jupyter Practical 4 (unsaved changes)

File Edit View Insert Cell Kernel Widgets Help Not Trusted Python 3 (ipykernel)

Run Code

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

import pandas as pd
import seaborn as sns

%matplotlib inline
```

```
C:\ProgramData\Anaconda3\lib\site-packages\scipy\__init__.py:155: UserWarning: A NumPy version >=1.18.5 and <1.25.0 is required
for this version of SciPy (detected version 1.26.3
  warnings.warn(f"A NumPy version >={np_minversion} and <{np_maxversion}"
```

In [3]:
```
from sklearn.datasets import load_boston
boston_dataset = load_boston()

boston_dataset.keys()
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\utils\deprecation.py:87: FutureWarning: Function load_boston is deprecated;
`load_boston` is deprecated in 1.0 and will be removed in 1.2.

    The Boston housing prices dataset has an ethical problem. You can refer to
    the documentation of this function for further details.

    The scikit-learn maintainers therefore strongly discourage the use of this
    dataset unless the purpose of the code is to study and educate about
    ethical issues in data science and machine learning.

    In this special case, you can fetch the dataset from the original
    source::

        import pandas as pd
        import numpy as np


        data_url = "http://lib.stat.cmu.edu/datasets/boston"
        raw_df = pd.read_csv(data_url, sep="\s+", skiprows=22, header=None)
        data = np.hstack([raw_df.values[::2, :], raw_df.values[1::2, :2]])
        target = raw_df.values[1::2, 2]

    Alternative datasets include the California housing dataset (i.e.
    :func:`~sklearn.datasets.fetch_california_housing`) and the Ames housing
    dataset. You can load the datasets as follows::
```

Out[3]:
```
dict_keys(['data', 'target', 'feature_names', 'DESCR', 'filename', 'data_module'])
```

In [4]:
```
boston = pd.DataFrame(boston_dataset.data, columns=boston_dataset.feature_names)
boston.head()
```

Out[4]:

	CRIM	ZN	INDUS	CHAS	NOX	RM	AGE	DIS	RAD	TAX	PTRATIO	B	LSTAT
0	0.00632	18.0	2.31	0.0	0.538	6.575	65.2	4.0900	1.0	296.0	15.3	396.90	4.98
1	0.02731	0.0	7.07	0.0	0.469	6.421	78.9	4.9671	2.0	242.0	17.8	396.90	9.14
2	0.02729	0.0	7.07	0.0	0.469	7.185	61.1	4.9671	2.0	242.0	17.8	392.83	4.03
3	0.03237	0.0	2.18	0.0	0.458	6.998	45.8	6.0622	3.0	222.0	18.7	394.63	2.94
4	0.06905	0.0	2.18	0.0	0.458	7.147	54.2	6.0622	3.0	222.0	18.7	396.90	5.33

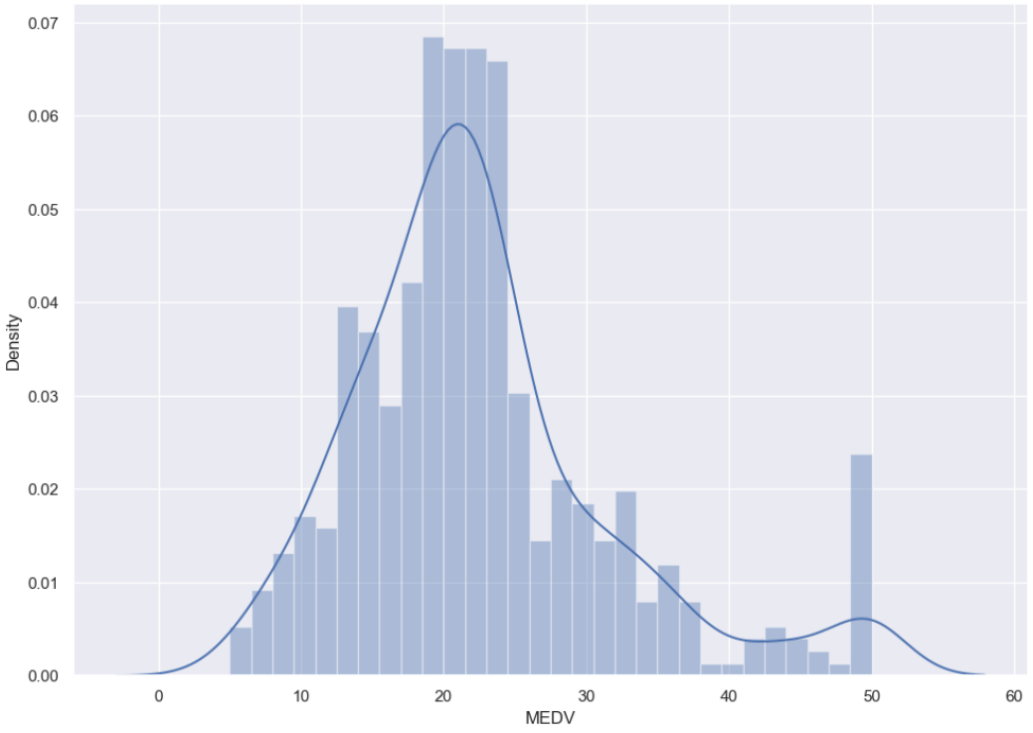
In [5]:
```
boston['MEDV'] = boston_dataset.target
```

In [6]:
```
boston.isnull().sum()
```

Out[6]:
```
CRIM       0
ZN         0
INDUS      0
CHAS       0
NOX        0
RM         0
AGE        0
DIS        0
RAD        0
TAX        0
PTRATIO    0
B          0
LSTAT      0
MEDV       0
dtype: int64
```

In [7]:
```
sns.set(rc={'figure.figsize':(11.7,8.27)})

