Chapter 16

Statistics

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INTRODUCTION

Statistics is the discipline that involves gathering, arranging, and interpreting numerical information, commonly referred to as data. Data can be synonymous with terms such as scores, measurements, and observations. The exploration and gathering of data include categorizing it into different categories. This process extensively utilizes numerical representations to measure characteristics, commonly referred to as measurement. Essentially, data comprises measurements related to a situation under consideration

Example: The recorded heights of all living being worldwide constitute data. Variables refer to numerical characteristics. Numerous observations on a single variable can be condensed into a frequency table. Any discernible pattern of fluctuation is denoted as a distribution.

Measures of central tendency

The central tendency measures most frequently employed are:

- The mode
- The median
- The arithmetic mean

1. The Mode

The mode is the value that occurs most frequently in the distribution of a variable.

2. The Median

The median is the central point in a set of measures arranged in rank order. For an odd number of observations, the median corresponds to the $\left(\frac{n+1}{2}\right)^{th}$ observation. In the case of an even number of observations, the median is the average of the $\left(\frac{n}{2}\right)^{th}$ and $\left(\frac{n}{2}+1\right)^{th}$ observations.

3 The Arithmetic Mean

The arithmetic mean is calculated by summing the values and dividing the result by the total number of values, represented as, $X = \left(\frac{\sum x_i}{N}\right)$. Unlike the median, which is the middle of the distribution, the mean is the point in a distribution where deviations from it sum to zero. A deviation score (x) is the distance between a value and its mean, and can be either positive (+) or negative (-). In this context, the mean serves as a centroid.

However, it's important to note that measures of central tendency alone may not provide complete information about the given data. Another crucial aspect to consider is "variability," which falls under the study of statistics. The single number that characterizes variability is referred to as 'Measures of dispersion.'

MEASURES OF DISPERSION

Dispersion refers to the degree of "scatteredness" in a dataset, measuring how much the variable deviates from a central value. The measures of dispersion include the following:

- Range
- Quartile deviation
- Mean deviation
- Variance
- Standard deviation.

In this chapter, we will examine all the measures of dispersion, excluding the Quartile deviation.