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Topic : **CENTRAL TENDENCY**

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INTRODUCTION

- To discuss about the Central Tendency for Data Analysis purpose . Data Analysis is a stage from which we got the result by the surgery of collected data .

  statistical method is an important tool for Data Analysis, Central Tendency one of them.

STATISTICS

- The word statistics derived from the Latin word “Status” , which means political state . It is not a individual discipline , but also it related with mathematics .
- Generally we say about the definition of statistics that , “Statistics is scientific measurements to get report after analyzing the data” .
- In statistics we use some terms , that’s are Class limit , Class Boundary , Mid Value , Frequency etc.

CENTRAL TENDENCY

- Central Tendency the word consisted by two words , one Central means middle Point of universe and Tendency means direction of inclination .
- Definition : “ Calculation of average from universe to find out tendency”.
- Meaning : Central tendency help to find out direction of tendency or inclination from the universe.

USE OF CENTRAL TENDENCY

- It use to calculate the central inclines of the series of data in agriculture , temperature , rainfall , cloudiness , economic geography , resource geography etc sector.

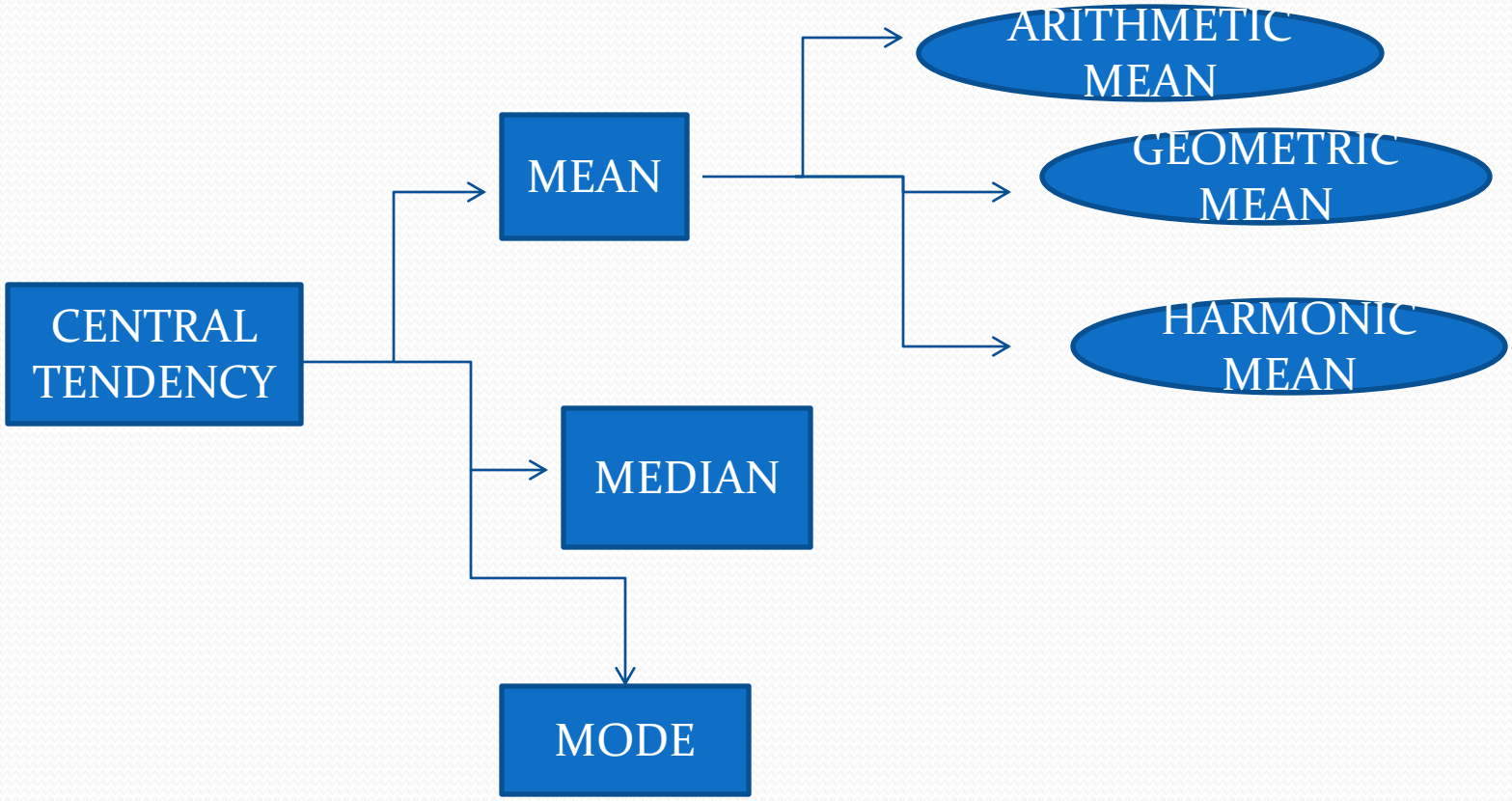
ADVAVTAGES OF CENTRAL TENDENCY

- It is the quick measurement process to understanding the complex data .
- It help to reduce the large volume data .
- It is simple to understand .
- It is scientific data analysis method.
- It help to take decision .
- Generally it is the synonyms of average .

