assignment-3

September 18, 2023

IMPORT

[1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

DATA VISUALIZATION

[5]:
```
df=pd.read_csv("Titanic-Dataset.csv")
```

[6]:
```
df
```

[6]:

	PassengerId	Survived	Pclass	\
0	1	0	3	
1	2	1	1	
2	3	1	3	
3	4	1	1	
4	5	0	3	
..	…	…	…	
886	887	0	2	
887	888	1	1	
888	889	0	3	
889	890	1	1	
890	891	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	
..	…	…	…	…	
886	Montvila, Rev. Juozas	male	27.0	0	
887	Graham, Miss. Margaret Edith	female	19.0	0	
888	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	
889	Behr, Mr. Karl Howell	male	26.0	0	
890	Dooley, Mr. Patrick	male	32.0	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
..     …                …       …   …      …
886      0            211536  13.0000   NaN        S
887      0            112053  30.0000   B42        S
888      2        W./C. 6607  23.4500   NaN        S
889      0            111369  30.0000  C148        C
890      0            370376   7.7500   NaN        Q

[891 rows x 12 columns]
```

[7]:
```
df.describe()
```

[7]:
```
       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
```

[13]:
```
df.shape
```

[13]:
```
(891, 12)
```

[9]:
```
df.isnull().sum()
```

[9]:
```
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
```

[11]:
```
df.describe()
```

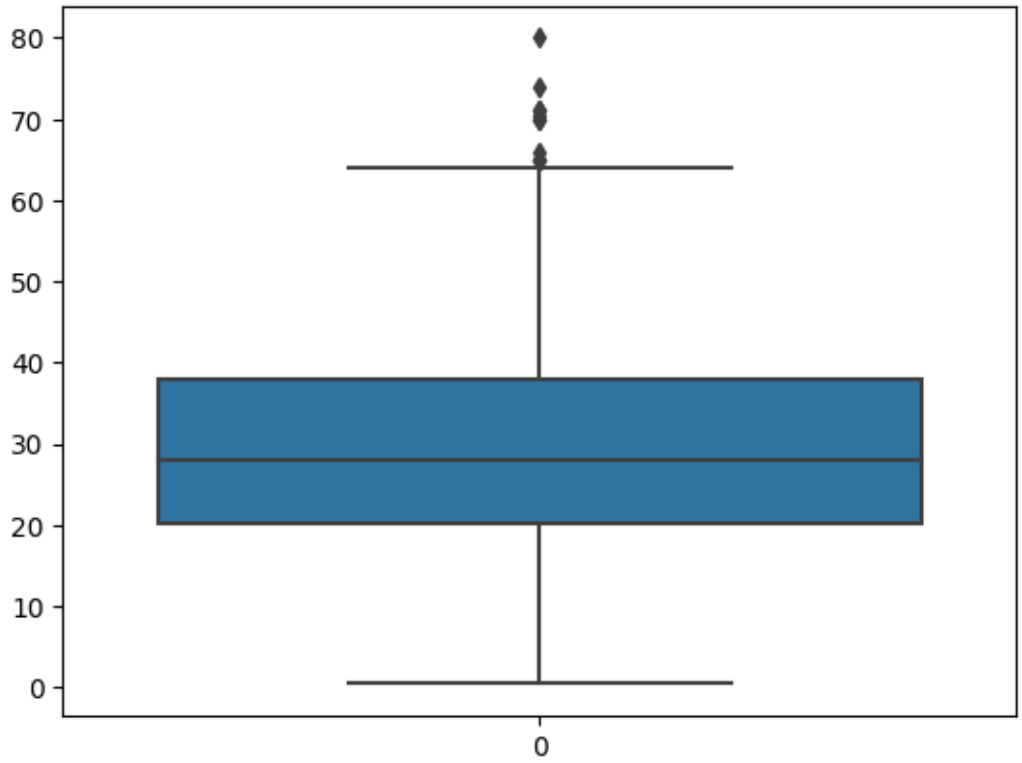
[11]:
```
       PassengerId    Survived      Pclass         Age       SibSp  \
count   891.000000  891.000000  891.000000  714.000000  891.000000
mean    446.000000    0.383838    2.308642   29.699118    0.523008
std     257.353842    0.486592    0.836071   14.526497    1.102743
min       1.000000    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
```

OUTLIER DETECTION

[16]:
```
sns.boxplot(df.Age)
```

[16]:
```
<Axes: >
```



[17]:
```
q1=df.Age.quantile(0.25)
q3=df.Age.quantile(0.75)
```

[18]:
```
print(q1)
print(q3)
```

