Package ‘onlineBcp’

July 22, 2025

Type Package

Title Online Bayesian Methods for Change Point Analysis

Version 0.1.8

Description It implements the online Bayesian methods for change point analysis. It can also perform missing data imputation with methods from 'VIM'. The reference is Yigiter A, Chen J, An L, Danacioglu N (2015) <doi:10.1080/02664763.2014.1001330>. The link to the package is <`https://CRAN.R-project.org/package=onlineBcp`>.

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Depends R (>= 3.1.0)

Encoding UTF-8

LazyData true

RoxygenNote 7.1.2

Imports VIM

Suggests knitr, rmarkdown, testthat

VignetteBuilder knitr

NeedsCompilation no

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Repository CRAN

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Contents

`aCGH` *Transformed aCGH data*

Description

A dataset containing the tranformed aCGH data from the genome of the fibroblast cell line GM02948

Usage

```
aCGH
```

Format

A data frame with 2046 rows and 1 variable:

transNorm normalized aCGH intensity

`addDatapoint` *Add one data point*

Description

Add one data point

Usage

```
addDatapoint(bcp, d)
```

Arguments

`bcp`	current BayesCP object
`d`	additional data point to be added to the existing data

Value

a vector with new data point appended

`cnv_H2347` *GC-corrected data for copy number variation*

Description

A dataset containing the raw data and GC-corrected/normalized data

Usage

```
cnv_H2347
```

Format

A data frame with 14189 rows and 2 variables:

raw.count raw read counts

normalized.count normalized read counts

`combine` *Combine two BayesCP objects*

Description

Combine two BayesCP objects

Usage

```
combine(bcp1, bcp2)
```

Arguments

`bcp1`	the first BayesCP object to be combined
`bcp2`	the second BayesCP opbject to be combined

Value

The combined BayesCP object. Notice that if bcp1 has n1 change points (n1 + 1 segments), and bcp2 has n2 change points (n2 + 1 segments), the combined bcp will have n1+n2 change points and n1+n2+2 segments.

`covid` *US COVID-19 data*

Description

A dataset containing new daily cases in the United States downloaded from the World Health Organization on August 25, 2020

Usage

```
covid
```

Format

A data frame with 219 rows and 8 variables

Date_reported The report date

Country_code The code for country

Country Country in full name

WHO_region Geographic region defined by WHO

New_cases New COVID-19 cases

Cumulative_cases Cumulative COVID-19 cases

New_deaths New COVID-19 deaths

Cumulative_deaths Cumulative COVID-19 deaths

`imputation` *Impute missing data*

Description

Impute missing data

Usage

```
imputation(x, method = c("Median", "kNN"))
```

Arguments

`x`	the normalized data with missing
`method`	the imputation method

Value

The vector of imputed data with no missing values

`online_cp` *Online change point detection algorithm for normally distributed data.*

Description

Online change point detection algorithm for normally distributed data.

Usage

```
online_cp(x, theta = 0.9, alpha = 1, beta = 1, th_cp = 0.5, debug = FALSE)
```

Arguments

`x`	the normalized data
`theta`	the probability of occurrence of a change point, default 0.9
`alpha`	the hyperparameter of posterior distribution, default 1.0
`beta`	the hyperparameter of posterior distribution, default 1.0
`th_cp`	threshold level for the posterior distribution of change point, default 0.5
`debug`	a logical value, when TRUE, will print more information

Value

An object of the BayesCP class

`plot.BayesCP` *Plot BayesCP object*

Description

Plot BayesCP object

Usage

```
## S3 method for class 'BayesCP'
plot(x, xlab = "Index", ylab = "x", ...)
```

Arguments

`x`	the BayesCP class object to be plotted
`xlab`	the default x-axis label, default "Index"
`ylab`	the default y-axis label, default "x"
`...`	the plotting parameters passed to plot()

Value

No return value, called for side effects

`summary.BayesCP` *Summarize BayesCP object*

Description

Summarize BayesCP object

Usage

```
## S3 method for class 'BayesCP'
summary(object, norm.test = FALSE, ...)
```

Arguments

`object`	the BayesCP class object to be summarized
`norm.test`	logical value for normality test, default is false
`...`	parameters passed to summary()

Value

An object of BayesCP class with updated summary result

Examples

```
x <- c(rnorm(10, 0, 1), rnorm(10, 5, 1))
bcp <- online_cp(x)
summary(bcp)
```

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