```
import numpy as np
import matplotlib.pyplot as plt

import pandas as pd
import seaborn as sns

%matplotlib inline


boston_dataset = pd.read_csv("/content/BostonHousing.csv")


boston_dataset.head()
```

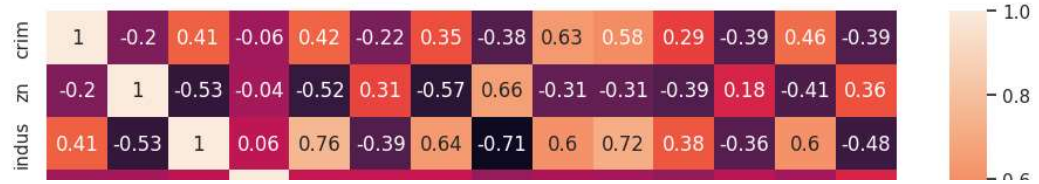
	crim	zn	indus	chas	nox	rm	age	dis	rad	tax	ptratio	b	lstat	medv
0	0.00632	18.0	2.31	0	0.538	6.575	65.2	4.0900	1	296	15.3	396.90	4.98	24.0
1	0.02731	0.0	7.07	0	0.469	6.421	78.9	4.9671	2	242	17.8	396.90	9.14	21.6
2	0.02729	0.0	7.07	0	0.469	7.185	61.1	4.9671	2	242	17.8	392.83	4.03	34.7
3	0.03237	0.0	2.18	0	0.458	6.998	45.8	6.0622	3	222	18.7	394.63	2.94	33.4
4	0.06905	0.0	2.18	0	0.458	7.147	54.2	6.0622	3	222	18.7	396.90	5.33	36.2

```
boston_dataset.isnull().sum()
```

```
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
```

```
correlation_matrix = boston_dataset.corr().round(2)
# annot = True to print the values inside the square
sns.heatmap(data=correlation_matrix, annot=True)
```

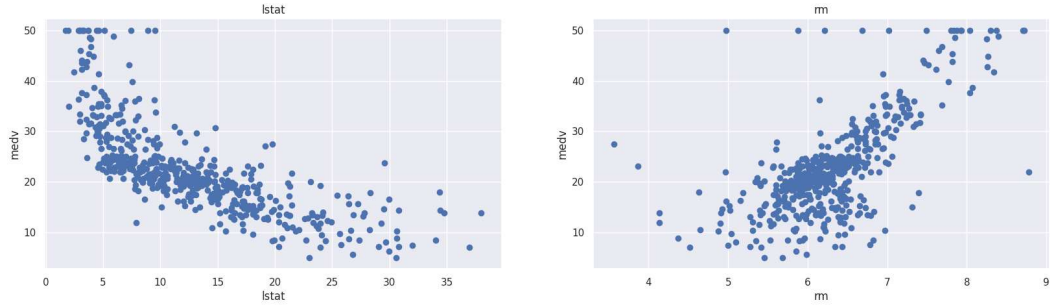
```
<Axes: >
```




```
plt.figure(figsize=(20, 5))

features = ['lstat', 'rm']
target = boston_dataset['medv']

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




```
X = pd.DataFrame(np.c_[boston_dataset['lstat'], boston_dataset['rm']], columns = ['lstat','rm'])
Y = boston_dataset['medv']


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=5)
print(X_train.shape)
print(X_test.shape)
print(Y_train.shape)
print(Y_test.shape)
```

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

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error
import statsmodels.api as sm

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

```
▾ LinearRegression
LinearRegression()
```

```
model = sm.OLS(Y_train, X_train).fit()


print(model.summary())
```

```
                            OLS Regression Results
==============================================================================================
Dep. Variable:                   medv   R-squared (uncentered):                   0.947
Model:                            OLS   Adj. R-squared (uncentered):              0.947
Method:                 Least Squares   F-statistic:                              3581.
Date:                Fri, 21 Apr 2023   Prob (F-statistic):                   6.67e-257
Time:                        04:07:20   Log-Likelihood:                         -1272.2
No. Observations:                 404   AIC:                                      2548.
Df Residuals:                     402   BIC:                                      2556.
Df Model:                           2
Covariance Type:            nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
lstat         -0.6911      0.036    -19.367      0.000      -0.761      -0.621
rm             4.9699      0.081     61.521      0.000       4.811       5.129
==============================================================================
Omnibus:                      121.894   Durbin-Watson:                   2.063
Prob(Omnibus):                  0.000   Jarque-Bera (JB):              389.671
Skew:                           1.370   Prob(JB):                     2.42e-85
Kurtosis:                       6.954   Cond. No.                         4.70
==============================================================================

Notes:
[1] R² is computed without centering (uncentered) since the model does not contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.
```