Package ‘sazedR’

Type Package
Title Parameter-Free Domain-Agnostic Season Length Detection in Time Series
Version 2.0.2
Description Spectral and Average Autocorrelation Zero Distance Density ('sazed') is a method for estimating the season length of a seasonal time series. 'sazed' is aimed at practitioners, as it employs only domain-agnostic preprocessing and does not depend on parameter tuning or empirical constants. The computation of 'sazed' relies on the efficient autocorrelation computation methods suggested by Thibauld Nion (2012, URL: <https://etudes.tibonihoo.net/literate_musing/autocorrelations.html>) and by Bob Carpenter (2012, URL: <https://lingpipe-blog.com/2012/06/08/autocorrelation-fft-kiss-eigen/>).
License GPL-2
URL https://github.com/mtoller/autocorr_season_length_detection/
Encoding UTF-8
LazyData true
Imports bspec (>= 1.5), dplyr (>= 0.8.0.1), fftwtools (>= 0.9.8), pracma (>= 2.1.4), zoo (>= 1.8-3)
RoxygenNote 6.1.1
NeedsCompilation no
Author Maximilian Toller [aut], Tiago Santos [aut, cre], Roman Kern [aut]
Maintainer Tiago Santos <teixeiradossantos@tugraz.at>
Repository CRAN
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R topics documented:

aze ................................................................. 2
Compute the AZE component of the SAZED ensemble

Description
aze estimates the season length of its argument from the mean autocorrelation zero distance

Usage
aze(y, preprocess = T)

Arguments
y The input time series.
preprocess If true, y is detrended and z-normalized before computation.

Value
The AZE season length estimate of y.

Examples
season_length <- 26
y <- sin(1:400*2*pi/season_length)
aze(y)
aze(y, preprocess = FALSE)
azed

Compute the AZED component of the SAZED ensemble

Description
azed computes the autocorrelation of its argument, and then derives the season length from its the autocorrelations zero density.

Usage
azed(y, preprocess = T)

Arguments
y The input time series.
preprocess If true, y is detrended and z-normalized before computation.

Value
The AZED season length estimate of y.

Examples
season_length <- 26
y <- sin(1:400*2*pi/season_length)
azed(y)
azed(y, preprocess = FALSE)

computeAcf
Compute and shorten autocorrelation

Description
computeAcf computes the autocorrelation function of its argument and discards the zero lag and all lags greater than 2/3 of the argument’s length.

Usage
computeAcf(y)

Arguments
y The input time series.

Value
The shortened autocorrelation
Examples

```r
code
season_length <- 26
y <- sin(1:400*2*pi/season_length)
computeAcf(y)
```

```
downsampling <- function(data, window_size = 2)
  downsample

Arguments

data: The input time series.
window_size: The size of the rolling mean window used.

Value

The downsampled time series.
```

Preprocess Time Series for SAZED ensemble

Description

preprocessTs detrends and z-normalizes its argument.

Usage

preprocessTs(y)

Arguments

y: The input time series.

Value

The detrended and z-normalized time series.

Examples

```r
code
season_length <- 26
y <- sin(1:400*2*pi/season_length)
preprocessTs(y)
```
**S**

*Compute the S component of the SAZED ensemble*

**Description**
S computes the spectral density of its argument, and then derives the season length from it.

**Usage**

\[ S(y, \text{preprocess} = T) \]

**Arguments**

- \( y \)  The input time series.
- \( \text{preprocess} \)  If true, \( y \) is detrended and z-normalized before computation.

**Value**
The S season length estimate of \( y \).

**Examples**
```
season_length <- 26
y <- sin(1:400*2*pi/season_length)
S(y)
S(y, preprocess = FALSE)
```

---

**Sa**

*Compute the SA component of the SAZED ensemble*

**Description**
Sa computes the autocorrelation of its argument, and then derives the season length from its spectral density.

**Usage**

\[ Sa(y, \text{preprocess} = T) \]

**Arguments**

- \( y \)  The input time series.
- \( \text{preprocess} \)  If true, \( y \) is detrended and z-normalized before computation.

**Value**
The SA season length estimate of \( y \).
Examples

```r
season_length <- 26
y <- sin(1:400*2*pi/season_length)
Sa(y)
Sa(y, preprocess = FALSE)
```

**sazed**  
*SAZED Ensemble (Optimum)*

**Description**

`sazed` estimates a time series’ season length by combining 3 different estimates computed on an input time series and its 10-fold self-composed autocorrelation.

**Usage**

`sazed(y)`

**Arguments**

`y`  
The input time series.

**Value**

The season length of the input time series.

**Examples**

```r
season_length <- 26
y <- sin(1:400*2*pi/season_length)
sazed(y)
```

---

**sazed.maj**  
*SAZED Ensemble (Majority)*

**Description**

`sazed.maj` estimates a time series’ season length by computing 6 different estimates and taking a majority vote.

**Usage**

`sazed.maj(y, iter = 0, method = "down", preprocess = T)`
sazedR

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>The input time series.</td>
</tr>
<tr>
<td>iter</td>
<td>The recursion depth.</td>
</tr>
<tr>
<td>method</td>
<td>The method used for breaking ties. One of c(&quot;alt&quot;,&quot;diff&quot;,&quot;down&quot;).</td>
</tr>
<tr>
<td>preprocess</td>
<td>If true, y is detrended and z-normalized before computation.</td>
</tr>
</tbody>
</table>

Value

The season length of the input time series.

Examples

```r
season_length <- 26
y <- sin(1:400*2*pi/season_length)
sazed.maj(y)
```

sazedR: A package for estimating the season length of a seasonal time series.

Description

The sazedR package provides the main function to compute season length, sazed, which is an ensemble of many season length estimation methods, also included in this package.

ze

Compute the ZE component of the SAZED ensemble

Description

ze estimates the season length of its argument from the mean zero distance

Usage

```r
ze(y, preprocess = T)
```

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>The input time series.</td>
</tr>
<tr>
<td>preprocess</td>
<td>If true, y is detrended and z-normalized before computation.</td>
</tr>
</tbody>
</table>

Value

The ZE season length estimate of y.
Examples

```r
season_length <- 26
y <- sin(1:400*2*pi/season_length)
ze(y)
ze(y, preprocess = FALSE)
```

---

**Description**

`zed` computes the zero density of its argument, and then derives the season length from it.

**Usage**

```r
zed(y, preprocess = T)
```

**Arguments**

- `y` The input time series.
- `preprocess` If true, y is detrended and z-normalized before computation.

**Value**

The ZED season length estimate of y.

**Examples**

```r
season_length <- 26
y <- sin(1:400*2*pi/season_length)
ze(y)
ze(y, preprocess = FALSE)
```
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