titanic-survivors-predictive-model

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Project Name: Titanic Survivors Predictive Model

1 Titanic Survivors Predictive Model

1.1 1. Data Preparation

1.2 Importing the train and test data

Import the libraries and the dataset

[ ]:

```
import pandas as pd
import numpy as np



train_df = pd.read_csv('C:/Users/student/Downloads/titanic (1)/train.csv')
test_df = pd.read_csv('C:/Users/student/Downloads/titanic (1)/test.csv')


#head of train.csv
train_df.head()
```

[ ]:

```
   PassengerId  Survived  Pclass  \
0            1         0       3
1            2         1       1
2            3         1       3
3            4         1       1
4            5         0       3

                                                Name     Sex   Age  SibSp  \
0                            Braund, Mr. Owen Harris    male  22.0      1
1  Cumings, Mrs. John Bradley (Florence Briggs Th…  female  38.0      1
2                             Heikkinen, Miss. Laina  female  26.0      0
3       Futrelle, Mrs. Jacques Heath (Lily May Peel)  female  35.0      1
4                           Allen, Mr. William Henry    male  35.0      0

   Parch            Ticket     Fare Cabin Embarked
```

```
0      0         A/5 21171   7.2500   NaN        S
1      0          PC 17599  71.2833   C85        C
2      0  STON/O2. 3101282   7.9250   NaN        S
3      0            113803  53.1000  C123        S
4      0            373450   8.0500   NaN        S
```

[ ]:
```
train_df.describe()
```

[ ]:
```
       PassengerId    Survived      Pclass         Age       SibSp  \
count   891.000000  891.000000  891.000000  714.000000  891.000000
mean    446.000000    0.383838    2.308642   29.699118    0.523008
std     257.353842    0.486592    0.836071   14.526497    1.102743
min       1.000000    0.000000    1.000000    0.420000    0.000000
25%     223.500000    0.000000    2.000000   20.125000    0.000000
50%     446.000000    0.000000    3.000000   28.000000    0.000000
75%     668.500000    1.000000    3.000000   38.000000    1.000000
max     891.000000    1.000000    3.000000   80.000000    8.000000

            Parch        Fare
count  891.000000  891.000000
mean     0.381594   32.204208
std      0.806057   49.693429
min      0.000000    0.000000
25%      0.000000    7.910400
50%      0.000000   14.454200
75%      0.000000   31.000000
max      6.000000  512.329200
```

[ ]:
```
train_df.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
```

1.3 Cleaning the train data

[ ]:

```
# Filled Age with median.
train_df['Age'].fillna(train_df['Age'].median(),inplace=True)



#Filled Embarked witht the mode.
most_frequent_port = train_df['Embarked'].mode()[0]
train_df['Embarked'].fillna(most_frequent_port, inplace=True)

#Cabin has a lot of missing values its better to drop it.
train_df.drop('Cabin', axis=1, inplace=True)
```

1.4 Cleaning the test data

[ ]:

```
# Do the same for the test data
test_df['Age'].fillna(test_df['Age'].median(), inplace=True)
test_df['Fare'].fillna(test_df['Fare'].median(), inplace=True)  # 'Fare' might␣
  ↪have missing values in test set
test_df.drop('Cabin', axis=1, inplace=True)
```

[ ]:

```
test_df.isnull().sum()
```

[ ]:

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

[ ]:

```
test_df['Age'].fillna(test_df['Age'].median(), inplace=True)
test_df['Fare'].fillna(test_df['Fare'].median(), inplace=True)
```

1.5 Changing Catagorical Variables to numerical variables

Sex = needs to be changed to 0 and 1 Embarked = needs to be changed to dummy variables

[ ]:

```
# Convert 'Sex' into a binary variable (0 and 1)
train_df['Sex'] = train_df['Sex'].map({'female': 1, 'male': 0}).astype(int)
test_df['Sex'] = test_df['Sex'].map({'female': 1, 'male': 0}).astype(int)

# One-hot encode 'Embarked' since it's a nominal categorical variable
train_df = pd.get_dummies(train_df, columns=['Embarked'], drop_first=True)
```

```
test_df = pd.get_dummies(test_df, columns=['Embarked'], drop_first=True)

# Take a look at the modified DataFrame
train_df.head()
```

