

Session 2 - Simple Linear Regression

September 5, 2018

1 Python Training: Day 3 Session 2

References:

- http://scikit-learn.org/stable/auto_examples/linear_model/plot_ols.html

1.1 3.2.1 Numpy Basics

```
In [ ]: import numpy as np

In [ ]: x = np.array([[1,2],[3,4]])

In [ ]: x

In [ ]: x[0,0]

In [ ]: x[1,1]

In [ ]: y = np.ones((2,2))

In [ ]: y

In [ ]: x + y

In [ ]: x * y

In [ ]: print(x.shape)
        print(x.dtype)
        print(y.shape)
        print(y.dtype)

In [ ]: z = np.array([[1,2,3],[4,5,6],[7,8,9]])

In [ ]: z[0,1]

In [ ]: z[0:3,1]
```

1.2 3.2.2 Simple Linear Regression

```
In [ ]: import matplotlib.pyplot as plt
import numpy as np
from sklearn import linear_model
from sklearn.metrics import mean_squared_error, r2_score

In [ ]: X = np.array([[3.],[2.],[6.],[5.],[8.],[8.5],[10.1]])
Y = np.array([1, 2, 4, 3.5, 5, 6, 6.5])

In [ ]: print(X)
print(Y)

In [ ]: regr = linear_model.LinearRegression()

In [ ]: regr.fit(X, Y)

In [ ]: Predictions = regr.predict(X)

In [ ]: print(Predictions)

In [ ]: print("Coefficients: ")
print(regr.coef_)
print("Mean squared error: ", mean_squared_error(Y, Predictions))
print("Variance score: ", r2_score(Y, Predictions))

In [ ]: plt.scatter(X, Y, color='blue')
plt.plot(X, Predictions, color='green', linewidth=2)

plt.xticks((0,2,4,6,8,10))
plt.yticks((0,2,4,6,8,10))

plt.show()
```