**Abstract**

* The word ANOVA means **AN**alysis **O**f **VA**riance, it is a tool used in statistics to analyze the differences among means.
* In this project, main intent is to perform the **ONE WAY ANOVA** analysis on a dataset which is based on the student’s education level to know about their performance and analyzing the means among the student groups.
* Performing the Exploratory Data Analysis by providing the box plots among the groups.
* Calculate Means, Variance, Standard Deviation, Sum of Squares and Generating the Null and Alternate Hypothesis on the Student dataset.
* By using F-test statistics we will perform the above functions.
* Depends on the F-test, we’ll decide to accept or reject the hypothesis. Suppose, if we reject the null hypothesis then we’ll perform Pairwise Comparison using Bonferrori Correction Methods.

**Theory:**

**What is Statistical Test:**

* A statistical test determines whether there is strong evidence to reject a null hypothesis or not.
* The statistic test measures the variation between the variables in a test and the null hypothesis, where no difference exist.
* Statistical test requires a large data set for dertermining the accurate result.

**Conditions for Statistical Test:**

* Before Performing Anova, we must check three important conditions on the data.

They are:

i)The observations are Independent in sample.

ii)The data within each group are nearly normal

iii)The variability across the groups is about equal.

When the three conditions are okay, then we can use ANOVA against null hypothesis that all the mean are equal.

**Types of Statistic Tests**:

There are Different types of statistic tests. Below are the most used statistic tests.

1. T-Test: This test is used to compare the mean in two groups.
2. Anova: This test is used to determine the statistical difference’s in the mean of two or more different groups.

**Anova of Analysis (ANOVA):**

It is an analysis tool used in statistics to test whether the mean outcome differs two or more groups. It uses a test statistic F, which shows a standardized ratio of variability in the sample means relative to the variability within the groups.

**One way Anova:**

* One-way ANOVA is used to test equality of three or more samples simultaneously using variance
* There is only one factor in one way anova.
* The Number of observations need not to be same in each group.
* It should satisfy two principles i.e. replication and randomization.

**Two way Anova:**

* Two-way anova is a hypothesis test to classify the data based on two factors.
* In two-way anova, compares multiple levels of two factors and number od observations should be in the same group.
* It should satisfy three principles which are replication, randomization and local control.