Biswas_Sayan_Project

September 23, 2019

[13]:

```
#Loading the data set

import pandas as pd

cols = list(pd.read_csv("kc_house_data.csv", nrows =1))
data = pd.read_csv("kc_house_data.csv", usecols =[i for i in cols if i not in␣
 ↪["id","date","zipcode"]])

data1 = data.drop(columns=['price'])

dict1={}

#computing  the average value, the min and max and variance values:

for col in data1.columns:
    if not "Feature" in dict1:
        dict1["Feature"] = [col]
    else:
        dict1["Feature"].append(col)
    if not "Average" in dict1:
        dict1["Average"] = [data1[col].mean()]
    else:
        dict1["Average"].append(data1[col].mean())
    if not "Min" in dict1:
        dict1["Min"] = [data1[col].min()]
    else:
        dict1["Min"].append(data1[col].min())
    if not "Max" in dict1:
        dict1["Max"] = [data1[col].max()]
    else:
        dict1["Max"].append(data1[col].max())
    if not "Variance" in dict1:
        dict1["Variance"] = [data1[col].var()]
    else:
        dict1["Variance"].append(data1[col].var())
```

```
df = pd.DataFrame(dict1)
df
```

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```
         Feature       Average        Min           Max      Variance
0       bedrooms      3.370842     0.0000  3.300000e+01  8.650150e-01
1      bathrooms      2.114757     0.0000  8.000000e+00  5.931513e-01
2    sqft_living   2079.899736   290.0000  1.354000e+04  8.435337e+05
3       sqft_lot  15106.967566   520.0000  1.651359e+06  1.715659e+09
4         floors      1.494309     1.0000  3.500000e+00  2.915880e-01
5     waterfront      0.007542     0.0000  1.000000e+00  7.485226e-03
6           view      0.234303     0.0000  4.000000e+00  5.872426e-01
7      condition      3.409430     1.0000  5.000000e+00  4.234665e-01
8          grade      7.656873     1.0000  1.300000e+01  1.381703e+00
9     sqft_above   1788.390691   290.0000  9.410000e+03  6.857347e+05
10  sqft_basement    291.509045     0.0000  4.820000e+03  1.958727e+05
11      yr_built   1971.005136  1900.0000  2.015000e+03  8.627973e+02
12  yr_renovated     84.402258     0.0000  2.015000e+03  1.613462e+05
13           lat     47.560053    47.1559  4.777760e+01  1.919990e-02
14          long   -122.213896  -122.5190 -1.213150e+02  1.983262e-02
15  sqft_living15   1986.552492   399.0000  6.210000e+03  4.697612e+05
16     sqft_lot15  12768.455652   651.0000  8.712000e+05  7.455182e+08
```

[14]:

```
## Feaure with Minimum Variance
df.loc[df['Variance'] == df["Variance"].min()]
```

[14]:

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      Feature   Average  Min  Max  Variance
5  waterfront  0.007542  0.0  1.0  0.007485
```

[15]:

```
## Feature with Maximum Variance
df.loc[df['Variance'] == df["Variance"].max()]
```

[15]:

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    Feature       Average    Min        Max      Variance
3  sqft_lot  15106.967566  520.0  1651359.0  1.715659e+09
```

[26]:

```
#Correlation of the features with response
corr_data = data.corr(method="pearson")
corr_data.iloc[0:1,1:]
```

[26]:

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       bedrooms  bathrooms  sqft_living  sqft_lot    floors  waterfront  \
price   0.30835   0.525138     0.702035  0.089661  0.256794    0.266369

           view  condition     grade  sqft_above  sqft_basement  yr_built  \
price  0.397293   0.036362  0.667434    0.605567       0.323816  0.054012

       yr_renovated       lat      long  sqft_living15  sqft_lot15
price      0.126434  0.307003  0.021626       0.585379    0.082447
```

[22]:

```
# Positive and negative correlation

temp = corr_data.iloc[0:1,1:]
```

```
positive_correlation =[]
negative_correlation = []

for i in temp:
    coeff = temp[i]
    if coeff[0]> 0 :
        positive_correlation.append(i)
    else:
        negative_correlation.append(i)

print("Positive Correlation:", positive_correlation)
print("Negative Correlation:", negative_correlation)
```

```
Positive Correlation: ['bedrooms', 'bathrooms', 'sqft_living', 'sqft_lot',
'floors', 'waterfront', 'view', 'condition', 'grade', 'sqft_above',
'sqft_basement', 'yr_built', 'yr_renovated', 'lat', 'long', 'sqft_living15',
'sqft_lot15']
Negative Correlation: []
```

