# Types of Statistical Analysis

**1. <u>Descriptive Statistical Analysis</u>**

Fundamentally, it deals with organizing and summarizing data using numbers and graphs. It makes easy the massive quantities of data for intelligible interpretation even without forming conclusions beyond the analysis or responding to any hypotheses.
Instead of processing data in its raw form, descriptive statistical analysis enables us to represent and interpret data more efficiently

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| Calculation | Formula | Notes |
|---|---|---|
| Population Mean | $\mu = \frac{\Sigma X_i}{N}$ | $\mu$ = population average<br>X = individual values of population<br>N = count of individual values |
| Sample Mean | $\bar{x} = \frac{\Sigma x_i}{n}$ | $\bar{X}$ = sample average<br>x = individual values of population<br>n = count of individual values in sample |
| Weighted Mean | $\bar{x} = \frac{\Sigma w_i x_i}{\Sigma w_i}$ | $\bar{X}$ = weighted sample average<br>$w_i$ = weight of value *i*<br>$x_i$ = individual value to be weighted |
| Sample Mean of grouped data | $\bar{x} = \frac{\Sigma f_i x_i}{n}$ | $f_i$ = number of observations in the ith group<br>$x_i$ = midpoint of the ith class<br>n = count of all observations of ith classes |
| Mean Deviation | $MD = \frac{\Sigm\|a x_i - \bar{x}\|}{n}$ | $\bar{X}$ = sample average<br>x = individual values in sample<br>n = count of individual values in sample |
| Population Variance | $\sigma^2 = \frac{\Sigma (X_i - \mu)^2}{N}$ | μ = population average<br>X = individual values in population<br>*N* = count of values in population |

## 2. Inferential Statistical Analysis

The inferential statistical analysis basically is used when the inspection of each unit from the population is not achievable, hence, it extrapolates, the information obtained, to the complete population.

In simple words, inferential statistical analysis lets us test a hypothesis depending on a sample data from which we can extract inferences by applying probabilities and make generalizations about the whole data, and also can make conclusions with respect to future outcomes beyond the data available.

By this way, it is highly preferable while drawing conclusions and making decisions about the whole population on the basis of sample data. As such, this method involves the sampling theory, various tests of significance, statistical control etc.

| S.No | Descriptive Statistical Analysis | Inferential Statistical Analysis |
|---|---|---|
| 1 | Handling and compling data via numbers and grpahs | Deploy sample data to draw insights from the population |
| 2 | Explain essence of sample or population | Make an inference or extract conclusion |
| 3 | Choose when dataset is small | Used when population data is extensive |
| 4 | Mode of outcomes: Charts, graphs and tables | Mode of outcomes: Probability measure |
| 5 | Tools- Measure of tendency, measure of dispersion | Tools- Hypothesis test, ANOVA |

## 3. Predictive Analysis

Predictive analysis is implemented to make a prediction of future events, or what is likely to take place next, based on current and past facts and figures

## 4. Prescriptive Analysis

The prescriptive analysis examines the data In order to find out what should be done, it is widely used in business analysis for identifying the best possible action for a situation.

While other statistical analysis might be deployed for driving exclusions, it provides the actual answer. Basically, it focuses on discovering the optimal suggestion for a process of decision making.

## 5. Exploratory Data Analysis (EDA)

Exploratory data analysis, or EDA as it is known, is a counterpart of inferential statistics, and greatly implemented by data experts. It is generally the first step of the data analysis process that is conducted prior to any other statistical analysis techniques.

EDA is not deployed alone for predicting or generalizing, it renders a preview of data and assists in getting some key insights into it.

This method fully focuses on analyzing patterns in the data to recognize potential relationships. EDA can be approached for

discovering unknown associations within data, inspecting missing data from collected data and obtaining maximum insights, examining assumptions and hypotheses.

## 6. Causal Analysis

In general, causal analysis assists in understanding and determining the reasons behind “why” things occur, or why things are as such, as they appear.

For example, in the present business environment, many ideas, or businesses are there that get failed due to some events’ happening, in that condition, the causal analysis identifies the root cause of failures, or simply the basic reason why something could happen.

## 7. Mechanistic Analysis

Among the above statistical analysis, mechanistic is the least common type, however, it is worthy in the process of big data analytics and biological science. It is deployed to understand and explain how things happen rather than how specific things will take place ulteriorly.

It uses the clear concept of understanding individual changes in variables that cause changes in other variables correspondingly while excluding external influences and considering the assumption that

the entire system gets influenced via its own internal elements' interaction.