Package ‘PSF’

Type Package
Title Forecasting of Univariate Time Series Using the Pattern Sequence-Based Forecasting (PSF) Algorithm
Version 0.5
Date 2022-04-30
Author Neeraj Bokde, Gualberto Asencio-Cortes and Francisco Martinez-Alvarez
Maintainer Neeraj Bokde <neerajdhanraj@gmail.com>
Description Pattern Sequence Based Forecasting (PSF) takes univariate time series data as input and assist to forecast its future values. This algorithm forecasts the behavior of time series based on similarity of pattern sequences. Initially, clustering is done with the labeling of samples from database. The labels associated with samples are then used for forecasting the future behaviour of time series data. The further technical details and references regarding PSF are discussed in Vignette.

BugReports https://github.com/neerajdhanraj/PSF/issues
URL https://www.neerajbokde.in/viggnette/2021-10-13-PSF/
License GPL (>= 2)
Imports data.table, cluster
VignetteBuilder knitr
RoxygenNote 7.1.2
NeedsCompilation no
Encoding UTF-8
Repository CRAN
Date/Publication 2022-05-01 14:20:10 UTC
Suggests knitr, rmarkdown, forecast

R topics documented:

plot.psf ................................................................. 2
predict.psf ............................................................ 2
psf ................................................................. 3
plot.psf  
*Plot actual and forecasted values of an univariate time series*

**Description**

Takes an univariate time series and a vector with forecasted values.

**Usage**

```r
## S3 method for class 'psf'
plot(x, predictions = c(), cycle = 24, ...)
```

**Arguments**

- `x`: The trained PSF model generated by `psf()` function.
- `predictions`: A vector with previously computed forecasted values.
- `cycle`: The number of values that conform a cycle in the time series (e.g. 24 hours per day, 12 month per year, and so on). Only used when input data is not in time series (ts) format.
- `...`: Additional graphical parameters given to `plot` function.

**Examples**

```r
## Train a PSF model from the univariate time series 'nottem' (package:datasets).
p <- psf(nottem)

## Forecast the next 12 values of such time series.
pred <- predict(p, n.ahead = 12)

## Plot forecasted values.
plot(p, pred)
```

predict.psf  
*Forecasting of univariate time series using a trained PSF model*

**Description**

Takes a trained PSF model and the prediction horizon as inputs.

**Usage**

```r
## S3 method for class 'psf'
predict(object, n.ahead = 1, ...)
```
**Arguments**

- **object**: The trained PSF model generated by `psf()` function.
- **n.ahead**: The number of predicted values to be obtained.
- **...**: Other parameters will be ignored.

**Value**

Vector with the resulting predictions

**Examples**

```r
## Train a PSF model from the univariate time series 'nottem' (package:datasets).
p <- psf(nottem)

## Forecast the next 12 values of such time series.
pred <- predict(p, n.ahead = 12)
```

---

**psf**  
*Train a PSF model from an univariate time series using the PSF algorithm*

**Description**

Takes an univariate time series as input. Optionally, specific internal parameters of the PSF algorithm can be also specified.

**Usage**

`psf(data, k = seq(2, 10), w = seq(1, 10), cycle = 24)`

**Arguments**

- **data**: Input univariate time series, in any format (time series (ts), vector, matrix, list, data frame).
- **k**: The number of clusters, or a vector of candidate values to search for the optimum automatically.
- **w**: The window size, or a vector of candidate values to search for the optimum automatically.
- **cycle**: The number of values that conform a cycle in the time series (e.g. 24 hours per day). Only used when input data is not in time series format.
Value

An object of class 'psf' with 7 elements:

- **original_series**: Original time series stored to be used internally to build further plots.
- **train_data**: Adapted and normalized internal time series used to train the PSF model.
- **k**: Number of clusters used
- **w**: Window size used
- **cycle**: Determined cycle for the input time series.
- **dmin**: Minimum value of the input time series (used to denormalize internally further predictions).
- **dmax**: Maximum value of the input time series (used to denormalize internally further predictions).

Examples

```r
## Train a PSF model from the univariate time series 'nottem' (package:datasets).
p <- psf(nottem)

## Train a PSF model from the univariate time series 'sunspots' (package:datasets).
p <- psf(sunspots)
```
Index

plot.psf, 2
predict.psf, 2
psf, 3