[ ]:

```
   PassengerId  Survived  Pclass  \
0            1         0       3
1            2         1       1
2            3         1       3
3            4         1       1
4            5         0       3

                                                Name  Sex   Age  SibSp  Parch  \
0                            Braund, Mr. Owen Harris    0  22.0      1      0
1  Cumings, Mrs. John Bradley (Florence Briggs Th…    1  38.0      1      0
2                             Heikkinen, Miss. Laina    1  26.0      0      0
3       Futrelle, Mrs. Jacques Heath (Lily May Peel)    1  35.0      1      0
4                           Allen, Mr. William Henry    0  35.0      0      0

             Ticket     Fare  Embarked_Q  Embarked_S
0         A/5 21171   7.2500       False        True
1          PC 17599  71.2833       False       False
2  STON/O2. 3101282   7.9250       False        True
3            113803  53.1000       False        True
4            373450   8.0500       False        True
```

We can add new veraible feature ‘Family size’ adding Sibsp and Parch, also added ‘Is Alone’ feature if the passenger is traveling alone

[ ]:

```
# Creating a new feature 'FamilySize' as a combination of 'SibSp' and 'Parch'
train_df['FamilySize'] = train_df['SibSp'] + train_df['Parch'] + 1  # Adding 1␣
 ↪to include the passenger
test_df['FamilySize'] = test_df['SibSp'] + test_df['Parch'] + 1



#We set the ISALONE variable to one so the following condition would turn it to␣
 ↪zero if Family size is > one for both the training and test data.
train_df['IsAlone'] = 1
test_df['IsAlone'] = 1

train_df.loc[train_df['FamilySize'] > 1, 'IsAlone'] = 0
test_df.loc[test_df['FamilySize'] > 1, 'IsAlone'] = 0
```

