NON PARAMTERIC TESTS

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Parametric and Non Parametric Test
An overview

Parametric Test

Inferential procedures that rely on testing claims regarding parameters such as the population mean μ, the population standard deviation, σ, or the population proportion, p. Many times certain requirements had to be met before we could use those procedures.

Non Parametric Test

Inferential procedures that are not based on parameters, which require fewer requirements be satisfied to perform the tests. They do not require that the population follow a specific type of distribution.

Parametric and Non Parametric Test
An overview

Parametric Test	Non Parametric test
The form of the distribution function of the population from which samples have been drawn is assumed to be known and they were concerned with the testing statistical hypothesis about the parameters of the distribution function. That is in this case the test mainly deals with the parameters of the distribution.	A non-parametric test is a test which is not concerned with testing of parameters. Non parametric tests do not depend on the particular form of the distribution of the population. That is they do not make any assumption regarding the form of the population. So theses tests are called *distribution free tests.*

Assumption of Non Parametric Tests

- Sample observations are independent.
- The variables under study is continuous.
- Probability density function is continuous.
- Lower moments exist.
- The measurements are in nominal or ordinal Scale.

Note that this assumption are fewer and much weaker than those associated with parametric tests

Advantages of Nonparametric Tests

1. They are readily comprehensible, very simple and easy to apply and do not requires complicated sample theory
2. No assumption is made about the probability distribution of the population from which the sample is drawn
3. Non parametric tests can be applied, when the measurement scale of data is nominal or ordinal. So the Non parametric procedures can be used for count data or rank data, so nonparametric methods can be used on data such as rankings of a movie as excellent, good, fair, or poor.

Advantages of Nonparametric Tests

4. There is no restriction on sample size for non parametric tests
5. Since the data in psychology, Sociology, Education, Medicine etc are in general not normally distributed as non parametric tests found application in these areas.
6. Even if the sample size is small the non parametric tests are powerfull.

Disadvantages of Nonparametric Tests

1. **Non parametric tests can be applied only when the measurement scale of data is nominal or ordinal.**
2. **The results of the test are *typically less powerful*. Recall that the power of a test refers to the probability of making a Type II error. A Type II error occurs when a researcher does not reject the null hypothesis when the alternative hypothesis is true.**
3. **Nonparametric procedures are *less efficient* than parametric procedures. This means that a larger sample size is required when conducting a nonparametric procedure to have the same probability of a Type I error as the equivalent parametric procedure.**

Disadvantages of Nonparametric Tests

4. Non parametric tests not all are very simple.
5. It is not possible to determine the actual power of the non parametric tests.
6. Nonparametric tests exists for testing interactions in Analysis of variance unless special assumptions about the additivity of the model are made.
7. If parametric tests exist for a hypothesis then it is most powerful than non parametric tests.

Basic Steps involved in Nonparametric Tests

1. Make the assumptions necessary for the validity of the test procedure.
2. Collect the sample data.
3. Lay down the null and alternative hypotheses.
4. Decide the test procedure and test criterion.
5. Decide the level of significance α.
6. Obtained the critical or table value corresponding to the selected α.
7. Arrive at a conclusion.

Commonly Used Non parametric Tests

- Chi-square test (Independence, homogeneity etc.).
- Median test or Sign test (One sample and Two sample).
- Signed rank test or Wilcoxon Match pair Test.
- Mann-Whitney test.
- Kruskal-Wallis Test.
- Run test.
- Kolmogorov –Smirnov test.

The End

This is an introduction to the non- parametric tests

Next we consider the non-parametric tests one by one

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