pr4-1

April 22, 2024

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

[3]:
```
x=np.array([95,85,80,70,60])
y=np.array([85,95,70,65,70])
```

[5]:
```
model= np.polyfit(x, y, 1)
model
```

[5]:
```
array([ 0.64383562, 26.78082192])
```

[6]:
```
predict = np.poly1d(model)
predict(65)
```

[6]:
```
68.63013698630137
```

[7]:
```
y_pred = predict(x)
y_pred
```

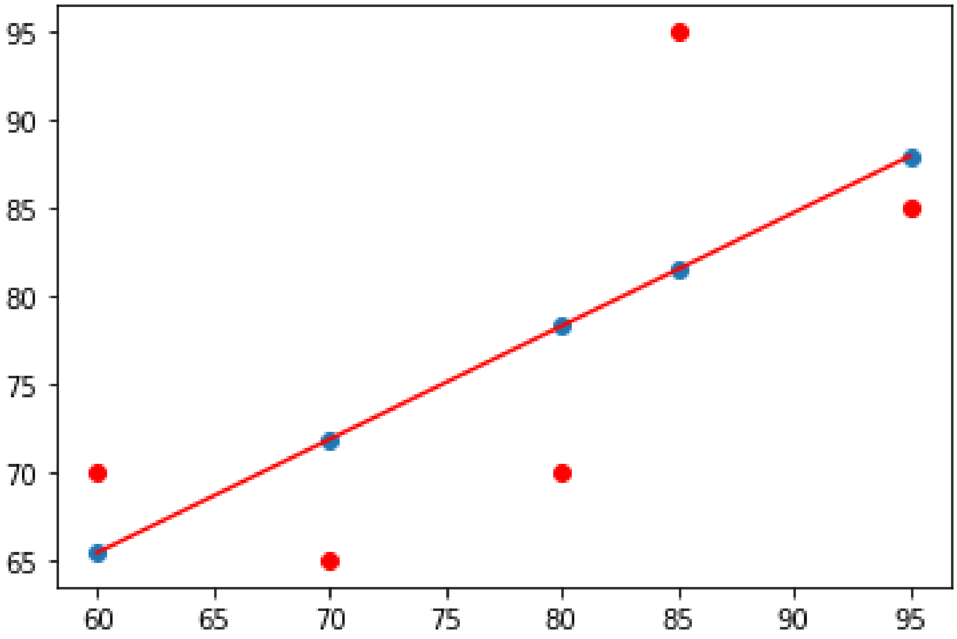
[7]:
```
array([87.94520548, 81.50684932, 78.28767123, 71.84931507, 65.4109589 ])
```

[8]:
```
from sklearn.metrics import r2_score
r2_score(y,y_pred)
```

[8]:
```
0.4803218090889322
```

[9]:
```
y_line = model[1] + model[0]* x
plt.plot(x,y_line,c = 'r')
plt.scatter(x,y_pred)
plt.scatter(x,y,c='r')
```

[9]:
```
<matplotlib.collections.PathCollection at 0x2655a795790>
```



[13]:
```
from sklearn.datasets import fetch_california_housing
housing = fetch_california_housing()
```

[14]:
```
data = pd.DataFrame(housing.data)
```

[15]:
```
data
```

[15]:
```
            0     1         2         3       4         5      6       7
0      8.3252  41.0  6.984127  1.023810   322.0  2.555556  37.88 -122.23
1      8.3014  21.0  6.238137  0.971880  2401.0  2.109842  37.86 -122.22
2      7.2574  52.0  8.288136  1.073446   496.0  2.802260  37.85 -122.24
3      5.6431  52.0  5.817352  1.073059   558.0  2.547945  37.85 -122.25
4      3.8462  52.0  6.281853  1.081081   565.0  2.181467  37.85 -122.25
…         …     …         …         …       …     …         …
20635  1.5603  25.0  5.045455  1.133333   845.0  2.560606  39.48 -121.09
20636  2.5568  18.0  6.114035  1.315789   356.0  3.122807  39.49 -121.21
20637  1.7000  17.0  5.205543  1.120092  1007.0  2.325635  39.43 -121.22
20638  1.8672  18.0  5.329513  1.171920   741.0  2.123209  39.43 -121.32
20639  2.3886  16.0  5.254717  1.162264  1387.0  2.616981  39.37 -121.24

[20640 rows x 8 columns]
```