sns.distplot(boston['MEDV'], bins=30)
plt.show()
```

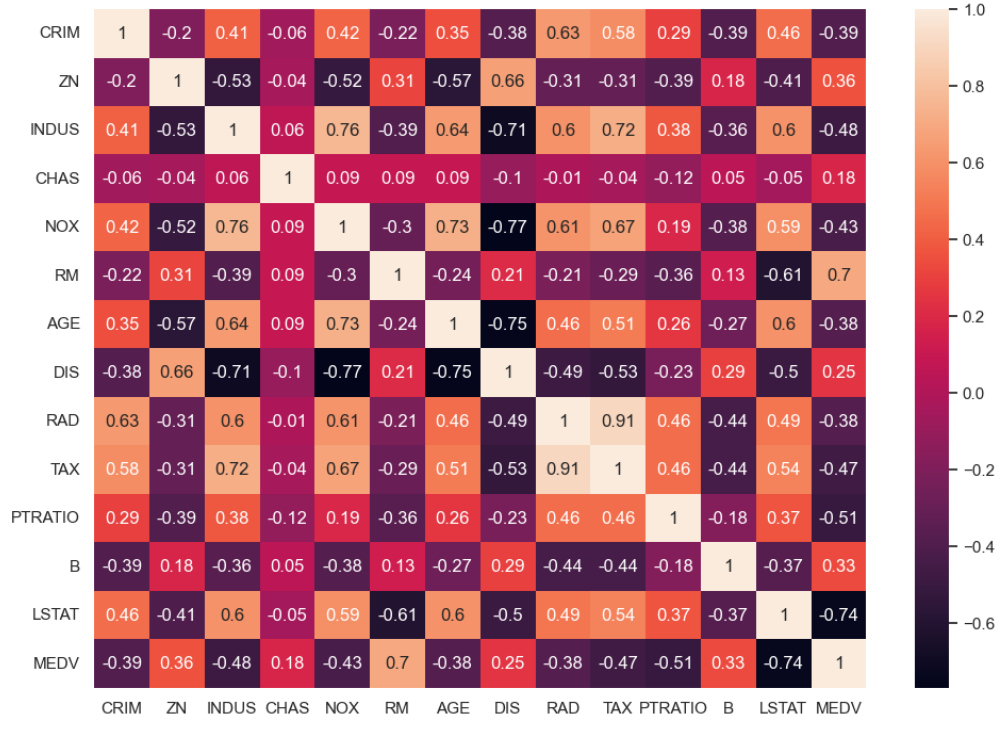
```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```



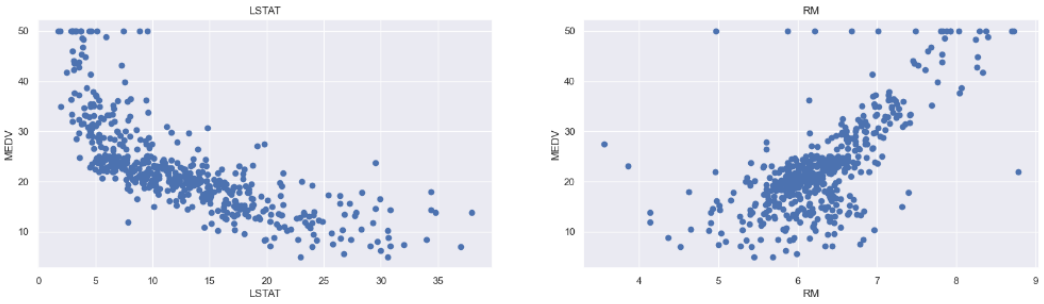
In [9]:
```
correlation_matrix = boston.corr().round(2)
```

