

1 Define Mean, Median, Mode with an example in the context of employee salaries

### → Mean

The mean is the average of all values

Formula :-

$$\text{Mean} = (\text{sum of all salaries}) / (\text{Number of employees})$$

Example :

Salaries = ₹ 30,000; ₹ 40,000; ₹ 50,000

$$\text{Mean} = 30,000 + 40,000 + 50,000 / 3 = 40,000$$

Show average salary in the data

### Median

The median is the middle value when data is arranged in order

Example

Salaries = ₹ 30,000, ₹ 40,000, ₹ 10,00,000

$$\text{Median} = ₹ 40,000$$

Useful when there are very high or very low salaries, or it avoids distortion

### Mode

The mode is the value that occurs most frequently

Example :

Salaries = ₹ 40,000, ₹ 40,000, ₹ 50,000, ₹ 60,000

$$\text{Mode} = ₹ 40,000$$

Indicates the most common salary paid to ~~to~~ employees

2 Difference between Range and Variance with examples

→ Feature Range Variance

Meaning

Difference between highest & lowest value

Measure of spread around the mean

Example

$\text{Max} - \text{Min}$

Average dispersion deviation

Sensitivity Highly affected

more stable

Variance gives a better picture of salary distribution

3 What is difference between Normal Distribution and Poission Distribution?

Normal Distribution

Poisson Distribution

Continuous data

Discrete data

Bell-shape curve

Right-skewed

used for measurement

used for counts

$\text{Mean} = \text{Median} = \text{Mode}$

$\text{Mean} \neq \text{Mode}$

4 Skewness with example

Skewness measures the asymmetry of data distribution

## Types

Positive skew: Tail on right

Negative skew: Tail on left

Workplace examples:

most employees earn 40,000 - 60,000  
and a few employ each  
2,00,000

→ Salary distribution become positively skewed

## \* Conditional Prob Probability & Promotions

Conditional Probability is the probability of an event or event occurring given that another event has already occurred

Formula

$$P(A|B) = P(A \cap B) / P(B)$$

Probability that an employee is promoted given they scored over 80

## 6 Independent vs Mutually Exclusive Events

### Independent Events

one event does not effect the others

Example

Employee working in I T department

Employee getting Sick leave

Both are unrelated

### Mutually exclusive events

Two events cannot happen at the same time

Example :

Employee is Promoted

Employee is Not Promoted

only one can occur

## 7 Bayes Theorem in real life

- Bayes theorem helps us update probabilities when new information becomes available.

Examples (HR):

- Initially, Probability of Promotion = 30%
- After seeing high performance score → Probability increases

used in

Promotion decision

Error detection

## 8 PCA

PCA is a technique used to reduce large dataset into fewer important features without losing much information.

In simple words

PCA keeps the pattern or

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Makes Data easier to analysis  
Visualise; Process, ML model