

Measures of Central Tendency: Mean, Mode, Median

Introduction:

- ❖ Measures of central tendency are statistical measures which describe the position of a distribution.
- ❖ They are also called statistics of location, and are the complement of statistics of dispersion, which provide information concerning the variance or distribution of observations.
- ❖ In the univariate context, the mean, median and mode are the most commonly used measures of central tendency.
- ❖ computable values on a distribution that discuss the behavior of the center of a distribution.

Measures of Central Tendency:

The value or the figure which represents the whole series is neither the lowest value in the series nor the highest it lies somewhere between these two extremes.

1. The average represents all the measurements made on a group, and gives a concise description of the group as a whole.
2. When two or more groups are measured, the central tendency provides the basis of comparison between them.

Definition:

Simpson and Kafka defined it as “ A measure of central tendency is a typical value around which other figures congregate”

Waugh has expressed “An average stand for the whole group of which it forms a part yet represents the whole”.

Central Tendency :

Mean, Median , Mode

Mean: Arithmetic mean , Geometric mean , Harmonic mean

Arithmetic Mean:

Arithmetic mean is a mathematical average and it is the most popular measures of central tendency. It is frequently referred to as ‘mean’ it is obtained by dividing sum of the values of all observations in a series (ΣX) by the number of items (N) constituting the series.

Thus, mean of a set of numbers $X_1, X_2, X_3, \dots, X_n$ denoted by \bar{x} and is defined as

Advantages of Mean:

- It is easy to understand & simple to calculate.
- It is based on all the values.
- It is rigidly defined .
- It is easy to understand the arithmetic average even if some of the details of the data are lacking.
- It is not based on the position in the series.

Disadvantages of Mean:

- It is affected by extreme values.
- It cannot be calculated for open end classes.
- It, sometimes, gives misleading conclusions.

Median:

Median is a central value of the distribution, or the value which divides the distribution in equal parts, each part containing equal number of items. Thus it is the central value of the variable, when the values are arranged in order of magnitude.

Calculation of Median –Discrete series :

- i. Arrange the data in ascending or descending order.
- ii. Calculate the cumulative frequencies.
- iii. Apply the formula.

Advantages of Median:

- **Median can be calculated in all distributions.**
- **Median can be understood even by common people.**
- **Median can be ascertained even with the extreme items.**
- **It can be located graphically**
- **It is most useful dealing with qualitative data**

Disadvantages of Median:

- It is not based on all the values.
- It is not capable of further mathematical treatment.
- It is affected fluctuation of sampling.
- In case of even no. of values it may not the value from the data.

Mode:

- Mode is the most frequent value or score in the distribution.
- It is defined as that value of the item in a series.
- It is denoted by the capital letter Z.
- highest point of the frequencies distribution curve.

Croxtan and Cowden : defined it as “the mode of a distribution is the value at the point where the item tend to most heavily concentrated. It may be regarded as the most typical of a series of value”

The exact value of mode can be obtained by the following formula.

Example: Calculate Mode for the distribution of monthly rent Paid by Libraries in Karnataka

Advantages of Mode :

- Mode is readily comprehensible and easily calculated
- It is the best representative of data
- It is not at all affected by extreme value.
- The value of mode can also be determined graphically.
- It is usually an actual value of an important part of the series.

Disadvantages of Mode :

- It is not based on all observations.
- It is not capable of further mathematical manipulation.
- Mode is affected to a great extent by sampling fluctuations.
- Choice of grouping has great influence on the value of mode.

Conclusion:

- A measure of central tendency is a measure that tells us where the middle of a bunch of data lies.
- Mean is the most common measure of central tendency. It is simply the sum of the numbers divided by the number of numbers in a set of data. This is also known as average.
- Median is the number present in the middle when the numbers in a set of data are arranged in ascending or descending order. If the number of numbers in a data set is even, then the median is the mean of the two middle numbers.
- Mode is the value that occurs most frequently in a set of data.