Spatial and Non- Spatial Data

Spatial data are also known as geospatial data. Spatial data is information about a physical object that can be represented by numerical values in a geographic coordinates system (latitudes and longitudes). Generally speaking, Spatial data represents the location, size and shape of an object on earth surface such as mountain, plain, township, people etc. it also provides all the attributes of an entity that is being represented. Any data which are directly or indirectly referenced to a location on the surface of the earth are Spatial data.

The Spatial data has the following features;

1. It consist of location, shape, size and orientation

2. It is generally multi- dimensional

3. It includes spatial relationship

Non- Spatial data cannot be related to a location on the earth surface. Examples of Non- Spatial data; height and age of a person, wages and savings of an employee of a factory etc. The Non-Spatial data has the following features;

1. It has no specific location in space

2. Tabular and attribute data are non- spatial data

3. It is also called attributes or characteristics data

4. It is generally one dimensional and independent data

Normal Distribution

Normal distribution is a continuous probability distribution. It is most important of all the theoretical distributions. It is sometimes called the "bell curve," It is most widely known and used. Because the normal distribution approximates many natural phenomena so well, it has developed into a standard of reference for many probability problems. The area under the normal curve is equal to 1.0. Normal distributions are denser in the centre and less dense in the tails. Normal distributions are defined by two parameters, the mean (μ) and the standard deviation (σ). 68% of the area of a normal distribution is within one standard deviation of the mean.

Characteristics of Normal Distribution Curve

1. Symmetric, bell shaped

2. Values of mean, median, mode computed for a distribution following this curve always coincide and have the same values

3. The height of the ordinates is Maximum at the Mean and in the unit normal curve is equal to 0.3989

4. The curve does not have boundaries in either direction because it never touches the Base Line no matter how far it is extended

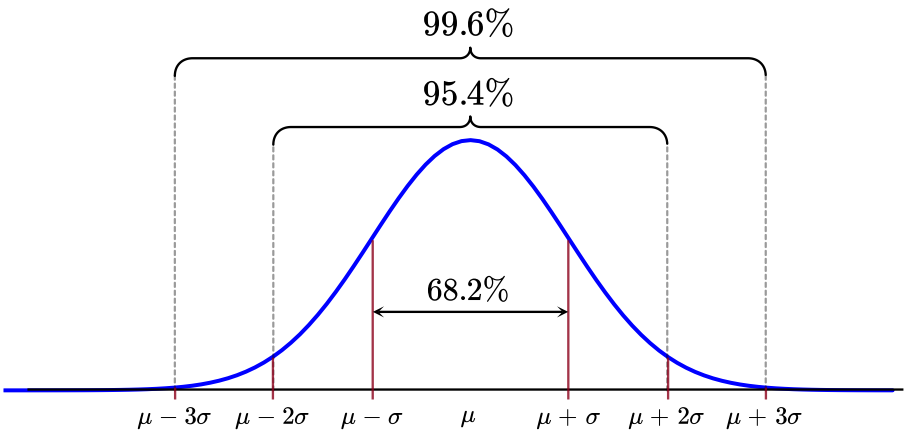
5. The area under the normal curve is equal to 1.0.

6. Normal distributions are denser in the centre and less dense in the tails.

7. Normal distributions are defined by two parameters, the mean (μ) and the standard deviation (σ).

8. 68% of the area of a normal distribution is within one standard deviation of the mean.

9. Approximately 95% of the area of a normal distribution is within two standard deviations of the mean.



What is Probability?

Probability denotes the possibility of the outcome of any random event. The meaning of this term is to check the extent to which any event is likely to happen. For example, when we flip a coin in the air, what is the possibility of getting a head? The answer to this question is based on the number of possible outcomes. Here the possibility is either head or tail will be the outcome. So, the probability of a head to come as a result is 1/2.

The probability is the measure of the likelihood of an event to happen. It measures the certainty of the event. The formula for probability is given by;

P(E) = Number of Favourable Outcomes/Number of total outcomes

P(E) = n(E)/n(S)

Here,

n(E) = Number of event favourable to event E

n(S) = Total number of outcomes

What Is a Sampling Distribution?

