Moments

December 20, 2016

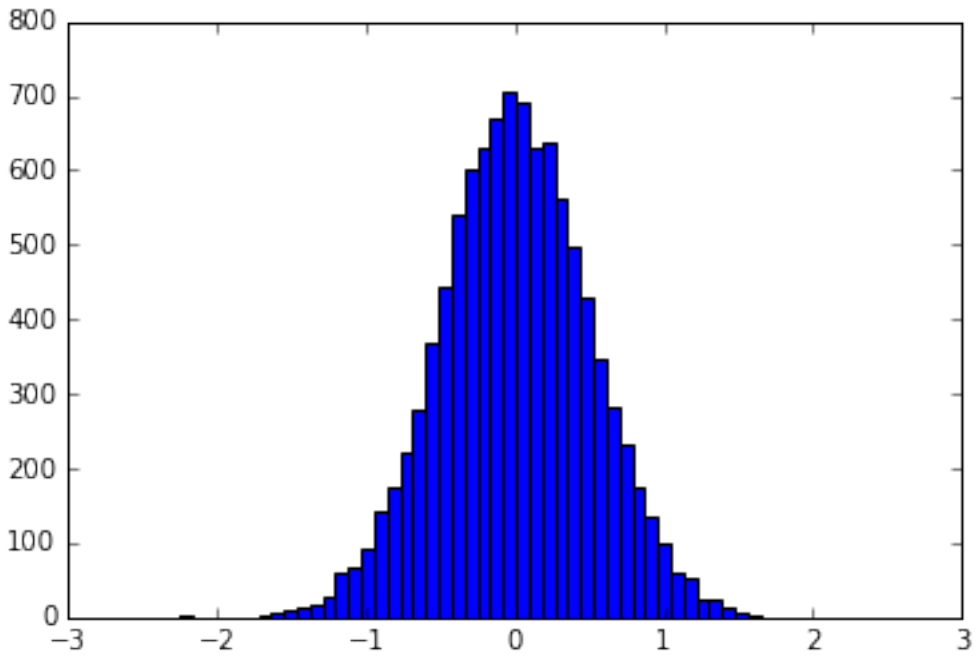
1 Moments: Mean, Variance, Skew, Kurtosis

Create a roughly normal-distributed random set of data:

```
In [1]: %matplotlib inline
        import numpy as np
        import matplotlib.pyplot as plt

        vals = np.random.normal(0, 0.5, 10000)

        plt.hist(vals, 50)
        plt.show()
```



The first moment is the mean; this data should average out to about 0:

```
In [2]: np.mean(vals)
```

```
Out[2]: -0.0012769999428169742
```

The second moment is the variance:

```
In [3]: np.var(vals)

Out[3]: 0.25221246428323563
```

The third moment is skew - since our data is nicely centered around 0, it should be almost 0:

```
In [4]: import scipy.stats as sp
        sp.skew(vals)

Out[4]: -0.008980636867783907
```

The fourth moment is "kurtosis", which describes the shape of the tail. For a normal distribution, this is 0:

```
In [5]: sp.kurtosis(vals)

Out[5]: 0.03835189521757343
```

1.1 Activity

Understanding skew: change the normal distribution to be centered around 10 instead of 0, and see what effect that has on the moments.

The skew is still near zero; skew is associated with the shape of the distribution, not its actual offset in X.

```
In [ ]:
```