Advantages & disadvantages of Non-parametric methods

Parameter is any numerical quantity that characterizes a given population or some aspect of it. Most common statistics parameters are mean, median, mode, standard deviation.Parametric methods are those methods for which we priory knows that the population is normal, or if not then we can easily approximate it using a normal distribution which is possible by appealing the Central Limit theorem. Parameters for using the normal distribution is –

- Mean
- Standard Deviation

Some of the parametric methods what we studied are student's 't' test for single mean, 't' test for difference of means and F test for variances etc.,

The general assumptions of parametric methods are (i) the populations are normally distributed (follow normal distribution curve). (ii) the selected population is representative of general population and (iii) the data is in interval or ratio scale. Nonparametric method refers to a type of statistic that does not require that the population being analyzed meet certain assumptions, or parameters. Well-known statistical methods such as ANOVA, Pearson's correlation, t test, and others provide valid information about the data being analyzed only if the underlying population meets certain assumptions. One of the most common assumptions is that the population data have a "normal distribution."Parametric statistic may also be applied to populations with other known distribution types, however. Nonparametric statistics do not require that the population data meet the assumptions required for parametric statistics. They're also known as distribution-free tests and can provide benefits in certain situations. Typically, people who perform statistical hypothesis tests are more comfortable with parametric tests than nonparametric tests.However, certain assumptions associated with Non parametric tests are:

(i) Sample observations are independent

(ii) The variable under study is continuous.

(iii) p.d.f. is continuous.

(iv) Lower order moments exist

Obviously these assumptions are fewer and much weaker than those associated with parametric tests.

Some advantages of parametric methods are 1: Parametric tests can provide trustworthy results with distributions that are skewed and non normal. 2: Parametric tests can provide trustworthy

results when the groups have different amounts of variability 3: Parametric tests have greater statistical power.

Advantages and disadvantages of Non parametric methods

Certainly there are advantages and disadvantages to non-parametric versus parametric methods, and the decision regarding which method is most appropriate depends very much on individual circumstances.

Advantages of Non Parametric Methods

1. Nonparametric methods require no or very limited assumptions to be made about the format of the data, and they may therefore be preferable when the assumptions required for parametric methods are not valid.

2. Nonparametric methods can be useful for dealing with unexpected, outlying observations that might be problematic with a parametric approach.

3. Nonparametric methods are intuitive and are simple to carry out by hand, for small samples at least.

4. Nonparametric methods are often useful in the analysis of ordered categorical data in which assignation of scores to individual categories may be inappropriate.

5. There are suitable non-parametric statistical tests for treating samples made up of observations from several different populations. Parametric tests often cannot handle such data without requiring us to make apparently unrealistic assumptions or requiring awkward computations.

6. Non-parametric statistical tests typically are much easier to learn and to apply   than are parametric methods. In addition, their interpretation often is more direct than the interpretation of parametric tests.

Disadvantages of Non parametric methods

1. Nonparametric methods may lack power as compared with more traditional approaches This is a particular concern if the sample size is small or if the assumptions for the corresponding parametric method (e.g. Normality of the data) hold.

2. Nonparametric methods are geared toward hypothesis testing rather than estimation of effects. It is often possible to obtain nonparametric estimates and associated confidence intervals, but this is not generally straightforward.

3. Tied values can be problematic when these are common, and adjustments to the test statistic may be necessary.
4. Appropriate computer software for nonparametric methods can be limited, although the situation is improving. In addition, how a software package deals with tied values or how it obtains appropriate P values may not always be obvious.