0 0 0 1 0 0 1 0 0 1 0 1 1 0 0 1 0 1
 0 0 0 0 0 0 1 1 0 0 1 0 1 0 1 0 0 0 0 0 0 1 0 1 0 0 1 1 0 0 1 1 0 1 0 0 1
0 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 0 1 0 0 0 1 1 1 0 1 0 0 0 0 0 1 0 0 0
1 1 0 0 1 0 0 1 0 0 1 0 0 1 0 1 0 1 0 1 0 1 1 1 1 1 1 0 0 1 1 1 0 0 1 0 0
 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 1 0 1 1 1
 0 0 0 1 0 0 0 1 0 0 1 0 0 0 1 1 0 1 0 0 0 0 0 1 1 0 1 1 1 1 0 0 0 0 0 0 0
 0 1 0 0 1 1 1 0 0 1 0 1 1 1 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 1 0 0 0
 0 0 0 0 0 0 1 0 1 0 0 1 0 0 1 0 1 0 1 1 0 0 0 0 1 0 1 0 0 1 0 0 0 1 0 0 0
 0 1 1 0 0 0 0 0 0 1 0 1 0 0 0 0 0 1 1 1 0 0 0 1 0 1 0 0 0 0 0 0 1 1 0 1 1
 0 1 1 1 0 0 0 0 0 0 0 0 0 1 0 0 1 1 1 0 1 0 0 0 0 1 1 0 0 0 1 0 1 1 1 0 0
 0 0 1 0 0 0 1 1 0 0 1 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 1 0 1 1 1 0 1 1 0 0 0
0 1 0 1 0 0 1 1 0 0 0 0 1 0 0 0 0 1 1 0 1 0 1 0 0 0 0 0 1 0 0 0 0 1 1 0 0
1 0 1 0 0 1 0 0 0 0 0 0 0 0 1 0 0 1 1 0 0 0 1 1 0 1 0 0 1 0 0 0 1 1 0 1 0
 0 0 0 0 1 0 0 1 0 1 1 0 0 1 0 0 1 0 0 0 1 0 1 1 0 0 1 1 0 1 0 1 1 1 0 1 0
```

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```
      0 1 0 0 1 0 0 1 0 0 0 0 1 1 0 0 1 0 1 0 0 0 0 0 0 1 1 1 0 0 1 1 0 0 0 0 0
      0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0
      0 0 1 0 0 0 0 0 1 0 1 0 1 0 0 0 1 0 1 1 1 0 0 0 1 0 1 0 0 0 1 1 1 0 0 1 1
     0 0 0 1 0 1 0 0 0 0 0 1 1 0 1 1 1 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 1 0 0 0 0
     1 0 0 1 0 1 0 0 0 1 1 1 1 1 0 0 1 1 0 1 1 1 1 0 0 0 1 1 0 0 1 0 0 0 0 0 0
      0 0 0 1 1 0 0 1 0] training_data_accuracy =
accuracy_score(Y_train, X_train_prediction) print('Accuracy score of
training data : ', training_data_accuracy)
```

```
     Accuracy score of training data :  0.8075842696629213
```

```
# accuracy on test data
X_test_prediction = model.predict(X_test)
```

```
print(X_test_prediction)
```

```
     [0 0 1 0 0 0 0 0 0 0 0 1 1 0 0 1 0 0 1 0 1 1 0 1 0 1 1 0 0 0 0 0 0 0 0 1 1
     0 0 0 0 0 1 0 0 1 1 0 0 1 0 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 0 0 1 0 1 0
     1 0 0 0 1 0 1 0 0 0 1 1 0 0 1 0 0 0 0 0 0 1 0 1 0 0 1 0 1 1 0 1 1 0 0 0 0
      0 0 0 1 1 0 1 0 0 1 0 0 0 0 0 0 1 0 0 0 0 1 1 0 0 0 0 0 0 1 1 1 1 0 1 0 0
     0 1 0 0 0 0 1 0 0 1 1 0 1 0 0 0 1 1 0 0 1 0 0 1 1 1 0 0 0 0 0]
```

```
test_data_accuracy = accuracy_score(Y_test, X_test_prediction) print('Accuracy
score of test data : ', test_data_accuracy)
```

```
     Accuracy score of test data :  0.7821229050279329
```

```
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```