Name- Russel B Rex
Reg.no- EA2352001010458

WEEK-12 LAQ

Explain the types of non-parametric techniques

Types of Non-Parametric Techniques:

Non-parametric techniques are statistical methods that do not rely on assumptions about the distribution of the data. They are particularly useful when dealing with data that does not meet the assumptions of parametric tests, such as normality, equal variances, or linearity.

Here's a breakdown of common non-parametric techniques:

1. Rank-Based Tests:

- **Wilcoxon Signed-Rank Test:** Used for comparing two related samples (e.g., before-after measurements) when the data is not normally distributed. It ranks the differences between pairs of observations and tests for a significant difference in the medians.
- **Wilcoxon Rank-Sum Test (Mann-Whitney U Test):** Used for comparing two independent samples (e.g., two groups) when the data is not normally distributed. It ranks all observations from both groups and tests for a significant difference in the medians.
- **Kruskal-Wallis Test:** Used for comparing more than two independent groups when the data is not normally distributed. It ranks all observations across all groups and tests for a significant difference in the medians.
- **Friedman Test:** Used for comparing more than two related groups (e.g., repeated measures) when the data is not normally distributed. It ranks the observations within each group and tests for a significant difference in the medians.

2. Correlation Tests:

- **Spearman's Rank Correlation:** Measures the strength and direction of the association between two variables when the data is not normally distributed or the relationship is not linear. It ranks the observations for each variable and calculates the correlation between the ranks.
- **Kendall's Tau:** Another non-parametric measure of correlation, similar to Spearman's rank correlation, but less sensitive to outliers.

3. Goodness-of-Fit Tests:

- **Chi-Square Goodness-of-Fit Test:** Tests whether the observed frequencies of categorical data differ significantly from the expected frequencies based on a theoretical distribution (e.g., uniform distribution, normal distribution).

- **Kolmogorov-Smirnov Test:** Tests whether the distribution of a sample data matches a theoretical distribution (e.g., normal distribution).

4. Other Non-Parametric Techniques:

- **Sign Test:** Used for comparing two related samples (e.g., before-after measurements) when the data is ordinal or dichotomous. It tests for a significant difference in the proportion of positive or negative changes.
- **Runs Test:** Tests whether the data is randomly distributed or exhibits a pattern.
- **Permutation Tests:** A general approach to non-parametric hypothesis testing that involves resampling the data to create a null distribution.

Advantages of Non-Parametric Techniques:

- **Robustness:** Less sensitive to violations of assumptions about the data distribution.
- **Flexibility:** Can be applied to a wider range of data types, including ordinal, nominal, and ranked data.
- **Fewer Assumptions:** Do not require assumptions about normality, linearity, or equal variances.
- **Ease of Use:** Many non-parametric tests are relatively simple to perform.

Limitations of Non-Parametric Techniques:

- **Less Powerful:** May be less powerful than parametric tests when the assumptions of parametric tests are met.
- **Limited Information:** Provide less detailed information about the data distribution compared to parametric tests.