Test	Purpose	Assumptions	Additional information
Normality Tests			
Shapiro-Wilk Test	Tests whether a data sample has a Gaussian distribution.	• Observations in each sample are independent and identically distributed (iid).	The SW test has good power properties over a wide range of asymmetric distributions. If the distribution is suspected to be asymmetric (i.e. skewed) then the SW test is the best test followed closely by the AD test. If the distribution is symmetric with low kurtosis values (i.e. symmetric short-tailed distribution), then the D'Agostino and SW tests have good power. For symmetric distribution with high sample kurtosis (symmetric long-tailed), the JB, SW or AD tests can be used.
D'Agostino's K-squared test	Tests whether a data sample has a Gaussian distribution.	• Observations in each sample are independent and identically distributed (iid).	
Anderson-Darling Test	Tests whether a data sample has a Gaussian distribution.	• Observations in each sample are independent and identically distributed (iid)	
Jarque–Bera test	The Jarque–Bera test is a goodness-of-fit test of whether sample data have the skewness and kurtosis matching a normal distribution	• Observations in each sample are independent and identically distributed (iid)	
Correlation Tests			
Pearson's Correlation Coefficient	Tests whether two samples have a linear relationship.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample are normally distributed. • Observations in each sample have the same variance.	

Spearman’s Rank Correlation	Tests whether two samples have a monotonic relationship.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample can be ranked.	
Kendall’s Rank Correlation	Tests whether two samples have a monotonic relationship.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample can be ranked.	
Chi-Squared Test	Tests whether two categorical variables are related or independent.	• Observations used in the calculation of the contingency table are independent. • 25 or more examples in each cell of the contingency table.	
Equality (Homogeneity) of Variances Tests			
F-test	Tests equality of variances.	• Two random samples from a normal distribution.	F test is very sensitive to departures from normality.
Bartlett's Test	Tests equality of variances.	• Two (or more) samples from a normal distribution.	
Levene's Test	Tests equality of variances.	• Random samples from continuous distributions.	

Squared Ranks Test	Tests equality of variances.	• Random samples. • Independence within samples • Mutual independence between samples. • Measurement scale is at least interval.	
Parametric Statistical Hypothesis Tests			
Student's t-test	Tests whether the means of two independent samples are significantly different.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample are normally distributed. • Observations in each sample have the same variance.	Parametric tests are those that make assumptions about the parameters of the population distribution from which the sample is drawn. This is often the assumption that the population data are normally distributed.
Paired Student's t-test	Tests whether the means of two paired samples are significantly different.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample are normally distributed. • Observations in each sample have the same variance. • Observations across each sample are paired.	
Analysis of Variance Test (ANOVA)	Tests whether the means of two or more independent samples are significantly different.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample are normally distributed. • Observations in each sample have the same variance.	

Repeated Measures ANOVA Test	Tests whether the means of two or more paired samples are significantly different.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample are normally distributed. • Observations in each sample have the same variance. • Observations across each sample are paired.	
Non-parametric Statistical Hypothesis Tests			
Mann-Whitney U Test	Tests whether the distributions of two independent samples are equal or not.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample can be ranked.	Non-parametric tests are "distribution-free" and, as such, can be used for non-Normal variables, But Parametric tests usually have more statistical power than their non-parametric equivalents. In other words, one is more likely to detect significant differences when they truly exist.
Wilcoxon Signed-Rank Test	Tests whether the distributions of two paired samples are equal or not.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample can be ranked. • Observations across each sample are paired.	
Kruskal-Wallis H Test	Tests whether the distributions of two or more independent samples are equal or not.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample can be ranked.	

Friedman Test	Tests whether the distributions of two or more paired samples are equal or not.	• Observations in each sample are independent and identically distributed (iid). • Observations in each sample can be ranked. • Observations across each sample are paired.	