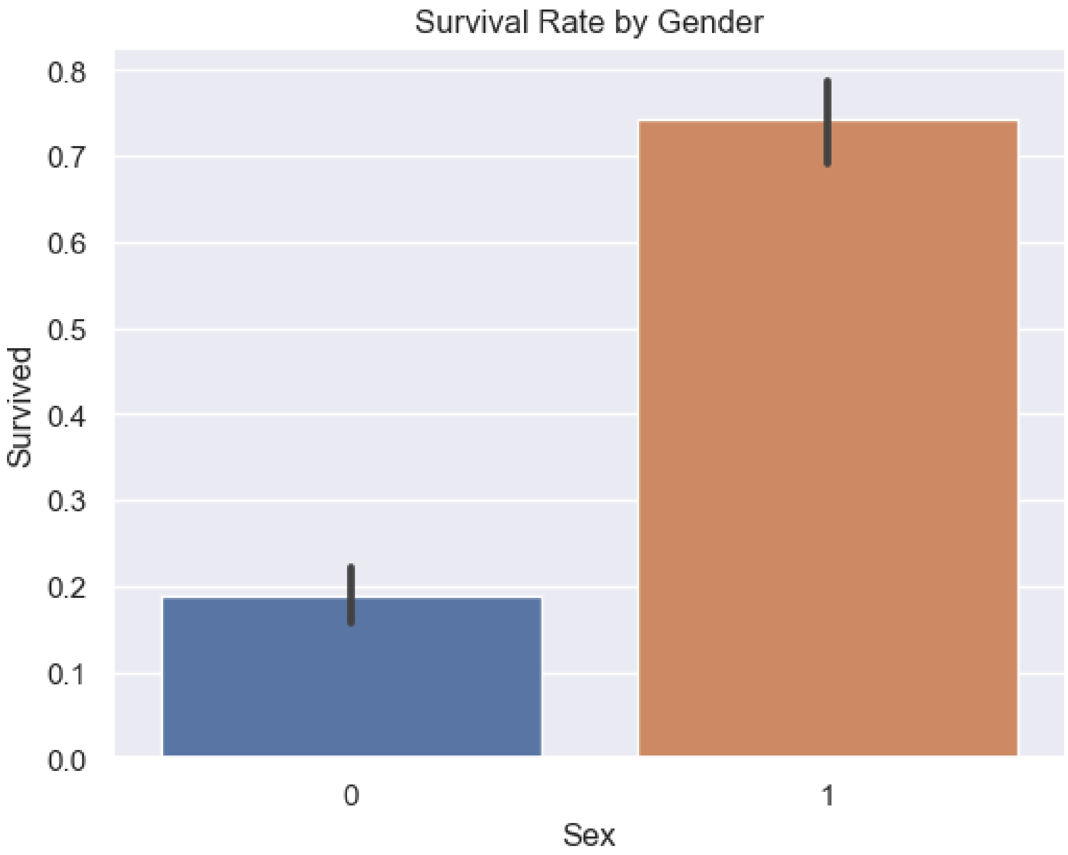
2 2. Explanatory Data Analysis

2.1 Importing Important Visualization Librarys

```
[ ]: import matplotlib.pyplot as plt
     import seaborn as sns
     sns.set() #defualt seaborn
```

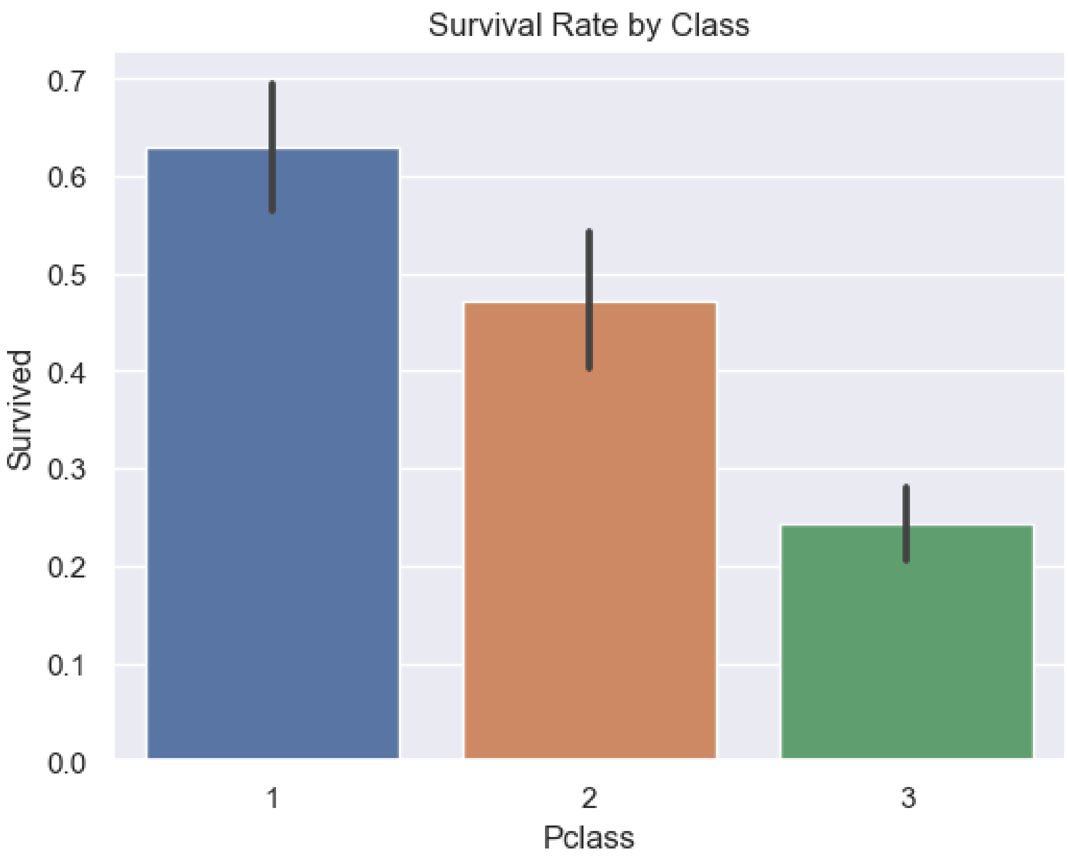
2.2 Survival Rate by Gender

```
[ ]: sns.barplot(x='Sex',y='Survived',data= train_df)
     plt.title('Survival Rate by Gender')
     plt.show()
```



