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Topic- Concept of Sampling

SAMPLING

Sampling refers to the process of selecting few representatives from the whole group of items in any field of inquiry. The whole group is referred to as 'population 'or 'universe'. Hence sampling refers to choosing few items of the population which would serve as representative group that can be used to estimate or predict unknown information about the population. Sampling seems to be a pre-requisite when the population is a bigger one and when there is practical difficulty in studying the entire population which is going to be time, cost and energy consuming.

Eg. Suppose you want to estimate the average age of the students in your class. There are two ways of doing this. The first method is to contact all students in the class, find out their ages, add them up and then divide this by the number of students (the procedure for calculating an average). The second method is to select a few students from the class (the small group of students selected is called the ***Sample***), ask them their ages, add them up and then divide by the number of students you have asked. From this you can make an estimate of the average age of the class

PRINCIPLES OF SAMPLING:

There are two important principles on which the sampling theory works:

1. Principle of statistical regularity

The principle of statistical regularity is derived from the theory of probability in mathematics. According to this principle, when a large number of items are selected at random from the universe, then it is likely to possess the same characteristics as that of the entire population.

This principle claims that the sample selection is random, i.e. every item has an equal and likely chance of being selected. It is believed that sample selected randomly and not deliberately acts as a true representative of the population. Thus, this principle is characterized by the large sample size and the random selection of a representative sample.

2. Principle of inertia of large numbers

The principle of Inertia of large numbers states that the larger the size of the sample the more accurate the conclusion is likely to be. This principle is based on the notion, that large numbers are more stable in their characteristics than the small numbers, and the variation in the aggregate of large numbers is insignificant. It does not mean that there is no variation in the large numbers, there is, but is less than in the smaller numbers.

BASIC CONCEPT OF SAMPLING

Population

The group of individuals considered under study is called as population. The word population here refers not only to people but to all items that have been chosen for the study. Thus in statistics, population can be number of bikes manufactured in a day or week or month, number of cars manufactured in a day or week or month, number of fans, TVs, chalk pieces, people, students, girls, boys, any manufacturing products, etc…

Finite and infinite population:

When the number of observations/individuals/products is countable in a group, then it is a finite population. Example: weights of students of class XII in a school.

When the number of observations/individuals/products is uncountable in a group, then it is an infinite population. Example: number of grains in a sack, number of germs in the body of a sick patient.

Sample and sample size

A selection of a group of individuals from a population in such a way that it represents the population is called as sample and the number of individuals included in a sample is called the sample size.

Parameter and statistic

Parameter: The statistical constants of the population like mean (m), variance($s2$) are referred as population parameters.

Statistic : Any statistical measure computed from sample is known as statistic.

Note

In practice, the parameter values are not known and their estimates based on the sample values are generally used.

KEY OBJECTIVES OF SAMPLING

1. **Reduce Costs and Time**: Sampling allows for efficient data collection by focusing on a representative subset.
2. **Improve Accuracy**: Smaller, well-designed samples can lead to more accurate, focused data collection.
3. **Ensure Representativeness**: By carefully selecting a sample, researchers can ensure that the findings are relevant to the larger population.