



SNS COLLEGE OF ENGINEERING



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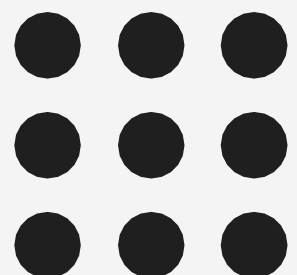
Department of Information Technology

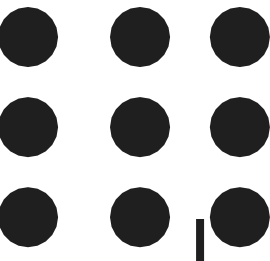
19IT601 - Data Science and Analytics

III Year / VI Semester

Unit 2 - DESCRIPTIVE ANALYTICS USING STATISTICS

Topic 7: Univariate, Bivariate and Multivariate
Analysis





Univariate Analysis

- Univariate analysis is the simplest of the three analyses where the data you are analyzing is only one variable.
- The objective of univariate analysis is to derive the data, define and summarize it, and analyze the pattern present in it. In a dataset, it explores each variable separately.
- When the data contains only one variable and doesn't deal with a causes or effect relationships then a Univariate analysis technique is used.
- Some patterns that can be easily identified with univariate analysis are Central Tendency (mean, mode and median), Dispersion (range, variance), Quartiles (interquartile range), and Standard deviation.
- Common visual technique used for univariate analysis is a histogram, which is a frequency distribution graph.
- Other visualization techniques includes Frequency Distribution Tables, Frequency Polygons, Pie Charts, Bar Charts.



Univariate Analysis



- In a survey of a class room, the researcher may be looking to count the number of boys and girls.
- In this instance, the data would simply reflect the number, i.e. a single variable and its quantity as per the below table.
- The key objective of Univariate analysis is to simply describe the data to find patterns within the data.
- This is be done by looking into the mean, median, mode, dispersion, variance, range, standard deviation etc



Bivariate Analysis



- This type of data involves two different variables.
- The analysis of this type of data deals with causes and relationships and the analysis is done to find out the relationship among the two variables
- Bivariate analysis is where you are comparing two variables to study their relationships.
- These variables could be dependent or independent to each other. In Bivariate analysis is that there is always a Y-value for each X-value.
- Bivariate analysis is conducted using
 - Correlation coefficients
 - Regression analysis



Bivariate Analysis



Example

- In a survey of a classroom, the researcher may be looking to analysis the ratio of students who scored above 85% corresponding to their genders.
- In this case, there are two variables – gender = X (independent variable) and result = Y (dependent variable).
- A Bivariate analysis is will measure the correlations between the two variables.



Multivariate Analysis



Multivariate analysis is a more complex form of statistical analysis technique and used when there are more than two variables in the data set.

When the data involves three or more variables, it is categorized under multivariate.

Types of Multivariate Analysis include

- Cluster Analysis,
- Factor Analysis,
- Multiple Regression Analysis,
- Principal Component Analysis



Multivariate Analysis



Example

A doctor has collected data on cholesterol, blood pressure, and weight.

She also collected data on the eating habits of the subjects (e.g., how many ounces of red meat, fish, dairy products, and chocolate consumed per week).

She wants to investigate the relationship between the three measures of health and eating habits?

In this instance, a multivariate analysis would be required to understand the relationship of each variable with each other.



THANK YOU