LIMITATION OF CENTRAL TENDENCY

- It is not use in Geomorphology .
- Generally it is not express the physical features .

CLASSIFICATION OF CENTRAL TENDENCY



MEAN

- INTRODUTION :

  Generally mean is the synonymous of average . Mean express one value , which is represent the universe.

  DEFINITION :

  By which statistical method we calculate the average value of universe , also known as Mean.

USES O MEAN

- It help to measure the production , income – expenditure , import – export etc.
- In mean calculation use the algebraic method.
- For the economical , business , political and social research purpose mean use .
- For the sampling mean use .
- To measure the probability , mean use.
- Mean use to simplified the complex data.

ADVANTAGES OF MEAN

- It help to calculate the average.
- It is simple.
- For mean calculation don't need data arrange according to ascending or descending order.
- Mean value represent the all.
- It is a parametric analysis.
- We can express the change clearly.

DISADVANTAGES OF MEAN

- It is not suitable for large data calculation.
- Low and high account value effected by mean.
- Some time mean has no real value to represent the hole.
- Mean can not represent graphically .

1. ARITHMATIC MEAN

- Mean also known as Arithmetic Mean .
- Formula :

Mean = $\sum X/n$ where, $\sum X$ = The Sum of variables.

n = Number of observation

for group data

Mean = $\sum fX/N$ where, f = Frequency

X = Mid value

N = Total Frequency

EXAMPLE OF ARITHMATIC MEAN

- CALCULATION FOR MEAN

Sl. No.	1	2	3	4	5	6	7	8
Rainfall (cm.) (X)	35	20	50	12	62	10	48	15

$\sum X = 252$

Calculation :

Mean = $\sum X/n$

= 252/8

= 31.5

∴ Mean Rainfall is 31.5 cm .

2.GEOMETRIC MEAN

- Geometric mean mainly measure the growth rate . As for example it use for to calculate the population growth rate , production growth rate.
- Formula :

$$= \sqrt[n]{X1 \times X2 \times X3 \times Xn}$$

3.HARMONIC MEAN

- Harmonic Mean is the sum of the reciprocal of the Arithmetic Mean of the varieties in the distribution .
- Generally it not much use in Geography , but also help to show gradient purpose .
- Formula :

$$\text{Mean} = \frac{1/x1 + 1/x2 + 1/x3 + 1/xn}{n}$$

MEDIAN

- Definition :

  By which calculation system we find out the central value of a series of data , also known as Median.

- Meaning :

  Median calculate the mid value of series of data . It means say that , it divide two section of data . One is smaller then Median and other is greater then Median .

USES O MEDIAN

- Generally it much use to Quality measurement . As for example – skill , intelligences etc.
- It help to calculate average value of large account data.
- It also use to calculate the average value of large account uneven data .

ADVANTAGES OF MEDIAN

- It is simple to calculate .
- It is simple to understand .
- Large account data , we can express in short figure by Median .
- In calculation of median is not effected by high and low value .
- Graphically it can show .
- It can give the real central tendency .
- It is stable in rank .
- It is more static then Mean .

DISADVATAGES OF MEDIAN

- Much irregular interval data do not express the real tendency according to central value . As for example – 1,2,3,200,600 ; here median is 3 .
- For median calculation need in ascending order data arrange .
- Arithmetically it is not suitable for all time .
- It is timely calculation method .
- It is non parametric .

FORMULA OF MEDIAN

- For simple data (ungroup data) :

  Median = (n+1 /2) where , n = No. of observation

- For Grouped Data :

$$\text{Median} = L1 + \frac{N/2 - F}{fm} \times i$$

where, L1 = Lower class Boundary of the Median class .

N = Total Frequency

F = Cumulative Frequency below L1

fm = Frequency of the Median class

i = Width of the median class

CALCULATION

- Median $= L_1 + \frac{N/2 - F}{fm} \times I$

$= L_1 + \frac{50/2 - F}{fm} \times I$

$= 1300 + \frac{25 - 14}{17} \times 100$ $\quad (N/2 = 50/2 = 25)$

$= 1300 + 11/17 \times 100$

$= 1300 + 64.705$

$= 1364.705$

∴ Median is 1364.705 .