2.3 Survival Rate by Class

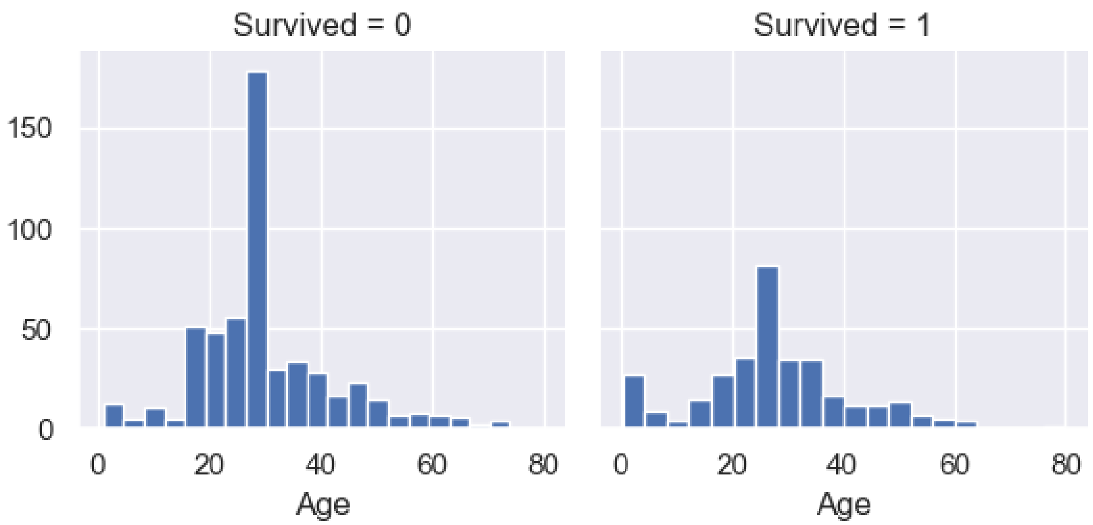
```
[ ]: sns.barplot(x='Pclass',y= 'Survived',data= train_df)
     plt.title("Survival Rate by Class")
     plt.show()
```



2.4 Age Distribution of Survivors vs. Non-Survivors

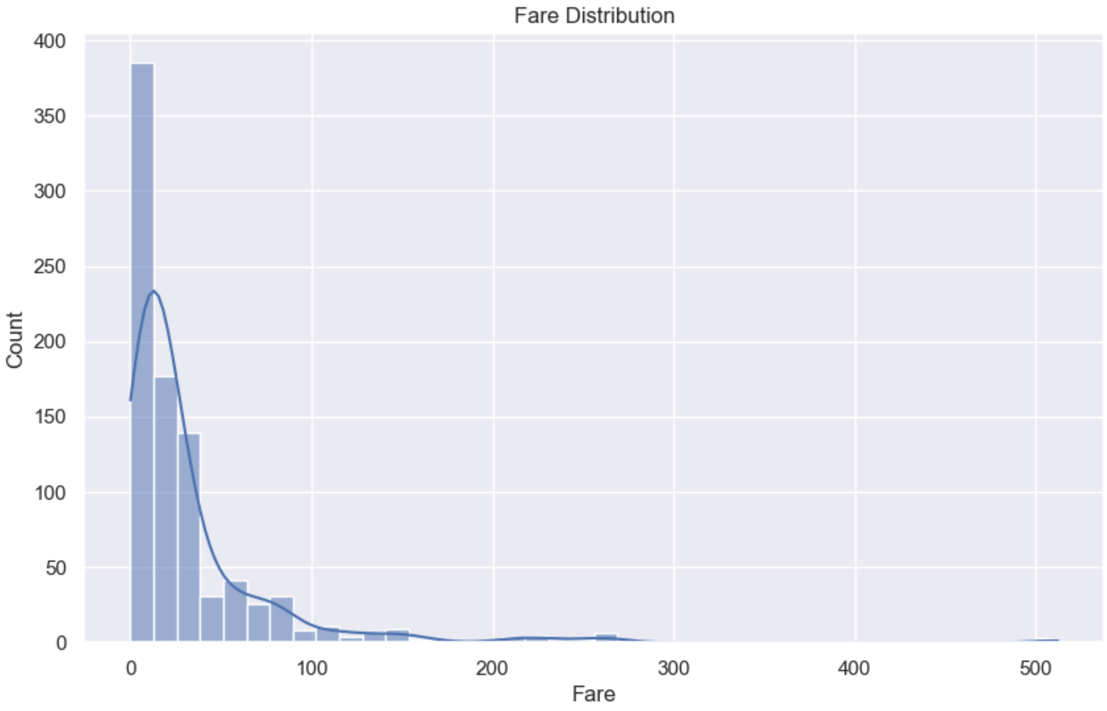
```
[ ]: g = sns.FacetGrid(train_df, col='Survived')
     g.map(plt.hist, 'Age', bins=20)
     plt.show()
```

```
c:\ProgramData\anaconda3\Lib\site-packages\seaborn\axisgrid.py:118: UserWarning:
The figure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
```



