# <u>Glossary</u>

## 1. Central Limit Theorem

In probability theory, the central limit theorem (CLT) states that, given certain conditions, the mean of a sufficiently large number of independent random variables, each with finite mean and variance, will be approximately normally distributed. The central limit theorem has a number of variants. In its common form, the random variables must be identically distributed. In variants, convergence of the mean to the normal distribution also occurs for non-identical distributions, given that they comply with certain conditions.

## 2. Constant

Constant is something that is unchanging or invariable, or that is continually occurring.

## 3. Estimate

An estimate is a specific observed value of a statistic.

## 4. Expected Value

The expected value (or population mean) of a random variable indicates its average or central value. It is a useful summary value (a number) of the variable's distribution. Stating the expected value gives a general impression of the behaviour of some random variable without giving full details of its probability distribution (if it is discrete) or its probability density function (if it is continuous).Two random variables with the same expected value can have very different distributions. The expected value of a random variable X is symbolized by E(X) or  $\mu$ 

#### 5. Mean

The mean of a statistical distribution with a continuous random variable, also called the expected value, is obtained by integrating the product of the variable with its probability as defined by the distribution. The expected value is denoted by the lower case Greek letter mu ( $\mu$ ).

#### 6. Modulus

In mathematics, the absolute value (or modulus) |a| of a real number 'a' is the numerical value of a without regard to its sign. So, for example, the absolute value of 3 is 3, and the absolute value of -3 is also 3. The absolute value of a number may be thought of as its distance from zero.

#### 7. Normal distribution

In probability theory, the normal (or Gaussian) distribution is a continuous probability distribution that has a bell-shaped probability density function, known as the Gaussian function or informally as the bell curve

#### 8. Probability density function

Probability density function (pdf), or density of a continuous random variable, is a function that describes the relative likelihood for this random variable to take on a given value. The probability for the random variable to fall within a particular region is given by the integral of this variable's density over the region.

## 9. Probability Distribution

Probability distribution is a function that gives the probability of all elements in a given space.

## 10. Random Variable

In probability and statistics, a random variable or stochastic variable is a variable whose value is subject to variations due to chance (i.e. randomness, in a mathematical sense). As opposed to other mathematical variables, a random variable conceptually does not have a single, fixed value rather; it can take on a set of possible different values, each with an associated probability.

## **11. Standard Deviation**

This is the most commonly used measure of statistical dispersion. It is the square root of the variance, and is generally written as sigma.

#### 12. Substitution

The replacement of a term of an equation by another that is known to have the same value in order to simplify the equation. Substitution of variables (also called variable substitution or coordinate transformation) refers to the substitution of certain variables with other variables.

#### 13. Summation

Summation is the operation of adding a sequence of numbers; the result is their sum or total.

#### 14. Variance

The variance is a measure of how far a set of numbers is spread out. It is one of several descriptors of a probability distribution, describing how far the numbers lie from the mean (expected value). In particular, the variance is one of the moments of a distribution.

#### 15. Weak Law of Large Numbers

In probability theory, the law of large numbers (LLN) is a theorem that describes the result of performing the same experiment a large number of times. According to the law, the average of the results obtained from a large number of trials should be close to the expected value, and will tend to become closer as more trials are performed.