

## 7.4 Parameter ESTIMATION

### Parameter ESTIMATION: MLE and Map

It is a process of finding parameter, e.g., mean, variance, of a distribution of the input data. Usually, we know the distribution which explains the data, e.g., whether it follows a normal distribution, binomial distribution, or Poisson distribution, but we don't know the parameters of the distribution, i.e., mean and standard deviation in case of normal distribution and  $\lambda$  (the rate parameter) in the case of Poisson distribution.

**Example :** A sample of 1000 input data is generated according to the normal distribution with mean zero and standard deviation 2.5.



```
import numpy as np
#generate 1000 random variable
rv= np.random.normal(0,2.5,1000) # first parameter is mean=0, second is SD=2.5 and third is sample
size=1000
#rv is a numpy ndarray
```

**Parameter Estimation Problem:** We are given “rv” and the knowledge that the data has been generated using normal distribution and our task is to find out parameters of the distribution i.e. mean or/and standard deviation of “rv”.

The task to determine parameters of a distribution can be done either by MLE or by MAP.