```
20.125
38.0
```

[19]:
```
IQR=q3-q1
```

[20]:
```
IQR
```

[20]: 17.875

[21]:
```
upper_limit=q3+1.5*IQR
```

[23]:
```
upper_limit
```

[23]: 64.8125

[24]:
```
df.median()
```

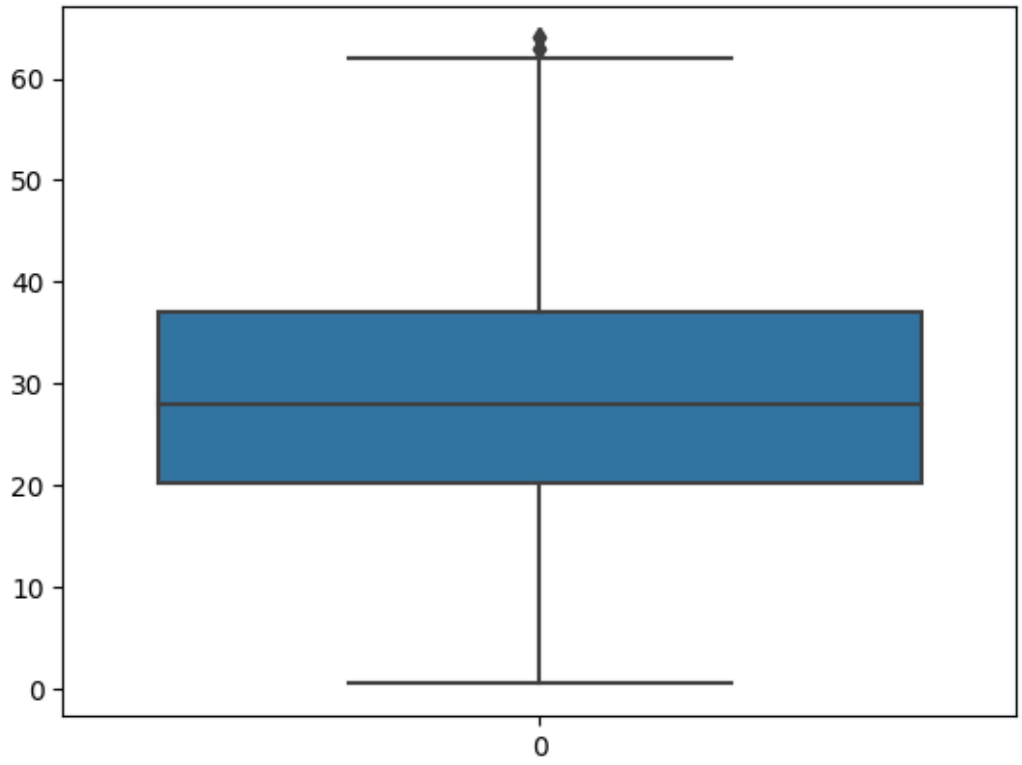
```
<ipython-input-24-6d467abf240d>:1: FutureWarning: The default value of
numeric_only in DataFrame.median is deprecated. In a future version, it will
default to False. In addition, specifying 'numeric_only=None' is deprecated.
Select only valid columns or specify the value of numeric_only to silence this
warning.
  df.median()
```