EXEMPLE FOR SIMPLE DATA (MEDIAN)

- Calculation for Median

Sl. No.	1	2	3	4	5	6	7
Value (X)	5	16	16	25	28	35	45

Median = (n+1/2)

= (7+1/2)

=4

∴ Median class is 4 , therefore median is 25 .

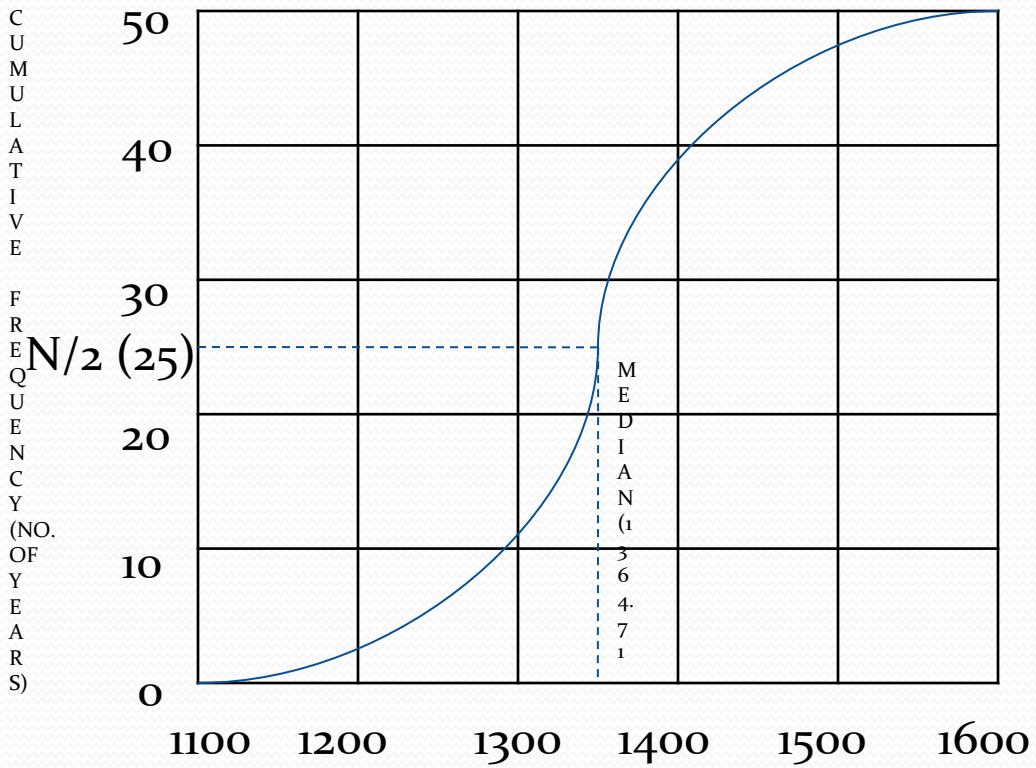
EXEMPLE FOR GROUP DATA (MEDIAN

- Calculation for Median

Class Boundary	Class Interval	Frequency (f)	Cumulative Freq. (Less than)
1100 – 1200	100	5	5
1200 – 1300	100	9	14
1300 -1400 (Median Class)	100	17	31
1400 – 1500	100	12	43
1500 - 1600	100	7	50

$$\sum F(N) = 50$$

GRAPHICAL REPRESENTATION OF MEDIAN



MODE

- Mode is follow the majority .
- Definition :

  By which calculation we find out much central tendency , also known as Mode .
- Meaning :

  Mode refer that value , which is highest numeric of the total series .

USE OF MODE

- It help to calculate market price rate .
- It help to calculate production .
- Mode use in geographical , social science , political science .
- It can use in daily life .
- Economic condition is calculated by Mode .
- To give weathering forecast it use .

ADVANTAGES OF MODE

- It is simple to understand and calculate .
- Mode value is effected by extension of data .
- We can graphically construct the Mode .
- Mode is much valuable and use than Mean and Median .
- By mode calculation we can calculate the accurate value .

DISADVANTAGES OF MODE

- It is difficult to calculate the mode for unequal class .
- It is difficult to calculate .
- Generally mode concentrate in the higher value area .
- For mode calculation we prefer to only frequency .
- Sometime one value is repeat several time , which controlled mode calculation .

FORMULA OF MODE (SIMPLE DATA)

- A series of data calculate the mode after arranging in frequency .
- Example :

Number	Frequency
2	2
3	4
4	2
8	5
12	2
15	2

∴ Mode is 8

FORMULA OF MODE (GROUPED DATA)

- $\text{Mode} = L_1 + \frac{d_1}{d_1 + d_2} \times I$

where ,

L_1 = Lower class boundary of the modal class (i.e. the class containing the largest frequency)

d_1 = Difference between the largest frequency and the frequency of just upper class .

d_2 = Difference between the modal class frequency and the just lower class frequency .

i = Common width of classes .