[25]:

```
# Maximum correlated feature

temp = corr_data.iloc[0:1,1:]
max_corr_feature = temp.idxmax(axis=1)[0]
max_corr_value = temp.max(axis=1)[0]

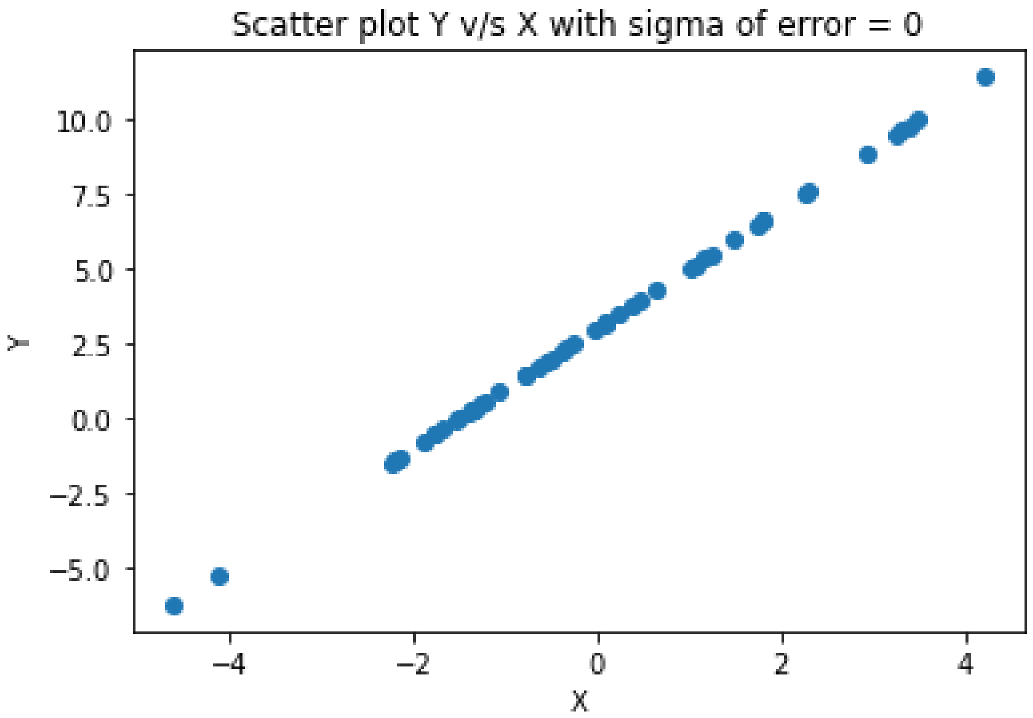

print("Maximum correlated feature: "+ max_corr_feature)
```

```
Maximum correlated feature: sqft_living
```

