

Numpy Advanced

May 29, 2019

Numpy - Advanced

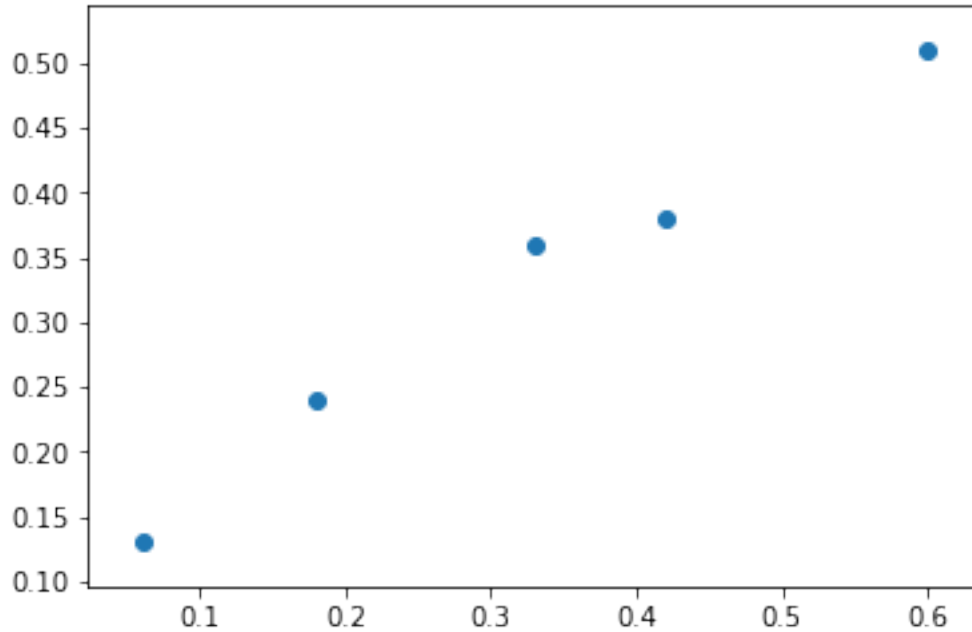
```
In [1]: #covariance and correlation
        from numpy import array
        from numpy import cov
        from numpy import corrcoef
        x = array([1,2,3,4,5,6,7,8,9])
        print(x)
        y = array([9,8,7,6,5,4,3,2,1])
        print(y)
        print(cov(x,y))
        print(corrcoef(x,y))
```

```
[1 2 3 4 5 6 7 8 9]
[9 8 7 6 5 4 3 2 1]
[[ 7.5 -7.5]
 [-7.5  7.5]]
[[ 1. -1.]
 [-1.  1.]]
```

```
In [4]: from numpy import array
        from matplotlib import pyplot
        data = array([
            [0.06, 0.13],
            [0.18, 0.24],
            [0.33, 0.36],
            [0.42, 0.38],
            [0.6, 0.51],
        ])
        print(data)
        X, y = data[:,0], data[:,1]
        X = X.reshape((len(X), 1))
        pyplot.scatter(X, y)
        pyplot.show()
```

```
[[0.06 0.13]
 [0.18 0.24]
```

```
[0.33 0.36]
[0.42 0.38]
[0.6 0.51]]
```



```
In [3]: #regression problem
from numpy import array
from numpy.linalg import inv
from matplotlib import pyplot
data = array([
    [0.06, 0.13],
    [0.18, 0.24],
    [0.33, 0.36],
    [0.42, 0.38],
    [0.6, 0.51],
])
print(data)
X, y = data[:,0], data[:,1]
X = X.reshape((len(X), 1))
b = inv(X.T.dot(X)).dot(X.T).dot(y)
print(b)
ydash = X.dot(b)
pyplot.scatter(X, y)
pyplot.plot(X, ydash, color='red')
pyplot.show()
```

```
[0.06 0.13]  
[0.18 0.24]  
[0.33 0.36]  
[0.42 0.38]  
[0.6 0.51]  
[0.9326288]
```

