Week-06-L-01

Agricultural Statistics in Practice

Multivariate Analysis

General Idea and Classification of Multivariate Analysis

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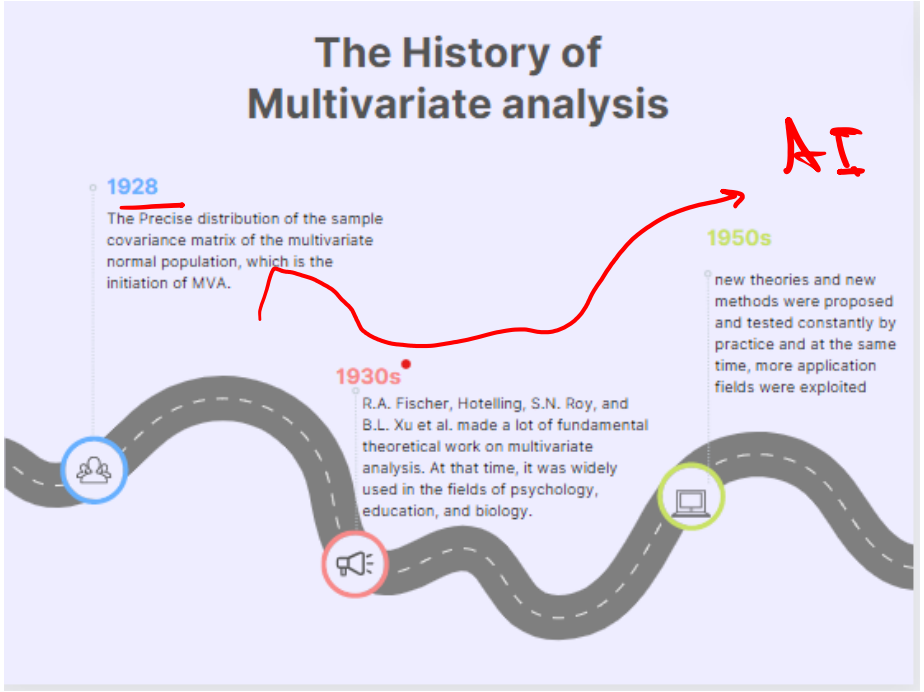
Multivariate Analysis

- Multivariate Analysis is a method that deals with multiple dependent variables to predict an outcome. It acknowledges that real-world problems are often complex and involve various factors.



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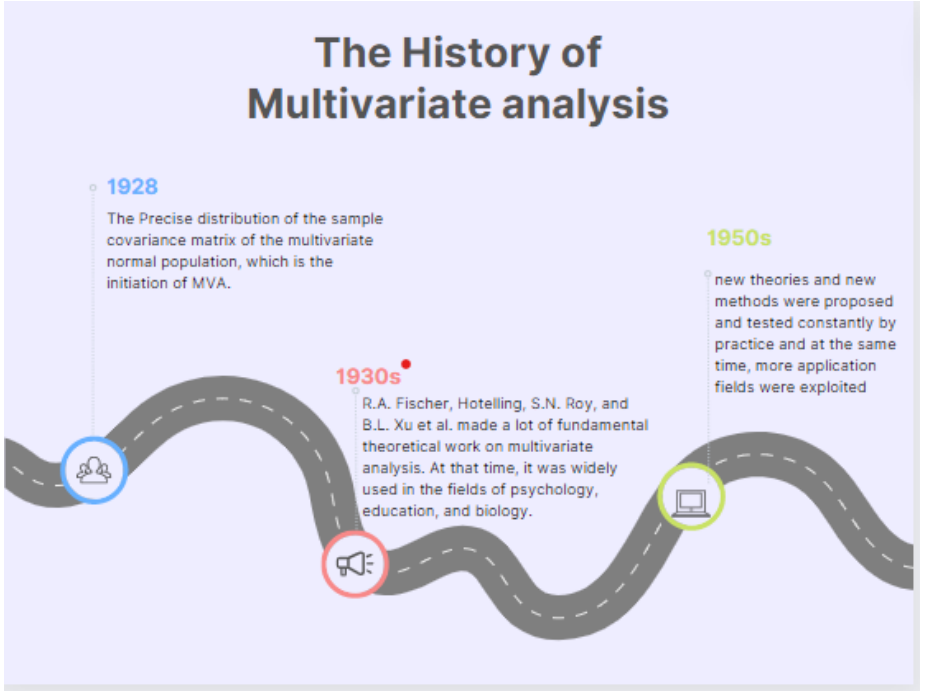
Multivariate Analysis

- For instance, weather prediction cannot rely solely on the season; it requires considering pollution, humidity, precipitation, and more.
- In this overview, we will explore the history of multivariate analysis, its applications across agricultural areas.