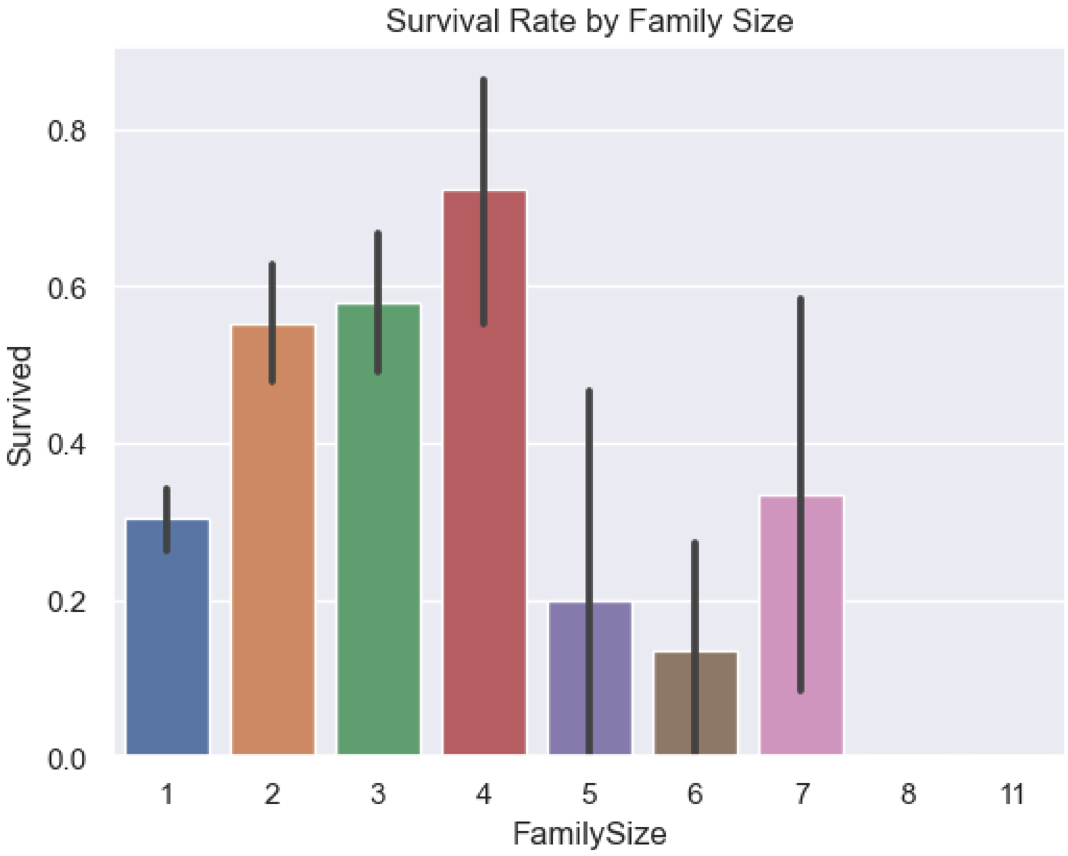
2.5 Fare Distribution

[ ]:
```
plt.figure(figsize=(10, 6))
sns.histplot(train_df['Fare'], kde=True, bins=40)
plt.title('Fare Distribution')
plt.show()
```



