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A Practical Roadmap for Choosing Correct Statistical Tests, Based on Three Decades of Teaching Experience

Throughout my years of research and university teaching, as well as advising master's and doctoral theses in applied fields such as economics, management, biology, geology, and agriculture, I have noticed that students and researchers often face difficulties in selecting appropriate statistical methods to validate their hypotheses. They may either choose an inappropriate method or fail to consider its underlying assumptions. This issue applies not only to complex models but also to conventional statistical methods.

Selecting the correct statistical test is critical, especially when examining relationships between variables or choosing between parametric and nonparametric approaches. Based on my thirty years of teaching experience, this presentation provides a clear, practical roadmap for making this choice correctly.

We begin by distinguishing between parametric and nonparametric methods, highlighting necessary conditions including normality, homogeneity of variances, sample size, and measurement scale. For relationships between two variables, we categorize relevant tests such as Pearson/Spearman correlation, t-test, Mann–Whitney, ANOVA, Kruskal–Wallis, Wilcoxon and chi-square test.

A novel contribution of this presentation is a set of operational flowcharts and decision algorithms that guide researchers step-by-step toward the correct test. These tools are built from practical scenarios frequently encountered in applied statistics. Each algorithm explicitly checks assumptions, data types, and research questions before recommending a specific test.

Attendees will leave this session having observed a comprehensive dashboard of relevant statistical tests simultaneously, while learning how to select the appropriate test for their specific research context.

Special/ Invited session

Classification

Both methodology and application

Keywords

Hypothesis testing, Parametric vs. nonparametric methods, Applied statistics

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