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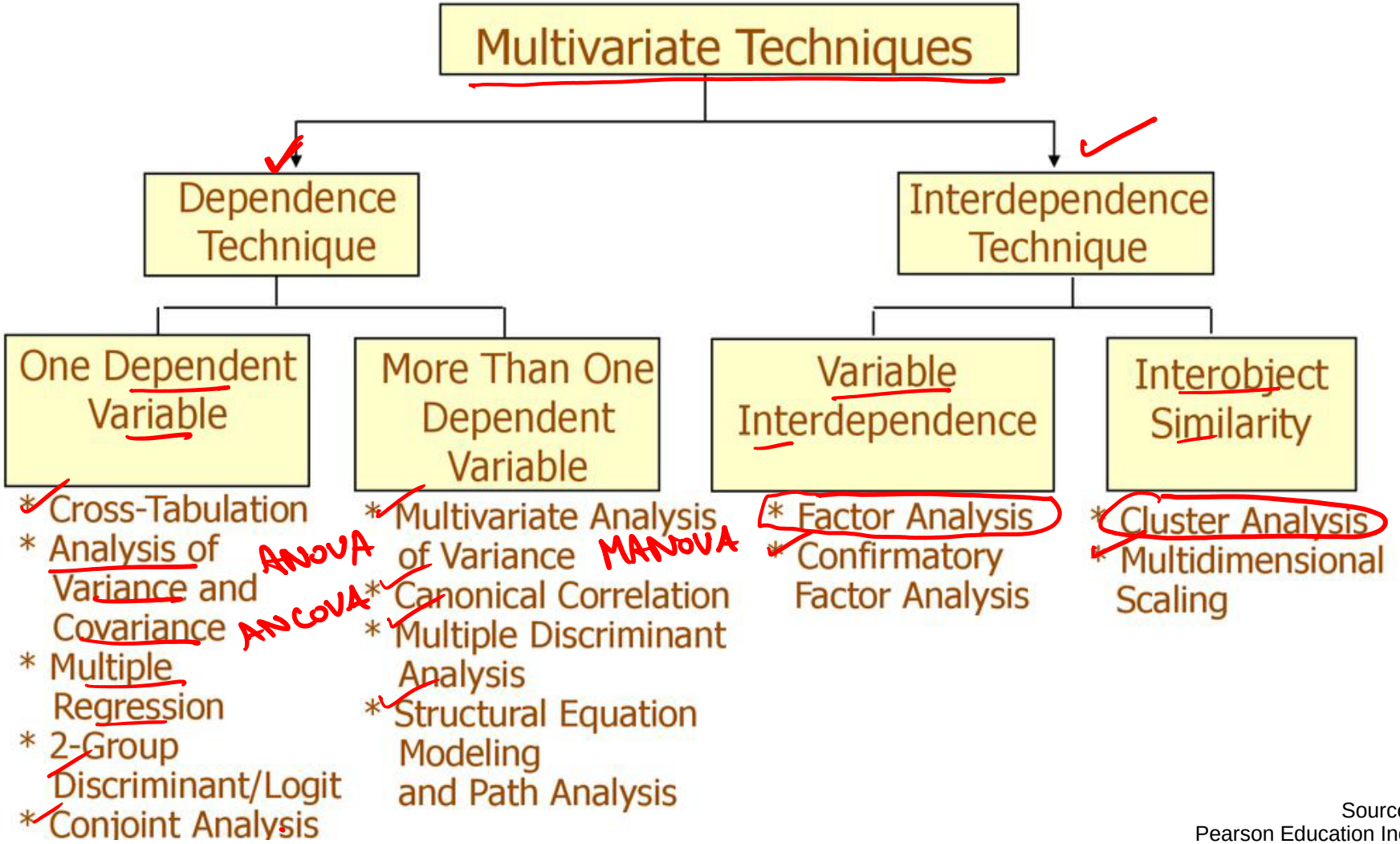
Objectives

Factor Analysis
Cluster Analysis

- Data reduction or structural simplification: Simplify the data while retaining valuable information, making interpretation easier.
- Sorting and grouping: Multiple variables are used to create groups of "similar" objects or variables based on their measured characteristics.
- Investigation of dependence among variables: The focus is on understanding the relationships between variables. Are the variables independent, or are some dependent on others? → Correlation
- Prediction of relationships between variables: The objective is to determine the relationships between variables in order to predict the values of one or more variables based on observations of others.
- Hypothesis construction and testing: Specific statistical hypotheses are formulated and tested to validate assumptions or strengthen existing beliefs about the parameters of multivariate populations.

Classification



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Advantages and Challenges

- ***Advantages:***
- **Enhanced Accuracy:** By considering multiple independent variables that impact the dependent variables, multivariate analysis provides more accurate conclusions.
- **Realistic Conclusions:** The conclusions drawn through multivariate analysis are closer to real-life situations, reflecting the complexity of the phenomena studied.

Matlab; MathWorks; R; MS Excel

- ***Challenges:***
- **Complex Computations:** Multivariate analysis often involves intricate calculations, which can be challenging and require specialized knowledge.
- **Time-Consuming:** Collecting and tabulating numerous observations for a large number of variables is a time-consuming process in multivariate analysis.

Thank You