Normal Distribution

It is a distribution that is symmetric about the mean, depicting that data near the mean are more frequent in occurrence than data far from the mean. continuous probability

A bell-shaped, continuous probability distribution.

- **Key Features:**
- Symmetrical around the mean.
- Defined by the **mean (μ)** and **standard deviation (σ)**.

Types of Normal Distribution

- **Standard Normal Distribution**

Characteristics:

- Mean(u) = 0
- Standard deviation(o) = 1

Use:

- Simplifies calculations in statistics.
- Values are converted to Z-scores

Graph: Standard bell curve

Multivariate Normal Distribution

- **Definition:**
  Extends the normal distribution to multiple variables.
- **Characteristics:**
  Describes the behavior of multiple normally distributed random variables.
  Each variable has its own mean and standard deviation.
  Linear relationships exist between variables.
- **Used in:**
  Machine learning, multivariate statistics.

Truncated Normal Distribution

- **Definition:**
  A normal distribution that is "cut off" or truncated at certain points.

- **Characteristics:**
  - Values are restricted to a specific range.
  - Tail regions outside the range are excluded.

- **Use Cases:** Modeling data that has natural bounds (e.g., heights, scores).

Skewed Normal Distribution

- **Definition:** A distribution that introduces skewness to the normal distribution.

- **Characteristics:**
  - Adjusts for asymmetry in the data.
  - Allows for distributions where one tail is longer than the other.

- **Use Cases:** When data is not perfectly symmetrical (e.g., income distributions).