[24]:
```
PassengerId    446.0000
Survived         0.0000
Pclass           3.0000
Age             28.0000
SibSp            0.0000
Parch            0.0000
Fare            14.4542
dtype: float64
```

[26]:
```
df['Age']=np.where(df['Age']>upper_limit,28,df['Age'])
```

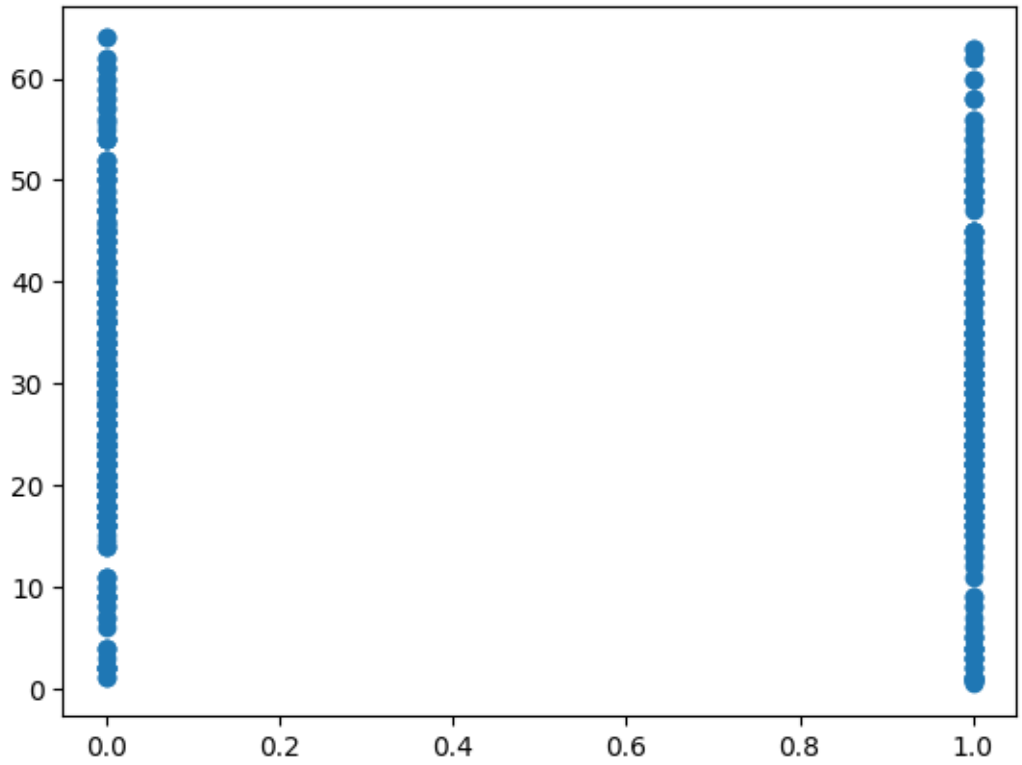
[27]:
```
sns.boxplot(df.Age)
```

[27]:
```
<Axes: >
```



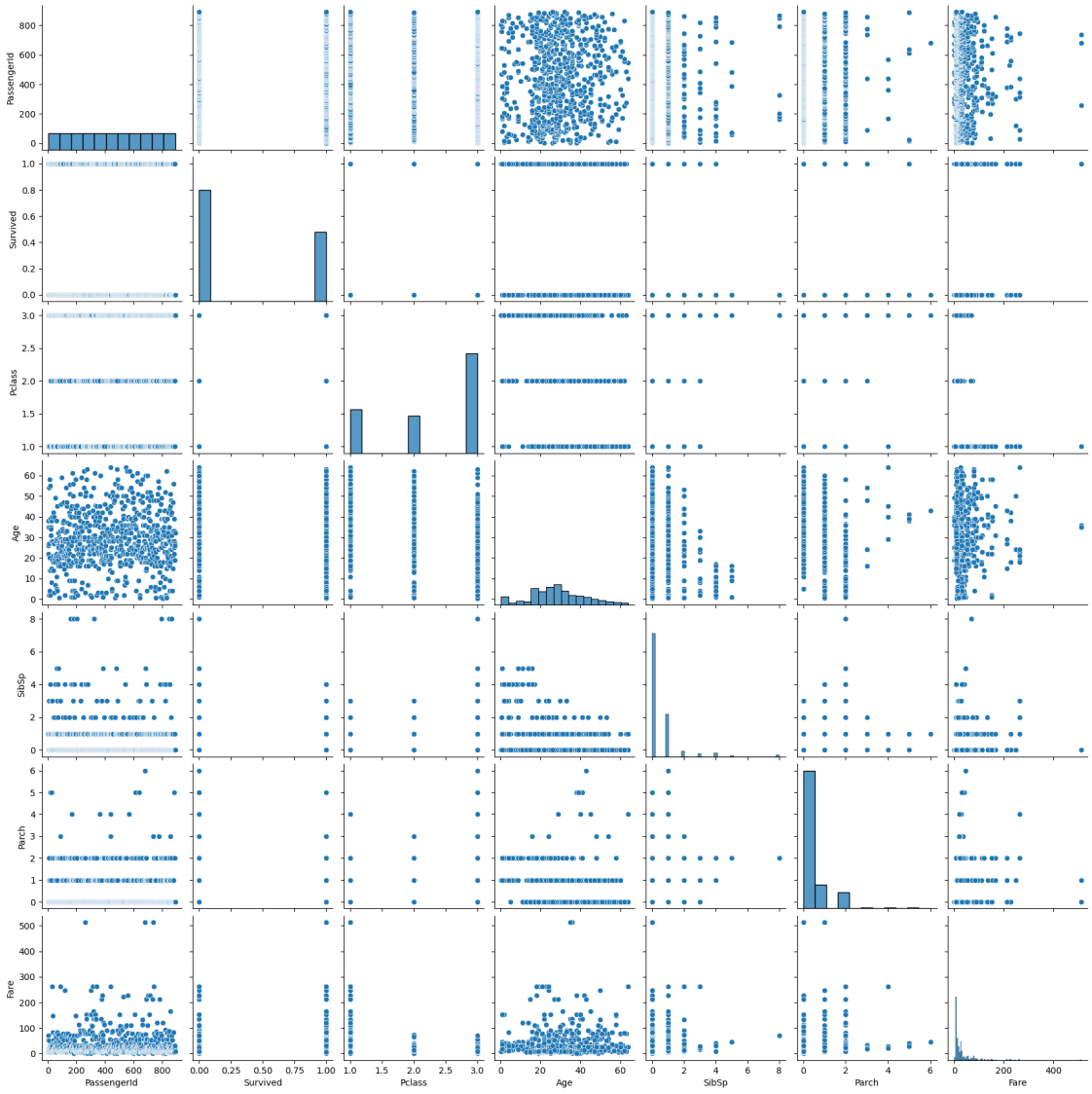
[28]:
```
plt.scatter(df['Survived'],df['Age'])
```

[28]: <matplotlib.collections.PathCollection at 0x7c5859e9f490>



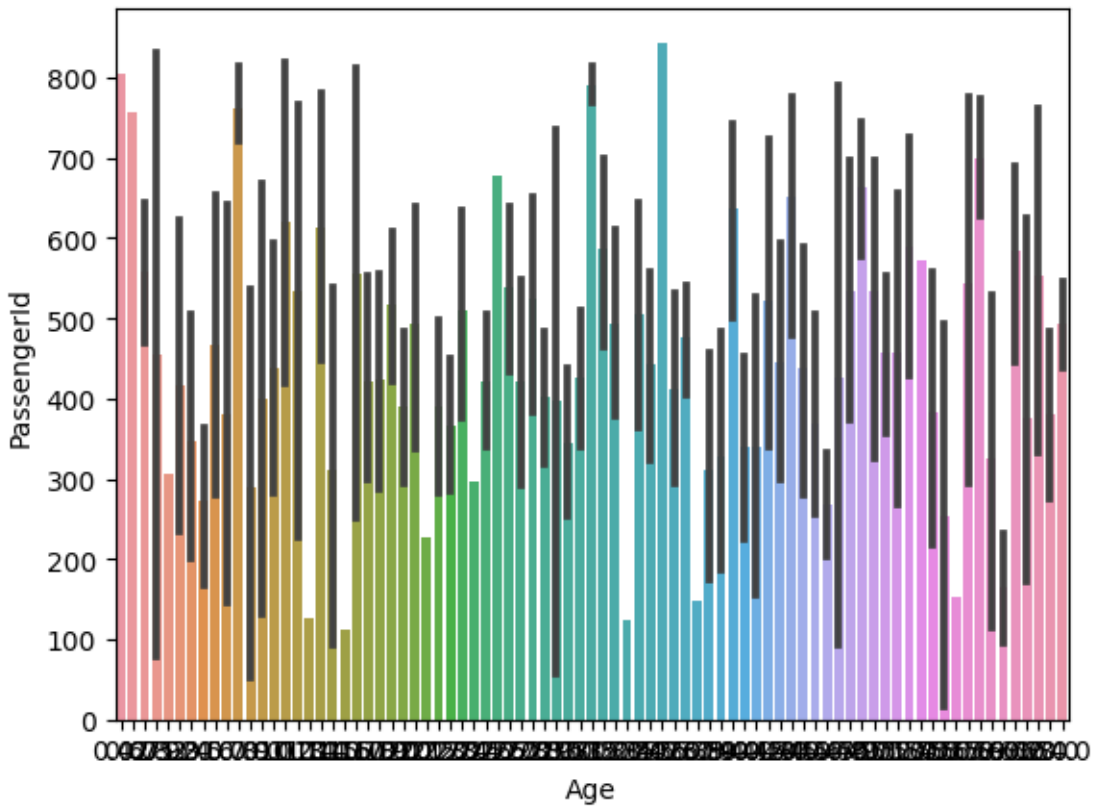
[29]:
```
sns.pairplot(df)
```

[29]: <seaborn.axisgrid.PairGrid at 0x7c5859894ee0>



[30]:
```
sns.barplot(x=df['Age'],y=df['PassengerId'])
```

[30]: <Axes: xlabel='Age', ylabel='PassengerId'>



[33]:
```
X=df.drop(columns=['Age'],axis=1)
X.head()
```

[33]:

	PassengerId	Survived	Pclass	Name	Sex	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th…	female	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	0	0	STON/O2. 3101282	7.9250	NaN	S
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	1	0				
4	5	0	3	Allen, Mr. William Henry	male	0	0				