2.6 Family Size and Survival

[ ]:
```python
sns.barplot(x='FamilySize', y='Survived', data=train_df)
plt.title('Survival Rate by Family Size')
plt.show()
```

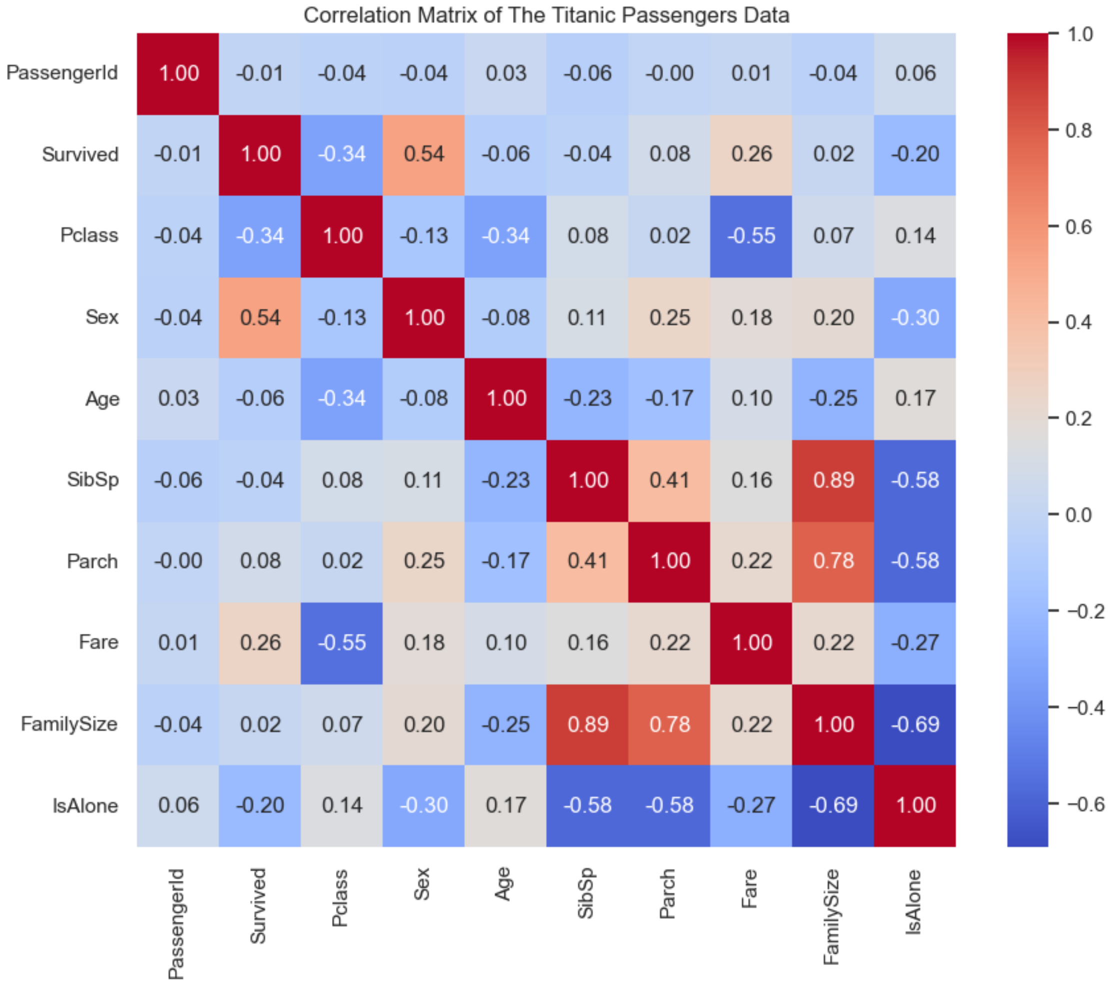


2.7 Correlation Analysis

[ ]:
```python
# Select only numeric columns for the correlation matrix
numeric_df = train_df.select_dtypes(include=[np.number])

# Calculate the correlation matrix
corr_matrix = numeric_df.corr()

# Visualize the correlation matrix
plt.figure(figsize=(10, 8))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm', fmt=".2f")
plt.title('Correlation Matrix of The Titanic Passengers Data')
plt.show()
```



3 3. Model Selection