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Shiny Application: t-test and ANOVA

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1 Introduction

The application developed in R/Shiny enables complete statistical analysis for mean comparison through parametric tests. Its interactive design facilitates:

- **Descriptive analysis**: Calculation of measures such as mean, median, standard deviation and coefficient of variation
- **Inferential tests**: Implementation of:
  - t-tests for independent and paired samples
  - One-way ANOVA for multiple group comparison
- **Data validation**: Automatic detection of outliers and missing values

2 Objectives

2.1 General Objective

To develop an interactive platform that integrates basic statistical analysis with didactic tools to facilitate result interpretation.

2.2 Specific Objectives

- Implement a tab-based interface for better navigation
- Generate automatic interpretations of statistical results
- Provide graphical visualizations with integrated explanations
- Enable result export in standard formats (Excel and PDF)

3 Methodology

3.1 Application Structure

The tool follows a modular architecture:

- **Control panel**:
  - File upload (CSV/Excel)
  - Variable selection
  - Analysis configuration
- **Visualization**:
  - Result tables
  - Interactive graphs
  - Textual interpretation

3.2 Implemented Technologies

Main packages used include:

- **Shiny**: For interactive web interface
- **ggplot2**: High-quality graph generation
- **dplyr**: Efficient data manipulation
- **DT**: Interactive table visualization

4 Results and Features

The application offers:

- **Complete analysis**:
  - Detailed descriptive statistics
  - Hypothesis testing with p-value
  - Assumption validation
- **Intuitive visualization**:
  - Group boxplots
  - Distribution histograms
  - Scatter plots
- **Flexible export**:
  - PDF reports with results
  - Excel tables for further analysis

5 Conclusions

The developed application represents a complete solution that:

- Combines analytical capabilities with a didactic approach
- Facilitates learning of statistical concepts
- Provides professional-ready results
- Adapts to various academic and research contexts