EXAMPLE OF MODE (GROUPED DATA)

- CALCULATION TABLE

CLASS BOUNDARY	CLASS WIDTH	FREQUENCY
1100 – 1200	100	5
1200 – 1300	100	9
1300 – 1400 (MODAL CLASS)	100	17 (MODAL Freq:)
1400 -1500	100	12
1500 - 1600	100	7

CALCULATION OF MODE

- $$\text{MODE} = L_1 + \frac{d_1}{d_1 + d_2} \times i$$

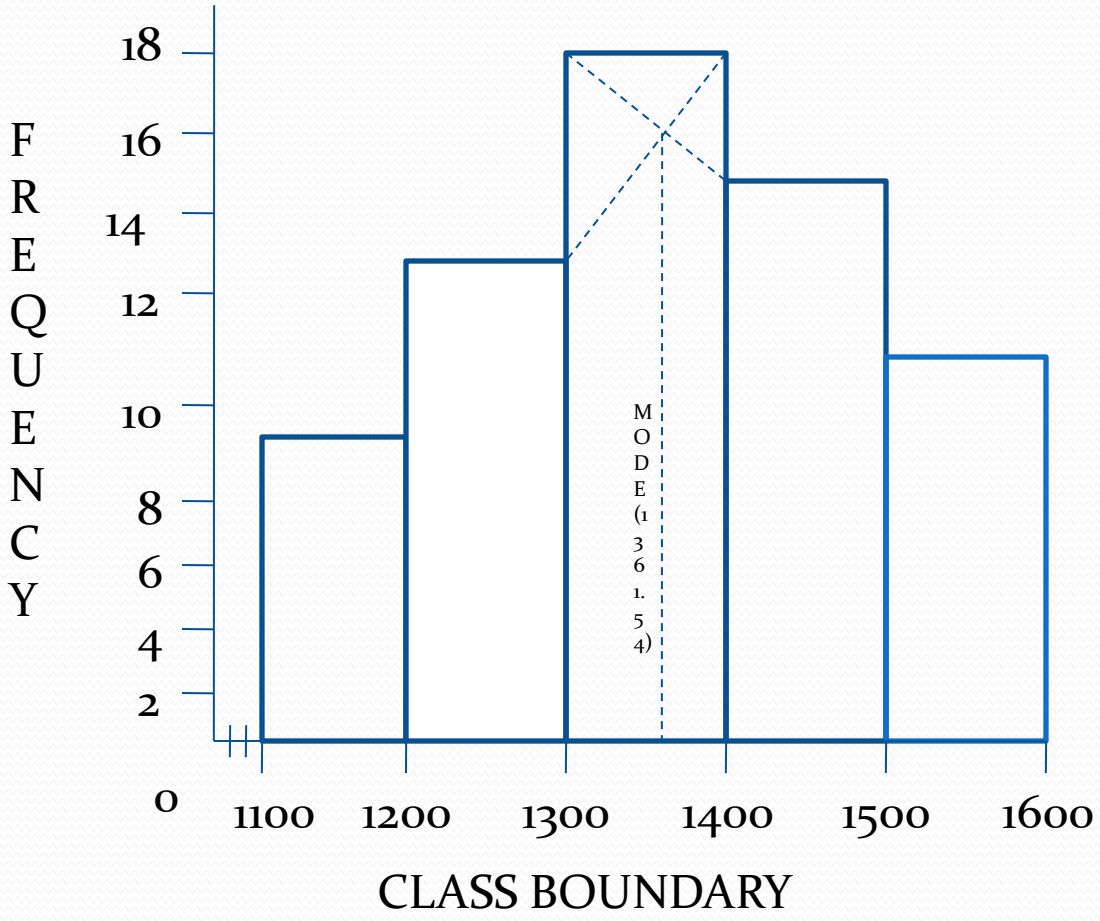
$$= L_1 + \frac{(17 - 9)}{(17 - 9) + (17 - 12)} \times 100$$

$$= 1300 + 61.538$$

$$= 1361.538$$

∴ Mode is 1361.536 .

GRAPHICAL REPRESNTATION OF MODE



RELATIONSHIP BETWEEN MEAN MEDIAN AND MODE

- Mean – Mode = 3 (Mean – Median)

or, Mean –Mode = 3Mean – 3Median

or, Mode = Mean – 3Mean + 3Median

or, Mode = 3Median – 2Mean

CONCLUTION

- Central Tendency is an important element of statistics , which help to data analysis .