Package 'sazedR'

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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

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R topics documented:

aze 2

azed . . . 3
computeAcf . . . 3
downsample . . . 4
preprocessTs . . . 4
S . . . 5
Sa . . . 5
sazed . . . 6
sazed.maj . . . 6
sazedR . . . 7
ze . . . 7
zed . . . 8

Index **9**

`aze` *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

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

`downsample` *Downsample Time Series*

Description

`downsample` samples down a time series with a rolling mean.

Usage

```
downsample(data, window_size = 2)
```

Arguments

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

Value

The downsampled time series.

`preprocessTs` *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

```
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, preprocess = T)
```

Arguments

y	The input time series.
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, preprocess = T)
```

Arguments

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

Value

The SA season length estimate of y.

Examples

```
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

```
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)
```

Arguments

y	The input time series.
iter	The recursion depth.
method	The method used for breaking ties. One of c("alt","diff","down").
preprocess	If true, y is detrended and z-normalized before computation.

Value

The season length of the input time series.

Examples

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

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sazedR — *sazedR: A package for 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.

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ze — *Compute the ZE component of the SAZED ensemble*

Description

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

Usage

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

Arguments

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

Value

The ZE season length estimate of y.

Examples

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

---

zed *Compute the ZED component of the SAZED ensemble*

Description

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

Usage

```
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

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

Index

aze, 2
azed, 3

computeAcf, 3

downsample, 4

preprocessTs, 4

S, 5
Sa, 5
sazed, 6
sazed.maj, 6
sazedR, 7
sazedR-package (sazedR), 7

ze, 7
zed, 8