Package 'WaveletANN'

January 20, 2025

Type Package

Title Wavelet ANN Model

Version 0.1.2

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Description The wavelet and ANN technique have been combined to reduce the effect of data noise. This wavelet-ANN conjunction model is able to forecast time series data with better accuracy than the traditional time series model. This package fits hybrid Wavelet ANN model for time series forecasting using algorithm by Anjoy and Paul (2017) <DOI:10.1007/s00521-017-3289-9>.

License GPL-3

Encoding UTF-8

Imports stats, wavelets, fracdiff, forecast, Metrics

NeedsCompilation no

RoxygenNote 7.2.1

Repository CRAN

Date/Publication 2022-09-08 10:33:00 UTC

Contents

WaveletFitting *Wavelet Transform Using Maximal Overlap Discrete Wavelet Transform (MODWT) Algorithm*

Description

Wavelet Transform Using Maximal Overlap Discrete Wavelet Transform (MODWT) Algorithm

Usage

```
WaveletFitting(ts, Wvlevels, Filter = "haar", bndry = "periodic", FFlag = TRUE)
```

Arguments

ts	Univariate time series
Wvlevels	The level of wavelet decomposition
Filter	Wavelet filter
bndry	The boundary condition of wavelet decomposition
FFlag	The FastFlag condition of wavelet decomposition: True or False

Value

- WaveletSeries - The wavelet transform of the series

References

- Aminghafari, M. and Poggi, J.M. 2007. Forecasting time series using wavelets. Internationa Journal of Wavelets, Multiresolution and Inforamtion Processing, 5, 709 to 724
- Percival D. B. and Walden A. T. 2000. Wavelet Methods for Time-Series Analysis. Cambridge Univ. Press, U.K.
- Paul R. K., Prajneshu and Ghosh H. 2013. Wavelet Frequency Domain Approach for Modelling and Forecasting of Indian Monsoon Rainfall Time-Series Data. Journal of the Indian society of agricultural statistics, 67, 319 to 327.

Examples

```
data<-rnorm(100,mean=100,sd=50)
WaveletFitting(ts=data,Wvlevels=3,Filter='haar',bndry='periodic',FFlag=TRUE)
```

`WaveletFittingann` *Wavelet-ANN Hybrid Model for Forecasting*

Description

Wavelet-ANN Hybrid Model for Forecasting

Usage

```
WaveletFittingann(
  ts,
  Waveletlevels,
  Filter = "haar",
  boundary = "periodic",
  FastFlag = TRUE,
  nonseaslag,
  seaslag = 1,
  hidden,
  NForecast
)
```

Arguments

`ts`	Univariate time series
`Waveletlevels`	The level of wavelet decomposition
`Filter`	Wavelet filter
`boundary`	The boundary condition of wavelet decomposition
`FastFlag`	The FastFlag condition of wavelet decomposition: True or False
`nonseaslag`	Number of non seasonal lag
`seaslag`	Number of non seasonal lag
`hidden`	Size of the hidden layer
`NForecast`	The forecast horizon: A positive integer

Value

- Finalforecast - Forecasted value
- FinalPrediction - Predicted value of train data
- Accuracy - RMSE and MAPE for train data

References

- Aminghafari, M. and Poggi, J.M. 2012. Nonstationary time series forecasting using wavelets and kernel smoothing. Communications in Statistics-Theory and Methods, 41(3),485-499.
- Paul, R.K. A and Anjoy, P. 2018. Modeling fractionally integrated maximum temperature series in India in presence of structural break. Theory and Applied Climatology 134, 241–249.

Examples

```
N <- 100
PHI <- 0.2
THETA <- 0.1
SD <- 1
M <- 0
D <- 0.2
Seed <- 123
set.seed(Seed)
Sim.Series <- fracdiff::fracdiff.sim(n = N,ar=c(PHI),ma=c(THETA),d=D,rand.gen =rnorm,sd=SD,mu=M)
simts <- as.ts(Sim.Series$series)
WaveletForecast<-WaveletFittingann(ts=simts,Waveletlevels=3,Filter='d4',
nonseaslag=5,hidden=3,NForecast=5)
```

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