Package: MOutliers (via r-universe)

June 16, 2026

Title Multivariate Outlier Detection Methods

Version 0.0.0.9000

Description Provides tools for detecting multivariate outliers in numeric datasets using Mahalanobis distance, robust Minimum Covariance Determinant (MCD), and Principal Component Analysis (PCA)-based methods. The Mahalanobis distance calculations are performed using an efficient C++ backend via Rcpp.

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RoxygenNote 7.3.2

LinkingTo Rcpp

Imports Rcpp, stats, MASS, ggplot2, gridExtra, cowplot, rlang

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

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VignetteBuilder knitr

Repository https://senuyasara.r-universe.dev

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Contents

`detect_multivariate_outliers` *Detect Multivariate Outliers*

Description

Detects multivariate outliers using Mahalanobis, Minimum Covariance Determinant (MCD), or PCA-based distances. Supports robust detection by computing distance scores for each observation and comparing them against a chi-squared cutoff at a specified significance level.

Usage

```
detect_multivariate_outliers(data, method = "mahalanobis", alpha = 0.975)
```

Arguments

`data`	A numeric data frame or matrix.
`method`	Outlier detection method: "mahalanobis", "mcd", or "pca".
`alpha`	Significance level (default = 0.975).

Value

A data frame combining the original input data with distances and outlier flags.

Examples

```
df_mtcars <- mtcars[, c("mpg", "hp", "wt" )]
head(df_mtcars)

## Mahalanobis Distance
result_mahal <- detect_multivariate_outliers(df_mtcars, method = "mahalanobis", alpha = 0.975)

## Minimum Covariance Determinant (MCD)
result_mcd <- detect_multivariate_outliers(df_mtcars, method = "mcd", alpha = 0.975)

## Principal Component Analysis (PCA)
result_pca <- detect_multivariate_outliers(df_mtcars, method = "pca", alpha = 0.975)
```

plot_outliers *Plot Pairwise Outliers*

Description

Generates 2D scatterplots for each pair of variables in the dataset, with outliers identified using Mahalanobis or MCD distances computed across all variables, without including each observation in its own distance calculation.

Usage

```
plot_outliers(data, method = c("mahalanobis", "mcd"), alpha = 0.975)
```

Arguments

data	A numeric data frame or matrix.
method	Outlier detection method: "mahalanobis" or "mcd".
alpha	The quantile cutoff for identifying outliers (default 0.975).

Examples

```
df_mtcars <- mtcars[, c("mpg", "hp", "wt" )]
head(df_mtcars)

## Pairwise Plots: Mahalanobis
plot_outliers(df_mtcars, method = "mahalanobis", alpha = 0.975)

## Pairwise Plots: MCD
plot_outliers(df_mtcars, method = "mcd", alpha = 0.975)
```

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