

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

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

Shows average salary in the data

Median

The median is the middle value ^{when data} ~~is~~ is arranged in order

Example

Salaries = £30,000, £40,000, £100,000

$$\text{Median} = £40,000$$

Useful when there are very high or very low salaries, as 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 ~~the~~ employees

2 Difference between Range and Variance with examples

Feature	Range	Variance
Meaning	Difference between highest & lowest value	Measure of spread around the mean
Formula	$Max - Min$	Average of squared deviation
Sensitivity	Highly affected	more stable

Variance gives a better picture of spread distribution

3 What is difference between Normal Distribution and Poisson Distribution?

Normal Distribution	Poisson Distribution
Continuous data	Discrete data
Bell-shape curve	Right-skewed
used for measurement	used for counts

Mean = Median = Mode

Mean \neq Mode

4 Skewness what 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 employees earn
 2,000,000

→ Salary distribution become positively skewed

* Conditional Probability & Promotions

Conditional Probability is the probability of an 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 80

6 Independent Vs Mutually Exclusive Events

o Independent Events

one event does not effect the others

Example

Employee working in IT department

Employee getting Sick leave

Both are unrelated

o 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 updates probability when new information becomes available

Examples (HR) :

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

used in

Promotion decision

Evil 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 Posters on

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Makes Data easier to analysis
Visualize, Process, ML Model