

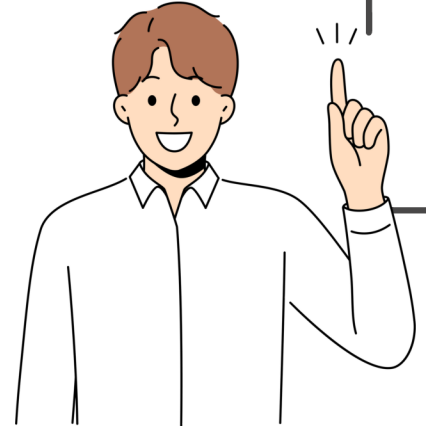


STATISTICS

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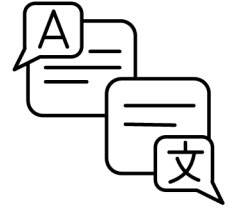
OUT LINE

- What is Statistics?
Understanding the definition and purpose of statistics.
- Importance of Statistics
Why statistics matters in everyday life and various fields.
- Types of Statistics
Descriptive vs. Inferential—two key branches.
- Population vs Sample
The difference and why sampling is useful.
- Types of Data
Qualitative vs. Quantitative, Discrete vs. Continuous.
- Measures of Central Tendency
Mean, Median, and Mode explained simply.
- Measures of Dispersion
Range, Variance, and Standard Deviation.
- Uses of Statistics
Applications in business, education, government, and health.



STATISTICS:THE LANGUAGE OF DATA

- Statistics is the science of collecting, organizing, analyzing, and interpreting data.
- It helps us understand large amounts of information easily.
- Statistics is used to find patterns, averages, and trends in data.
- It plays an important role in decision-making in every field.
- Examples include exam results, population census, and weather reports.
- In short, statistics converts raw data into meaningful information.



TYPES OF STATISTICS

- Statistics has two main types: Descriptive and Inferential.
- Descriptive Statistics means showing data in tables, charts, graphs, or averages.
- It helps to describe and summarize the data.
- Inferential Statistics means using a sample to guess about the whole group.
- It helps to make predictions and decisions.
- Both types are used to understand data better.

POPULATION VS SAMPLE

- Population means the whole group we want to study.
Example: All students in a school.
- Sample means a small part taken from the population.
Example: Students from one class of the school.
- Studying a sample saves time and work.
- From a sample, we can guess about the whole population.





DATA TYPES

- Data means the information we collect.
- Qualitative Data shows qualities, like color, gender, or name.
- Quantitative Data shows numbers, like age, marks, or height.
- Quantitative data has two kinds: Discrete and Continuous.
- Discrete Data is countable, like number of students.
- Continuous Data is measurable, like weight or time.

MEASURES OF CENTRAL TENDENCY

- Central tendency means finding the middle or average value of data.
- Mean is the average of all numbers.
- Median is the middle value when numbers are arranged.
- Mode is the number that comes most often.
- These measures show the center of the data.
- They help us to quickly understand the data.



USES OF STATISTICS

- ➡ In Business: Forecasting sales and profits.
- ➡ In Education: Analyzing student performance.
- ➡ In Government: Census and policy making.
- ➡ In Health: Tracking diseases and treatments.



EXPLAIN HYPOTHESIS TESTING AND ITS STEPS.

- Hypothesis testing is a procedure to test assumptions about a population.

Steps:

- State null (H_0) and alternative (H_1).
- Choose significance level (α).
- Collect data & calculate test statistic.
- Compare with critical value or p-value.
- Accept/reject H_0 .

○ WHAT IS A NULL HYPOTHESIS AND AN ALTERNATIVE HYPOTHESIS?

- Null hypothesis (H_0): No effect or no difference. Example: "Average height = 170 cm."
- Alternative hypothesis (H_1): There is an effect or difference. Example: "Average height \neq 170 cm."

○ EXPLAIN P-VALUE IN HYPOTHESIS TESTING.

The p-value shows the probability of obtaining test results if H_0 is true.

- Small p-value ($< \alpha$): Reject H_0 , strong evidence against it.
- Large p-value ($> \alpha$): Fail to reject H_0 .

○ WHAT IS THE DIFFERENCE BETWEEN TYPE I AND TYPE II ERRORS?

- Type I error (α): Rejecting H_0 when it is true (false positive).
- Type II error (β): Failing to reject H_0 when it is false (false negative).

○ WHAT IS A CONFIDENCE INTERVAL, AND HOW IS IT INTERPRETED?

A confidence interval gives a range of values where the true population parameter lies with a certain confidence level.

Example: 95% CI = [45, 55] → We are 95% confident true mean lies between 45 and 55.

CONCLUSION

Statistics plays a vital role in understanding and interpreting data. It provides tools to summarize information, make predictions, test hypotheses, and support decision-making in real life. By learning concepts like descriptive and inferential statistics, measures of central tendency, probability, hypothesis testing, and regression, we gain the ability to analyze data scientifically. In short, statistics connects raw data with meaningful conclusions, making it one of the most important subjects in today's data-driven world.



THANK YOU

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