

What is the concept of Descriptive Statistics and how is it used in statistical analysis?

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Descriptive Statistics is a branch of statistics that deals with the collection, organization, and presentation of numerical data. It involves summarizing and describing the characteristics and patterns of a given dataset, such as measures of central tendency (mean, median, mode) and variability (range, standard deviation).

In statistical analysis, descriptive statistics is used to provide a clear and concise understanding of the data, allowing researchers to identify trends, patterns, and outliers. It also helps in making comparisons between different groups or variables and in making data-driven decisions. Additionally, descriptive statistics can be used to detect errors or anomalies in the data and to communicate the findings of a study in a meaningful and easily interpretable way. Overall, descriptive statistics plays a crucial role in understanding and analyzing data, making it an essential tool in the field of statistics.

Statistics - Descriptive Statistics

Descriptive statistics gives us insight into data without having to look at all of it in detail.

Key Features to Describe about Data

Getting a quick overview of how the data is distributed is an important step in statistical methods.

We calculate key numerical values about the data that tells us about the distribution of the data. We also draw graphs showing visually how the data is distributed.

Key Features of Data:

Where is the center of the data? (location) How much does the data vary? (scale) What is the shape of the data? (shape)

These can be described by **summary statistics** (numerical values).

The Center of the Data

The **center** of the data is where most of the values are concentrated.

Different kinds of averages, like mean, median and mode, are **measures** of the center.

Note: Measures of the center are also called **location parameters**, because they tell us something about where data is 'located' on a number line.

The Variation of the Data

The **variation** of the data is how spread out the data are around the center.

Statistics like standard deviation, range and quartiles are **measures** of variation.

Note: Measures of variation are also called **scale parameters**.

The Shape of the Data

The shape of the data can refer to the how the data are bunched up on either side of the center.

Statistics like **skew** describe if the right or left side of the center is bigger. Skew is one type of **shape parameters**.

Frequency Tables

One typical of presenting data is with **frequency tables**.

A **frequency table** counts and orders data into a table. Typically, the data will need to be sorted into intervals.

Frequency tables are often the basis for making graphs to visually present the data.

Visualizing Data

Different types of graphs are used for different kinds of data. For example:

Pie charts for qualitative data
Histograms for quantitative data
Scatter plots for bivariate data

Graphs often have a close connection to numerical summary statistics.

For example, box plots show where the **quartiles** are.

Quartiles also tell us where the minimum and maximum values, range, interquartile range, and median are.

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