A sampling distribution is a concept used in statistics. It is a probability distribution of a statistic obtained from a larger number of samples drawn from a specific population. The sampling distribution of a given population is the distribution of frequencies of a range of different outcomes that could possibly occur for a statistic of a population. This allows entities like governments and businesses to make more well-informed decisions based on the information they gather. There are a few methods of sampling distribution used by researchers, including the sampling distribution of a mean.

Types of Sampling Distributions

Here is a brief description of the types of sampling distributions:

- **Sampling Distribution of the Mean:** This method shows a normal distribution where the middle is the mean of the sampling distribution. As such, it represents the mean of the overall population. In order to get to this point, the researcher must figure out the mean of each sample group and map out the individual data.
- **Sampling Distribution of Proportion:** This method involves choosing a sample set from the overall population to get the proportion of the sample. The mean of the proportions ends up becoming the proportions of the larger group.
- **T-Distribution:** This type of sampling distribution is common in cases of small sample sizes. It may also be used when there is very little information about the entire population. T-distributions are used to make estimates about the mean and other statistical points.

What are the sampling methods or Sampling Techniques?

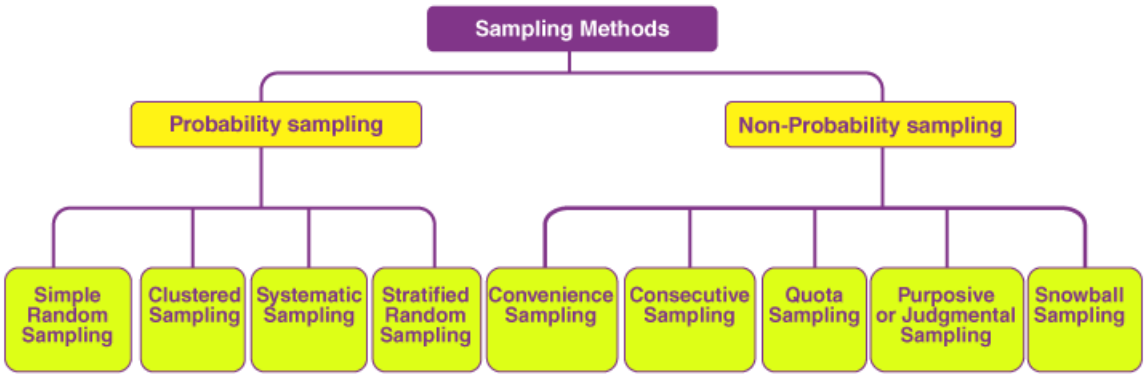
In Statistics, the **sampling method** or **sampling technique** is the process of studying the population by gathering information and analyzing that data. It is the basis of the data where the sample space is enormous.

There are several different sampling techniques available, and they can be subdivided into two groups. All these methods of sampling may involve specifically targeting hard or approach to reach groups.

Types of Sampling Method

In Statistics, there are different sampling techniques available to get relevant results from the population. The two different types of sampling methods are:

- Probability Sampling
- Non-probability Sampling



What is Probability Sampling?

The probability sampling method utilizes some form of random selection. In this method, all the eligible individuals have a chance of selecting the sample from the whole sample space. This method is more time consuming and expensive than the non-probability sampling method. The benefit of using probability sampling is that it guarantees the sample that should be the representative of the population.

Probability Sampling Types

Probability Sampling methods are further classified into different types, such as simple random sampling, systematic sampling, stratified sampling, and clustered sampling. Let us discuss the different types of probability sampling methods along with illustrative examples here in detail.

Simple Random Sampling

In simple random sampling technique, every item in the population has an equal and likely chance of being selected in the sample. Since the item selection entirely depends on the chance, this method is known as "**Method of chance Selection**". As the sample size is large, and the item is chosen randomly, it is known as "**Representative Sampling**".

Example:

Suppose we want to select a simple random sample of 200 students from a school. Here, we can assign a number to every student in the school database from 1 to 500 and use a random number generator to select a sample of 200 numbers.

Systematic Sampling

In the systematic sampling method, the items are selected from the target population by selecting the random selection point and selecting the other methods after a fixed sample interval. It is calculated by dividing the total population size by the desired population size.

