Chapter 9

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Positional Average

and

Partition values

(Median and Mode)

MEDIAN

Median is the value of the middle item of a series arranged in ascending or descending order of magnitude. Median would divide the series in two parts. One part containing value less than the median value and the other containing value more than the median value. Its value is the value of the middle item irrespective of all other values.

CHARACTERISTICS OF MEDIAN

1. It is affected by values of items but not the size of items.
2. The sum of deviations of the items from median is the minimum.
3. It is an appropriate average in dealing with qualitative data.
4. In symmetrical distribution the values of mean and median are equal.
5. The algebraic treatment of median is not possible.

CALCULATION OF MEDIAN

a) Individual observation

b) Discrete Series

C) Continuous series.

Median is the central positional average of given data i.e., Median has a position more or less at the centre of the values and divides the series roughly into equal parts.

a) Individual Series

(i) First of all, arrange the data in ascending or descending order.

(ii) Compute the number of items

(iii) Apply the following formula

M = Size of $\left(\dfrac{N+1}{2}\right)$ th item

b) Discrete Series

In case of discrete series the position of median i.e. (N+1)/2th item can be located through cumulative frequency. The corresponding value at this position is the value of median.

M = Size of $\left(\dfrac{N+1}{2}\right)$ th item

c) Continuous Series

In case of continuous series you have to locate the median class where N/2th item [not (N+1)/2th item] lies. The median can then be obtained as follows:

$$\text{Median} = l_1 + \dfrac{\frac{N}{2} - c.f.}{f} \times i$$

l_1 = lower limit of median group.

$c.f$ = Cumulative frequency of class preceding the median class

f = Frequency of median group.

i = The class interval of the median group

MERITS AND DEMERITS OF MEDIAN

Merits

1. It is easy to calculate and understand.

2. Median value is not affected by extreme values in a series.

3. Median can be graphically determined.

4. Median can be calculated even in the case of certain incomplete series.

Demerit

1. For median, data need to be arranged in ascending or descending order.

2. Not a good representative.

3. It is not accurate when the data is not large.

4. It is not based on all the observation of the series.

PARTITION VALUES (QUARTILES)

When we are required to divide a series into more than two parts, the dividing places are known as partition values. Quartiles are those values which divides the series into four equal parts.

CALCULATION OF PARTITION VALUES.

a) Individual series (b) Discrete Series C) Continuous Series.

$Q_1 = \dfrac{N+1}{4}$th item

$Q_3 = \dfrac{3(N+1)}{4}$th item

MODE

The word mode comes from French word la mode which means the fashion. Mode in statistical language is that value which occur most often in a series that is the value which is most typical. Thus, mode is that Value of observation which occurs the greatest number of time or with the greatest frequency.

DETERMINATION OF MODE

a) Series of individual series and Discrete Series Continuous series.

b) Graphical Location of Mode

(c) Mode from median and mean.

a) Series of individual Series and Discrete Series

(i) Data Array: The value of that item which occur most frequently is the mode of the data distribution

(ii) Discrete Series: The data are converted into discrete series to identify quickly the most frequently repeated value.

Discrete Series

In discrete Series mode can be located by two ways

(i)By Inspection

(ii) By Grouping

(1) By inspection

The mode can be determined just by inspection in discrete Series, the Value that occurs most frequently in the series.

(ii) By Grouping.

In discrete and Continuous series, if the items are concentrated at more than one value, attempt is made to find out the item of concentration with the help of grouping method. In such a situation it is desirable to prepare a grouping analysis table for ascertaining modal class.

$$M_0 = l_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \; X \; i$$

Merit of Mode

1. The most representative value of a series.

2 Simple to calculate and understand.

3. Helpful in describing qualitative character of the product

Demerits of Mode

1. Not based on all items

2. Not rigidly defined

3. Mode is unsuitable for further mathematical treatment.