In [10]:
```
sns.heatmap(data = correlation_matrix, annot=True)
```

Out[10]: <AxesSubplot:>



In [15]:
```
plt.figure(figsize=(20,5))

features = ["LSTAT", 'RM']
target = boston['MEDV']

for i, col in enumerate(features):
    plt.subplot(1,len(features) , i+1)
    x = boston[col]
    y = target
    plt.scatter(x,y,marker='o')
    plt.title(col)
    plt.xlabel(col)
    plt.ylabel('MEDV')
```



In [19]:
```
X = pd.DataFrame(np.c_[boston['LSTAT'],boston['RM']], columns = ['LSTAT','RM'])
Y = boston['MEDV']
```

In [21]:
```
from sklearn.model_selection import train_test_split

X_train, X_test, Y_train, Y_test = train_test_split(X,Y,test_size = 0.2,random_state=20)
print(X_train.shape)
print(X_test.shape)
print(Y_train.shape)
print(Y_test.shape)
```

```
(404, 2)
(102, 2)
(404,)
(102,)
```

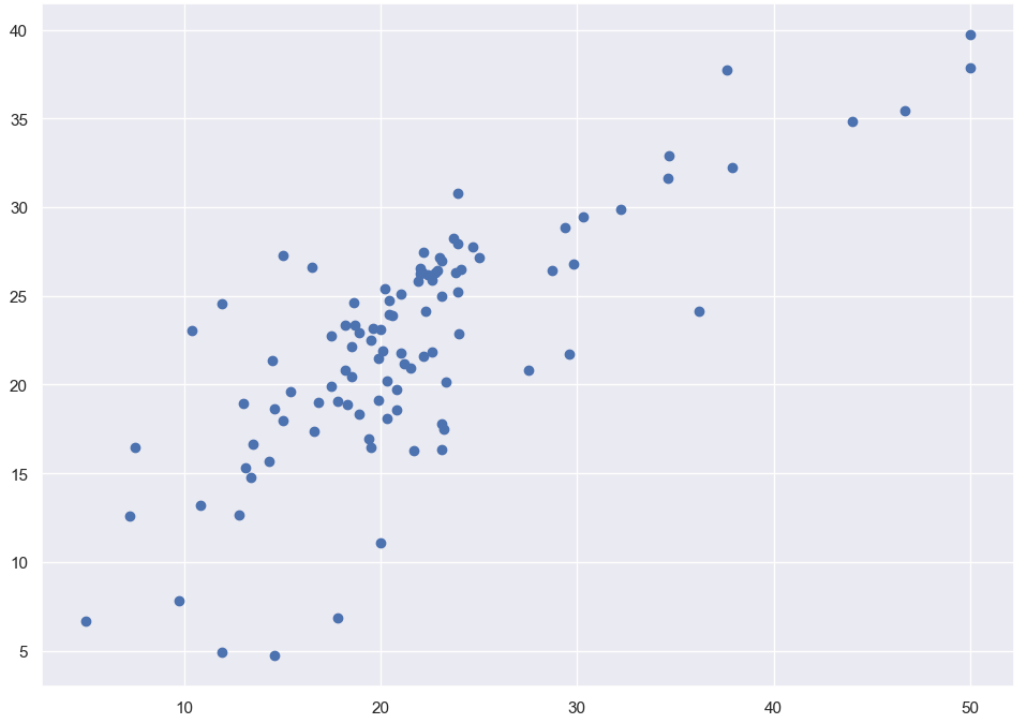
In [23]:
```
#Train the model using sklearnLinearRegression

from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error,r2_score

lin_model = LinearRegression()
lin_model.fit(X_train,Y_train)
```

Out[23]:
```
LinearRegression()
```

In [25]:
```
y_train_predict = lin_model.predict(X_train)
rmse = (np.sqrt(mean_squared_error(Y_train,y_train_predict)))
r2 = r2_score(Y_train,y_train_predict)

print("The model performance for testing set")
print("--------------------------------------")
print('RMSE is {}'.format(rmse))
print('R2 score is {}'.format(r2))


y_test_predict = lin_model.predict(X_test)

rmse = (np.sqrt(mean_squared_error(Y_test,y_test_predict)))

r2 = r2_score(Y_test, y_test_predict)

print("The model performance for testing set")
print("--------------------------------------")
print('RMSE is {}'.format(rmse))
print('R2 score is {}'.format(r2))
```

```
The model performance for testing set
--------------------------------------
RMSE is 5.612505753798557
R2 score is 0.6468915821243122
The model performance for testing set
--------------------------------------
RMSE is 5.175217627561771
R2 score is 0.5841519194311253
```

In [26]:
```
plt.scatter(Y_test,y_test_predict)
plt.show()
```



In [ ]: