Package 'SBRect'

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Title Detecting structural breaks using rectangle covering (non-parametric method).

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Depends rJava

SystemRequirements java

Suggests MASS

Description The package uses fitting axes-aligned rectangles to a time series in order to find structural breaks. The algorithm enclose the time series in a number of axes-aligned rectangles and tries to minimize their area and number. As these are conflicting aims, the user has to specify a parameter alpha in [0.0,1.0]. Values close to 0 result in more breakpoints, values close to 1 in fewer. The left edges of the rectangles are the breakpoints. The package supplies two methods, computeBreakPoints(series,alpha) which returns the indices of the break points and computeRectangles(series,alpha) which returns the rectangles. The algorithm is randomised; it uses a genetic algorithm. Therefore, the break point sequence found can be different in different executions of the method on the same data, especially when used on longer series of some thousand observations. The algorithm uses a range-tree as background data structure which makes i very fast and suited to analyse series with millions of observations. A detailed description can be found in Paul Fischer, Astrid Hilbert, Fast detection of structural breaks, Proceedings of Compstat 2014.

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URL http://www2.imm.dtu.dk/~pafi/StructBreak/index.html

BugReports pafi@dtu.dk

NeedsCompilation no

Repository CRAN

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R topics documented:

`computeBreakPoints` *Structural break detection with rectangles*

Description

Find structural breaks by fitting it rectangles to a time series. The algorithm is randomised; it uses a genetic algorithm. Therefore, the break point sequence found can be different in different executions of the method on the same data, especially when used on longer series of some thousand observations.

Usage

```
computeBreakPoints(series,alpha)
```

Arguments

`series`	The time series as a vector of doubles.
`alpha`	A double in the range $[0.0; 1.0]$. Values close to 0 result in more breakpoints, values close to 1 in fewer. With no background knowledge, $alpha = 0.25$ is a good start value for experiments.

Value

The break points found as a vector of integers. The first entry always is 0 (the first index of the series) the last one is the length of the series (note, indexing starts with 0). The other entries are the indices of the internal break points.

Author(s)

Paul Fischer and Astrid Hilbert

Examples

```
series <- c(1,2,1,2,1,2,5,6,5,6,5,6)
alpha <- 0.25
breaks <- computeBreakPoints(series,alpha)
breaks
```

`computeRectangles` *Structural break detection with rectangles*

Description

Find structural breaks by fitting it rectangles to a time series. The algorithm is randomised; it uses a genetic algorithms. Therefore, the break point sequence found can be different in different executions of the method on the same data, especially when used on longer series of some thousand observations.

Usage

```
computeRectangles(series,alpha)
```

Arguments

`series`	The time series as a vector of doubles.
`alpha`	A double in the range[0.0;1.0]. Values close to 0 result in more breakpoints, values close to 1 in fewer. With no background knowledge, alpha = 0.25 is a good start value for experiments.

Value

The rectangles found by the algorithm as a $k \times 4$ matrix of doubles. Each row is of length 4, describing one rectangle, $R_i = [llx, lly, urx, ury]$, where (llx, lly) is the lower left corner of the rectangle and (urx, ury) is the upper right corner.

Author(s)

Paul Fischer and Astrid Hilbert

Examples

```
series <- c(1,2,1,2,1,2,5,6,5,6,5,6)
alpha <- 0.25
rects <- computeRectangles(series,alpha)
rects
```

Index