[16]:
```
data.columns = housing.feature_names
data.head()
```

```
[16]:    MedInc  HouseAge  AveRooms  AveBedrms  Population  AveOccup  Latitude  \
      0  8.3252      41.0  6.984127   1.023810       322.0  2.555556     37.88
      1  8.3014      21.0  6.238137   0.971880      2401.0  2.109842     37.86
      2  7.2574      52.0  8.288136   1.073446       496.0  2.802260     37.85
      3  5.6431      52.0  5.817352   1.073059       558.0  2.547945     37.85
      4  3.8462      52.0  6.281853   1.081081       565.0  2.181467     37.85

         Longitude
      0    -122.23
      1    -122.22
      2    -122.24
      3    -122.25
      4    -122.25
```

```
[17]: data['MedInc'] = housing.target
```

```
[18]: data.isnull().sum()
```

```
[18]: MedInc        0
      HouseAge      0
      AveRooms      0
      AveBedrms     0
      Population    0
      AveOccup      0
      Latitude      0
      Longitude     0
      dtype: int64
```

```
[19]: x = data.drop(['MedInc'],axis = 1)
      y = data['MedInc']
```

```
[20]: from sklearn.model_selection import train_test_split
      xtrain, xtest, ytrain, ytest=train_test_split(x,y, test_size=0.2,random_state=0)
```

```
[27]: from sklearn.linear_model import LinearRegression


      lm = LinearRegression()
      lm.fit(xtrain, ytrain)


      ytrain_pred = lm.predict(xtrain)
      ytest_pred = lm.predict(xtest)
```

```
[28]: df=pd.DataFrame(ytrain_pred,ytrain)
      df=pd.DataFrame(ytest_pred,ytest)
```

[32]:

```
from sklearn.metrics import mean_squared_error, r2_score
mse = mean_squared_error(ytest,ytest_pred)
print(mse)
```

```
0.8195128774610305
```

[35]:

```
mse = mean_squared_error(ytrain_pred,ytrain)
print(mse)
```

```
0.7957123632209536
```

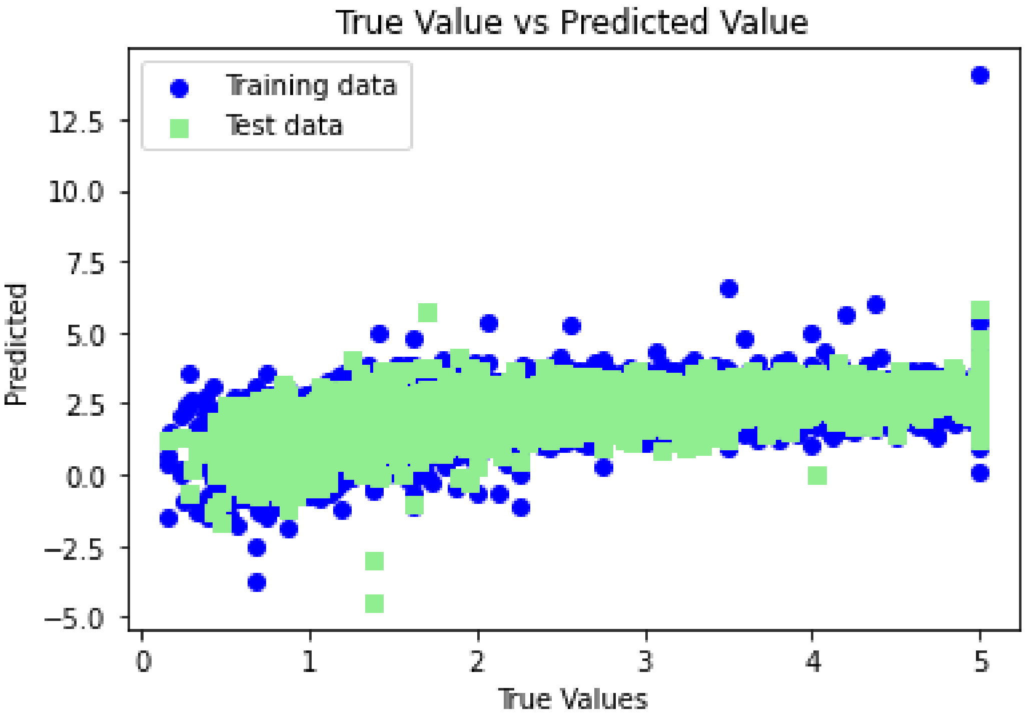
[37]:

```
mse = mean_squared_error(ytest,ytest_pred)
print(mse)
```

```
0.8195128774610305
```

[44]:

```
plt.scatter(ytrain,ytrain_pred,c='blue',marker='o',label='Training data')
plt.scatter(ytest,ytest_pred,c='lightgreen',marker='s',label='Test data')
plt.xlabel('True Values')
plt.ylabel('Predicted')
plt.title("True Value vs Predicted Value")
plt.legend(loc='upper left')
plt.plot()
plt.show()
```



```
[ ]:
```

```
[ ]:
```