Package 'GMC'

October 31, 2025

Type Package

Title Generalized Measure of Correlation (GMC)

Version 0.1.2

Description Provides tools to compute the Generalized Measure of Correlation (GMC), a dependence measure accounting for nonlinearity and asymmetry in the relationship between variables. Based on the method proposed by Zheng, Shi, and Zhang (2012) <doi:10.1080/01621459.2012.710509>.

License GPL (>= 3)

Encoding UTF-8

RoxygenNote 7.3.2

Suggests testthat (>= 3.0.0), knitr, rmarkdown

Config/testthat/edition 3

Imports ks, stats

VignetteBuilder knitr

NeedsCompilation no

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Repository CRAN

Date/Publication 2025-10-31 12:10:02 UTC

Contents

GMC_feature_ranking *Feature selection using GMC ranking*

Description

Feature selection using GMC ranking

Usage

```
GMC_feature_ranking(X, Y, kernel = dnorm, sort = TRUE)
```

Arguments

X	A matrix or data.frame of predictors
Y	A numeric response vector
kernel	Kernel function (default = dnorm)
sort	Logical, whether to sort variables by GMC score

Value

A data.frame with variable names and GMC scores

Examples

```
# Generate sample data with multiple predictors
set.seed(123)
n <- 500
X1 <- rnorm(n)
X2 <- rnorm(n)
X3 <- rnorm(n)
Y <- 2 * X1 + X2^2 + rnorm(n, sd = 0.5)
X <- cbind(X1, X2, X3)

# Rank features by GMC
ranking <- GMC_feature_ranking(X, Y)
print(ranking)
```

GMC_X_given_Y *Generalized Measure of Correlation: GMC(X | Y)*

Description

Generalized Measure of Correlation: GMC(X | Y)

Usage

```
GMC_X_given_Y(X, Y, kernel = dnorm)
```

Arguments

X	Predictor variable
Y	Response variable
kernel	Kernel function (default = dnorm)

Value

GMC(X|Y) estimate

Examples

```
# Generate sample data with nonlinear relationship
set.seed(123)
n <- 1000
X <- rnorm(n)
Y <- X^2 + rnorm(n, sd = 0.5)

# Calculate GMC(X|Y)
gmc_result <- GMC_X_given_Y(X, Y)
print(gmc_result)
```

GMC_Y_given_X *Generalized Measure of Correlation: GMC(Y | X)*

Description

Generalized Measure of Correlation: GMC(Y | X)

Usage

```
GMC_Y_given_X(X, Y, kernel = dnorm)
```

Arguments

X	Predictor variable
Y	Response variable
kernel	Kernel function (default = dnorm)

Value

GMC(Y|X) estimate

Examples

```
# Generate sample data with linear relationship
set.seed(123)
n <- 1000
X <- rnorm(n)
Y <- 2 * X + rnorm(n, sd = 0.5)

# Calculate GMC(Y|X)
gmc_result <- GMC_Y_given_X(X, Y)
print(gmc_result)
```

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