Example:

Suppose the names of 300 students of a school are sorted in the reverse alphabetical order. To select a sample in a systematic sampling method, we have to choose some 15 students by randomly selecting a starting number, say 5. From number 5 onwards, will select every 15th person from the sorted list. Finally, we can end up with a sample of some students.

Stratified Sampling

In a stratified sampling method, the total population is divided into smaller groups to complete the sampling process. The small group is formed based on a few characteristics in the population. After separating the population into a smaller group, the statisticians randomly select the sample.

For example, there are three bags (A, B and C), each with different balls. Bag A has 50 balls, bag B has 100 balls, and bag C has 200 balls. We have to choose a sample of balls from each bag proportionally. Suppose 5 balls from bag A, 10 balls from bag B and 20 balls from bag C.

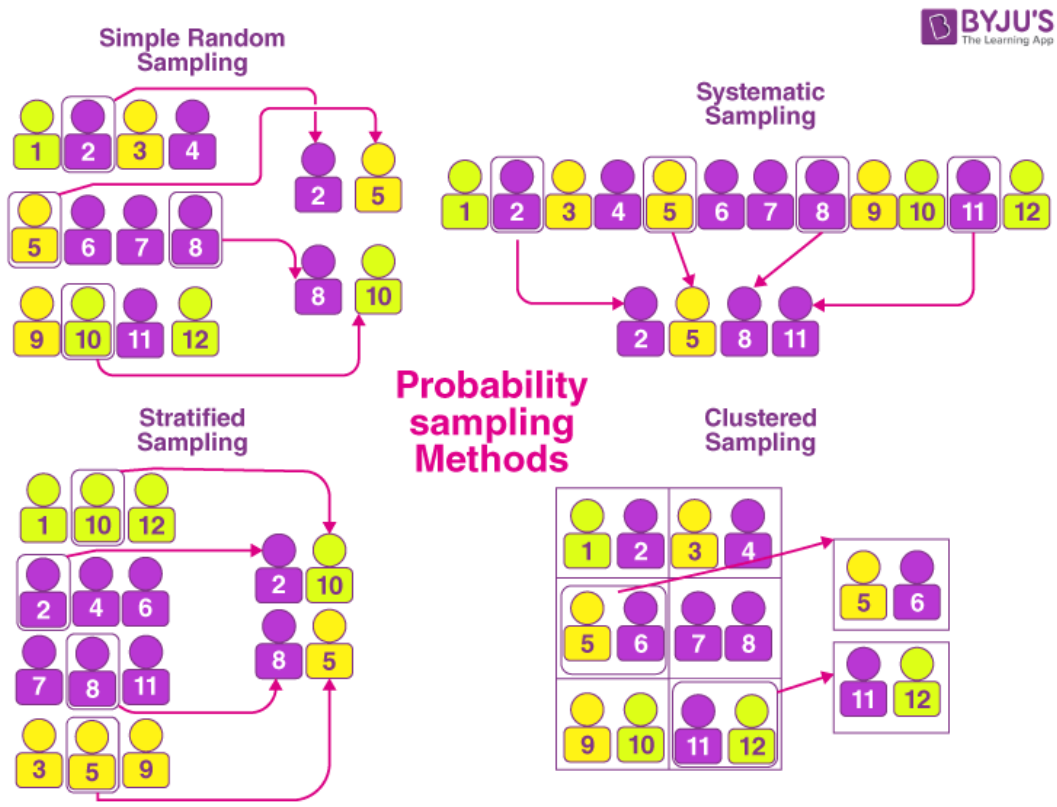
Clustered Sampling

In the clustered sampling method, the cluster or group of people are formed from the population set. The group has similar significatory characteristics. Also, they have an equal chance of being a part of the sample. This method uses simple random sampling for the cluster of population.

Example:

An educational institution has ten branches across the country with almost the number of students. If we want to collect some data regarding facilities and other things, we can’t travel to every unit to collect the required data. Hence, we can use random sampling to select three or four branches as clusters.

All these four methods can be understood in a better manner with the help of the figure given below. The figure contains various examples of how samples will be taken from the population using different techniques.



What is Non-Probability Sampling?

The non-probability sampling method is a technique in which the researcher selects the sample based on subjective judgment rather than the random selection. In this method, not all the members of the population have a chance to participate in the study.