```
3            113803  53.1000  C123        S
4            373450   8.0500   NaN        S
```

[35]:
```
X.shape
```

[35]:
```
(891, 11)
```

[37]:
```
type(X)
```

[37]:
```
pandas.core.frame.DataFrame
```

[38]:
```
y=df['Age']
y.head()
```

[38]:
```
0    22.0
1    38.0
2    26.0
3    35.0
4    35.0
Name: Age, dtype: float64
```

ENCODING

[40]:
```
X.head()
```

[40]:
```
   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  SibSp  Parch  \
0                            Braund, Mr. Owen Harris    male      1      0
1  Cumings, Mrs. John Bradley (Florence Briggs Th…  female      1      0
2                             Heikkinen, Miss. Laina  female      0      0
3       Futrelle, Mrs. Jacques Heath (Lily May Peel)  female      1      0
4                           Allen, Mr. William Henry    male      0      0

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

[39]:
```
from sklearn.preprocessing import LabelEncoder
le=LabelEncoder()
```

[41]:
```
X["Embarked"]=le.fit_transform(X["Embarked"])
```

[42]:
```
X.head()
```

[42]:
```
   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  SibSp  Parch  \
0                            Braund, Mr. Owen Harris    male      1      0
1  Cumings, Mrs. John Bradley (Florence Briggs Th…  female      1      0
2                             Heikkinen, Miss. Laina  female      0      0
3       Futrelle, Mrs. Jacques Heath (Lily May Peel)  female      1      0
4                           Allen, Mr. William Henry    male      0      0

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

[43]:
```
print(le.classes_)
```

```
['C' 'Q' 'S' nan]
```

[44]:
```
mapping=dict(zip(le.classes_,range(len(le.classes_))))
mapping
```

[44]:
```
{'C': 0, 'Q': 1, 'S': 2, nan: 3}
```

FEATURE SCALING

[48]:
```
from sklearn.preprocessing import MinMaxScaler
ms=MinMaxScaler()
```

[61]:
```
import pandas as pd
from sklearn.preprocessing import MinMaxScaler, StandardScaler
```

[55]:
```
df = pd.DataFrame(X.head())
```

[56]:
```
numerical_cols = ['Pclass', 'SibSp', 'Parch', 'Fare']
```

[57]:
```
scaler_minmax = MinMaxScaler()
df[numerical_cols] = scaler_minmax.fit_transform(df[numerical_cols])
```

[62]:
```
scaler_zscore = StandardScaler()
df[numerical_cols] = scaler_zscore.fit_transform(df[numerical_cols])
```

[66]:
```
X_Scaled=df.head()
```

[68]:
```
df.head()
```

[68]:
```
   PassengerId  Survived    Pclass  \
0            1         0  0.816497
1            2         1 -1.224745
2            3         1  0.816497
3            4         1 -1.224745
4            5         0  0.816497

                                                Name     Sex     SibSp  Parch  \
0                            Braund, Mr. Owen Harris    male  0.816497    0.0
1  Cumings, Mrs. John Bradley (Florence Briggs Th…  female  0.816497    0.0
2                             Heikkinen, Miss. Laina  female -1.224745    0.0
3       Futrelle, Mrs. Jacques Heath (Lily May Peel)  female  0.816497    0.0
4                           Allen, Mr. William Henry    male -1.224745    0.0

             Ticket      Fare Cabin  Embarked
0         A/5 21171 -0.816141   NaN         2
1          PC 17599  1.530347   C85         0
2  STON/O2. 3101282 -0.791405   NaN         2
3            113803  0.864024  C123         2
4            373450 -0.786825   NaN         2
```

TRAIN TEST SPLIT

[70]:
```
from sklearn.model_selection import train_test_split
```

[73]:
```
X = df.drop(columns=['Survived', 'Name', 'Sex', 'Ticket', 'Cabin'])  # Drop␣
↪non-numeric columns
y = df['Survived']
```

[74]:
```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,␣
↪random_state=42)
```

[ ]:
```

```