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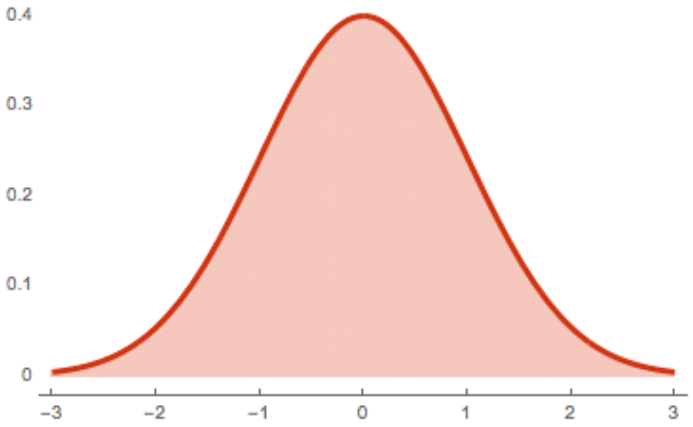
NORMAL DISTRIBUTION



- Its is Symmetrical in shape.
- Its also called as Bell curve.
- Being X variable is continues we can have -infinity to +infinity.

Probability distribution function is given by

$$p(X)=\frac{1}{\sqrt{2\pi\sigma^2}}\quad e^{\frac{-(X-\mu)^2}{2\sigma^2}}$$

- X follows Normal (μ, δ^2)
- E(X) = μ, V(X) = δ^2
- E(Z) = 0, V(Z) = 1
- If X$\sim N(\mu, \delta^2), Z \sim N(0,1)$ *then Z is called Standard Normal Variate.*
- Converting X in to Z is called Standardization of the data.
- Every distribution is going to have a parameters, if you know how your parameters are working you can estimate about your population data. So, Parameters are going to play a vital role to understand how is your data behaving.
- If you know parameters, you can also generate your own data set.
- So, Knowing the parameters are nothing but the knowing the population behaviour.

Areas under the Normal Curve

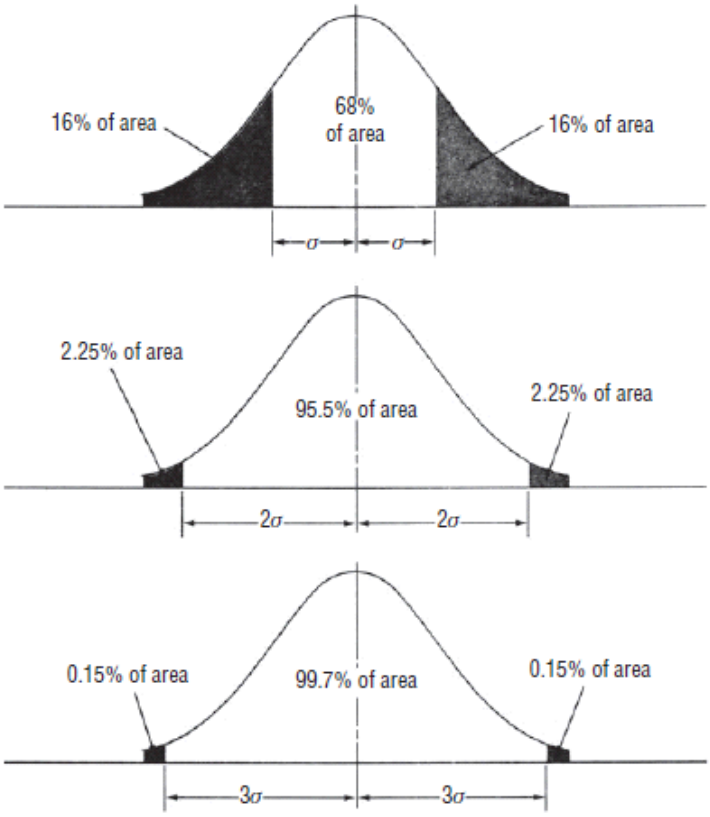
No matter what the values of μ and σ are for a normal probability distribution, the total area under the normal curve is 1.00, so that we may think of areas under the curve as probabilities.

Mathematically, it is true that

1. Approximately 68 % of all the values in a normally distributed population lie within ±1 standard deviation from the mean.

2. Approximately 95.5 % of all the values in a normally distributed population lie within ±2 standard deviations from the mean.

3. Approximately 99.7 % of all the values in a normally distributed population lie within ±3 standard deviations from the mean.



1. In real world, many of the variables studied tend to be normally distributed. Variables that are not normally distributed can be brought into Normal distribution by simple transformation of the variable. It also helps to study many discrete variables, as the sample size gets larger.
2. It helps quality control, cost management, and business operations by helping to determine the most sensitive part of the variable.
3. Sampling, test of hypothesis and other important statistical tools applied for decision-making are based on the assumption that samples have been drawn from a normally distributed population. Thus, Normal distribution serves as the base of other statistical tools