Chapter 3 - Regressoin Models

Segment 1 - Simple linear regression

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import sklearn

from pylab import rcParams

from sklearn.linear_model import LinearRegression
from sklearn.preprocessing import scale


%matplotlib inline
rcParams['figure.figsize'] = 10,8


np.random.seed(25)
rooms = 2*np.random.rand(100)+3
rooms[1:10]
```

```
array([4.16455386, 3.55767788, 3.37182246, 3.82220026, 3.23475109,
       4.36993749, 3.87522212, 4.11245865, 3.73416064])
```

```
price = 265 + 6*rooms+abs(np.random.randn(100))
p=price.reshape(1,-1)
price
p
```

```
array([[294.54733464, 290.92244306, 287.46154998, 287.48069695,
        289.24033634, 285.19691813, 291.66071605, 288.32489352,
        290.48685276, 288.32110989, 289.4021029 , 284.66599628,
        288.86435744, 290.2129355 , 285.502734  , 290.15187138,
        287.23051461, 292.20003209, 288.52498211, 294.55332025,
        288.96285059, 289.86618498, 288.72883683, 295.21713907,
        290.02610089, 290.44092194, 284.34519874, 292.95784409,
```

```
              289.25046023, 289.39253901, 286.96673023, 294.9752295 ,
              291.64307824, 291.22657165, 287.95693952, 290.44619304,
              289.73138941, 292.26384994, 294.89591042, 293.54473528,
              285.47105471, 290.93886428, 286.7283544 , 290.9257305 ,
              295.09635381, 294.06140079, 286.56890408, 289.37405827,
              284.23540069, 290.72809653, 284.65027998, 292.7642411 ,
              284.59047367, 287.57414344, 291.66187516, 289.78881029,
              293.7688621 , 291.94256759, 292.02628567, 289.28273861,
              287.97432008, 293.49474216, 291.77656489, 285.12130257,
              294.10615941, 288.68301318, 288.82994491, 294.33479731,
              289.73974923, 286.44306091, 283.58561813, 287.26456541,
              290.37300199, 285.7060786 , 293.0936355 , 293.71774735,
              285.86666333, 293.60422431, 287.96236618, 290.16792349,
              286.38263148, 294.169952  , 292.39406385, 291.76243962,
              284.45498004, 291.45769804, 284.34847678, 293.41099834,
              285.66585628, 290.54319841, 285.17350098, 292.49340293,
              283.5945632 , 292.56966071, 292.29928298, 291.28057776,
              285.13259408, 295.09442483, 285.3015623 , 290.05609286]])


plt.plot(rooms, price,'r^')
plt.xlabel("# of Rooms, 2019 Average")
plt.ylabel("2019 Average Home, 1000s USD")
plt.show()
```


```
X = rooms
y = price

LinReg = LinearRegression()
LinReg.fit(X,y)
print(LinReg.intercept_, LinReg.coef_)
LinReg=LinearRegression()
LinReg.fit(X,y)
sklearn.linear_model.LinearRegression()
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
<ipython-input-11-d3ba8db1b871> in <module>()
      3
      4 LinReg = LinearRegression()
----> 5 LinReg.fit(X,y)
      6 print(LinReg.intercept_, LinReg.coef_)
      7 LinReg=LinearRegression()
```

3 frames

```
/usr/local/lib/python3.7/dist-packages/sklearn/utils/validation.py in check_array(array, accept_sparse, accept_large_sparse,
dtype, order, copy, force_all_finite, ensure_2d, allow_nd, ensure_min_samples, ensure_min_features, estimator)
```

Simple Algebra

- y = mx + b
- b = intercept = 265.7

Estimated Coefficients

- LinReg.coef_ = [5.99] Estimated coefficients for the terms in the linear regression problem.

```
3.7227891  4.67274902 3.96268589 4.0320046  3.76609626 4.09508179
```

```
print(LinReg.score(X,y))
LinReg.score(X,y)
```

```
0.9595166940553669
0.9595166940553669
```

```
3.79308326 4.65027793 4.42510351 3.1958743  4.68430852 3.88164218


 3.6707317  3.94479591 3.43012874 4.824188   4.5184153  4.35312272
 3.04275256 4.32174865 3.18887918 4.66232514 3.22549808 4.13365922
 3.34925217 4.58121326 3.0673656  4.59194236 4.37887455 3.98369133
 3.17710754 4.87510053 3.16872445 3.93878734].
Reshape your data either using array.reshape(-1, 1) if your data has a single feature or array.reshape(1, -1) if it contains a
single sample.
```

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