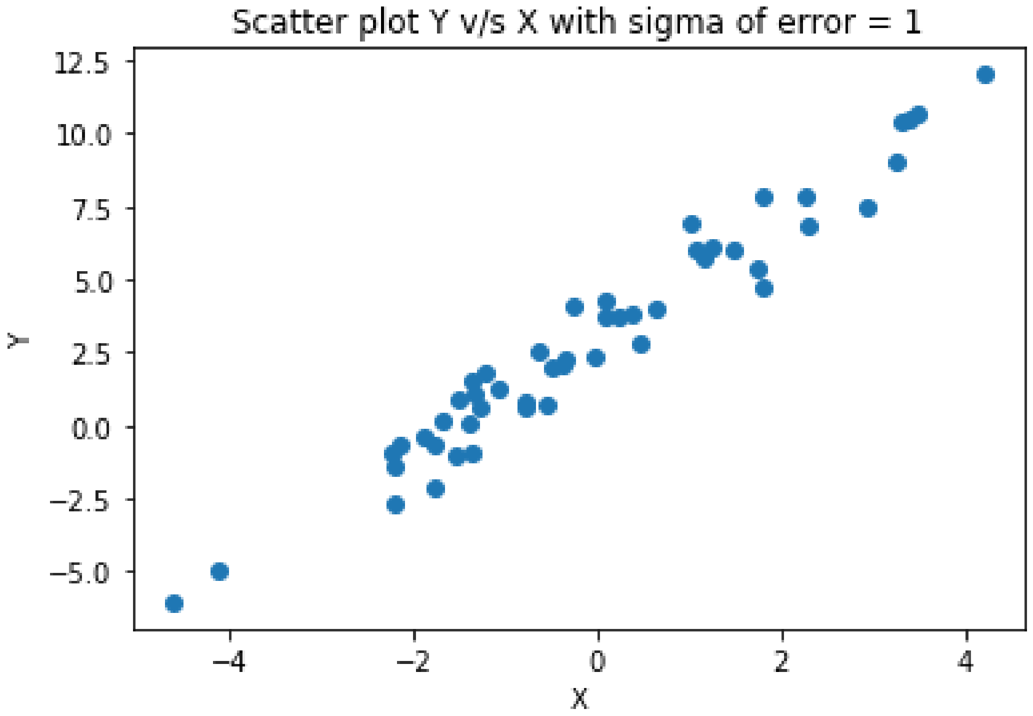
[23]:

```
# importing the required module

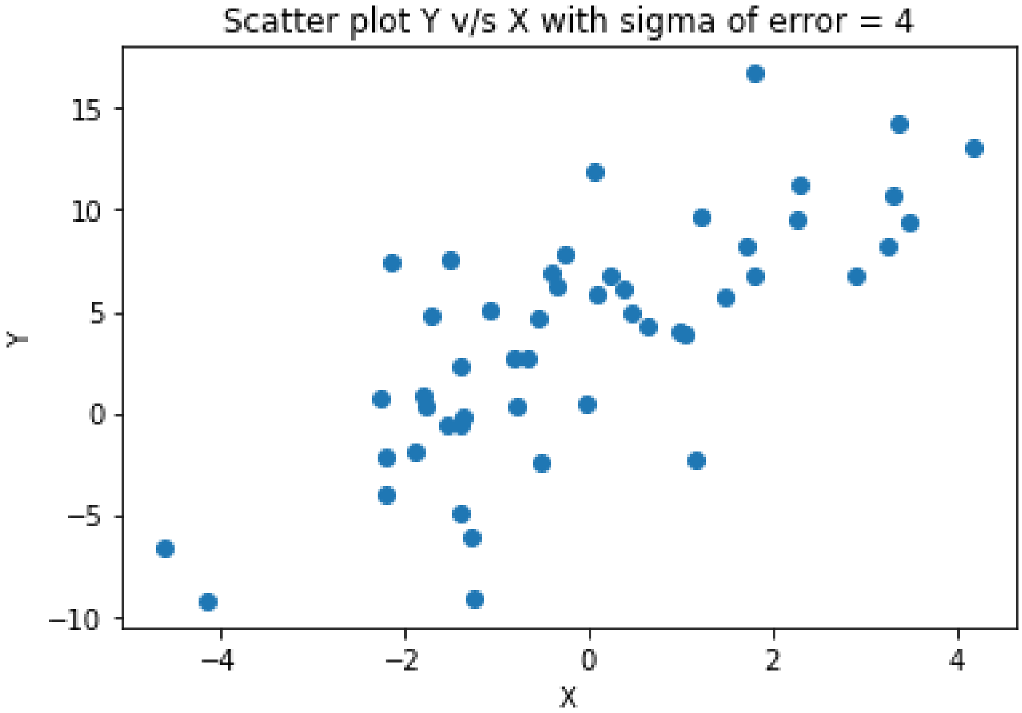
import matplotlib.pyplot as plt
import numpy as np
mu, sigma = 0,2
np.random.seed(1)
X = np.random.normal(mu,sigma,50)
for i in [0,1,4]:
    e = np.random.normal(mu,i,50)
    Y = 3 + 2*X + e
    plt.scatter(X,Y)
    title = "Scatter plot Y v/s X with sigma of error = " + str(i)
    plt.title(title)
    plt.xlabel('X')
    plt.ylabel('Y')
    plt.show()
```



Scatter plot Y v/s X with sigma of error = 0
10.0
7.5
5.0
2.5
0.0
−2.5
−5.0
Y
−4
−2
0
2
4
X



Scatter plot Y v/s X with sigma of error = 1
12.5
10.0
7.5
5.0
2.5
0.0
−2.5
−5.0
Y
−4
−2
0
2
4
X



[24]:
```
# Correlation for different values of sigma of error

from scipy.stats import pearsonr
mu, sigma = 0,2
np.random.seed(1)
X = np.random.normal(mu,sigma,50)

for i in [0,1,4]:
    e = np.random.normal(mu,i,50)
    Y = 3 + 2*X + e
    # calculate Pearson's correlation
    corr, _ = pearsonr(X, Y)
    print('Pearsons correlation when sigma of error is %s  : %.3f' %(i,corr))
```

```
Pearsons correlation when sigma of error is 0  : 1.000
Pearsons correlation when sigma of error is 1  : 0.976
Pearsons correlation when sigma of error is 4  : 0.743
```

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