

Package ‘nlcor’

March 8, 2020

Type Package

Title Compute Nonlinear Correlations

Version 1.2.0

Description An implementation of an efficient heuristic to compute the nonlinear correlations between numeric vectors. The heuristic works by adaptive identifying multiple local regions of linear correlations to estimate the overall nonlinear correlation. The nonlinear correlations estimate has various applications in data exploration and variable selection for nonlinear models.

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Encoding UTF-8

LazyData true

Imports ggplot2,
stats

Suggests testthat (>= 2.1.0),
reshape2,
knitr,
rmarkdown

RoxygenNote 7.0.2

Depends R (>= 3.0.1)

VignetteBuilder knitr

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FindSegmentSize	<i>Find the segmentation size.</i>
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Description

Identify a segment size that yields at least 5 record.

Usage

```
FindSegmentSize(l, refine)
```

Arguments

l	An integer.
refine	Optional. Default value 0.5. Increase the value to increase the granularity of local correlation computation.

Value

A floating number s between 0 and 1.

Examples

```
FindSegmentSize(l = 100, refine = 0.9)
```

NetCor	<i>Find net correlation from the "linear" segments.</i>
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Description

Find net correlation from the "linear" segments.

Usage

```
NetCor(cors, pvalues, p.threshold = 0.05)
```

Arguments

cors	A vector correlations.
pvalues	A vector of pvalues corresponding to the correlations in the cors vector.
p.threshold	The overall threshold of p value, also known as the significance level.

Value

The net correlation estimate, cor.estimate, and a list containing the adjusted correlations and pvalues for each "linear" segment.

Examples

```
cors <- c(-0.70, 0.93, -0.79, 0.91)
pvalues <- c(0.004, 0.0006, 0.0007, 0.009)
NetCor(cors, pvalues)
```

nlcor

*Compute Nonlinear Correlation***Description**

Compute nonlinear correlation using spatial sampling. Local linear correlations are computed at the samples and combined.

Usage

```
nlcor(x, y, refine = 0.975, plt = F, line_thickness = 1, line_opacity = 1)
```

Arguments

x	A numeric vector. NAs are not allowed. The length of the vector should be more than 10.
y	A numeric vector. NAs are not allowed. Length should be same as x.
refine	Optional. Default value 0.5. Increase the value to increase the granularity of local correlation computation.
plt	Optional. Default value FALSE. Set TRUE to return ggplot2 object for the data correlation visualization.

Value

The output is a list containing the nonlinear correlation `cor.estimate`, `adjusted.p.value`, and `cor.plot`. `cor.estimate` is between 0 and 1 (a negative nonlinear correlation is undefined). The `adjusted.p.value` shows the statistical significance of the `cor.estimate`. If `adjusted.p.value > 0.05`, the nonlinear correlation estimate can be considered as noise (statistically not significant). If `plt = T`, ggplot2 object is return for plotting the identified local linear correlations in the data.

See Also

[cor](#)

Examples

```
library(nlcor)
library(ggplot2)
plot(x1, y1)
c <- nlcor(x1, y1)
c
c <- nlcor(x2, y2, plt = TRUE)
print(c$cor.plot)
c <- nlcor(x3, y3, refine = 0.9, plt = TRUE)
c$cor.estimate
```

```
c$adjusted.p.value
print(c$cor.plot)
```

PlotNlcor

Plotting the nonlinear correlation.

Description

Plot nonlinear correlation.

Usage

```
PlotNlcor(x, y, segment.cor, s, line_thickness = 1, line_opacity = 1)
```

Arguments

x	A numeric vector. NAs are not allowed.
y	A numeric vector. NAs are not allowed. Length should be same as x.
segment.cor	A list Segment-wise correlation and associated p.value
s	The sample size as percent of the vector length. A float number between 0 and 1.

Value

ggplot plot object

Examples

```
library(ggplot2)
segment.cor <- list(cor = c(-0.77, 0.52, 0.91, 0.11, 0.43),
  p.value = c(0.00000012, 0.0002332, 0.0041, 0.01123, 0.52))
PlotNlcor(x, y, segment.cor = segment.cor, s = 0.2)
```

SampleCor

Correlation from spatial sampling.

Description

Compute nonlinear correlation from local linear correlations at some spatial sampling

Usage

```
SampleCor(x, y, s)
```

Arguments

x	A numeric vector. NAs are not allowed.
y	A numeric vector. NAs are not allowed. Length should be same as x.
s	The sample size as percent of the vector length. A float number between 0 and 1.

Value

list(cor, pvalue) containing the correlations and its pvalue for each segment.

Examples

```
SampleCor(x, y, s = 0.2)
```

Segment	<i>Segmentation.</i>
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Description

Segment 1:1 in to almost equal set of indices.

Usage

```
Segment(l, s)
```

Arguments

l	An integer.
s	A float number between 0 and 1.

Value

The list of segmented sequence 1:1.

Examples

```
Segment(l = 100, s = 0.2)
```

x	x
---	---

Description

a simple vector of 48 observation. This data set should be used with y to see the correlation

Usage

```
data("x")
```

Format

The format is: num [1:48] 30.729 11.286 33.706 34.347 -0.698 ...

Source

It is a simulated data. It is not from any specific source

x1	x1
----	----

Description

a simple vector of 1095 observation. This data set should be used with y1 to see the correlation

Usage

```
data("x1")
```

Format

The format is: int [1:1095] 1 2 3 4 5 6 7 8 9 10 ...

Source

It is a simulated data. It is not from any specific source

x2	x2
----	----

Description

a simple vector of 701 observation. This data set should be used with y2 to see the correlation

Usage

```
data("x2")
```

Format

The format is: num [1:701] -3 -2.99 -2.98 -2.97 -2.96 -2.95 -2.94 -2.93 -2.92 -2.91 ...

Source

It is a simulated data. It is not from any specific source

x3	x3
----	----

Description

a simple vector of 4001 observation. This data set should be used with y3 to see the correlation

Usage

```
data("x3")
```

Format

The format is: num [1:4001] -6.28 -6.28 -6.28 -6.27 -6.27 ...

Source

It is a simulated data. It is not from any specific source

y	y
---	---

Description

a simple vector of 48 observation. This data set should be used with x to see the correlation

Usage

```
data("y")
```

Format

The format is: num [1:48] 5.648 0.515 5.636 2.291 5.261 ...

Source

It is a simulated data. It is not from any specific source

y1	y1
----	----

Description

a simple vector of 1095 observation. This data set should be used with x1 to see the correlation

Usage

```
data("y1")
```

Format

The format is: num [1:1095] 87.6 80.1 70.1 89.2 65.7 ...

Source

It is a simulated data. It is not from any specific source

y2	y2
----	----

Description

a simple vector of 701 observation. This data set should be used with x2 to see the correlation

Usage

```
data("y2")
```

Format

The format is: num [1:701] -3.52 -3.73 -2.3 -3.1 -3.63 ...

Source

It is a simulated data. It is not from any specific source

y3	y3
----	----

Description

a simple vector of 4001 observation. This data set should be used with y3 to see the correlation

Usage

```
data("y3")
```

Format

The format is: num [1:4001] 0.0195 0.0159 0.0484 0.0358 0.0149 ...

Source

It is a simulated data. It is not from any specific source

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