Package ‘epicasting’

March 22, 2023

**Title**  Ewnet: An Ensemble Wavelet Neural Network for Forecasting and Epicasting

**Version**  0.1.0

**Author**  Madhurima Panja [aut],  
Tanujit Chakraborty [aut, cre, cph]

**Description**  Method and tool for generating time series forecasts using an ensemble wavelet-based auto-regressive neural network architecture. This method provides additional support of exogenous variables and also generates confidence interval. This package provides EWNet model for time series forecasting based on the algorithm by Panja, et al. (2022) and Panja, et al. (2023) <arXiv:2206.10696> <doi:10.1016/j.chaos.2023.113124>.

**Maintainer**  Tanujit Chakraborty <tanujitis@gmail.com>

**License**  GPL (>= 2)

**Encoding**  UTF-8

**RoxygenNote**  7.2.3

**Imports**  forecast, Metrics, stats, wavelets

**Depends**  datasets

**Suggests**  ggplot2

**NeedsCompilation**  no

**Repository**  CRAN

**Date/Publication**  2023-03-22 09:40:02 UTC

**R topics documented:**

ewnet .......................... 2

Index 4
ewnet

Ewnet: An Ensemble Wavelet Neural Network for Forecasting and Epicasting

Description

Ewnet: An Ensemble Wavelet Neural Network for Forecasting and Epicasting

Usage

ewnet(
  ts,
  Waveletlevels = floor(log(length(ts))),
  MaxARParam,
  boundary = "periodic",
  FastFlag = TRUE,
  NForecast,
  NVal = 0,
  measure = Metrics::mase,
  PI = FALSE,
  xreg_train = NULL,
  xreg_test = NULL,
  ret_fit = FALSE
)

Arguments

ts A numeric vector or time series
Waveletlevels An integer specifying the levels of decomposition. The default is set to floor(log(length(ts))).
MaxARParam An integer indicating the maximum lagged observations to be included in the neural network. The default is selected based on AIC using linear AR process.
boundary A character string indicating which boundary method to use. boundary = "periodic" (default) and boundary = "reflection".
FastFlag A logical flag which, if true (default), indicates that the pyramid algorithm is computed with an internal C function. Otherwise, only R code is used in all computations.
NForecast An integer specifying the forecast horizon.
NVal An integer indicating the size of validation set. Default is set to 0.
measure The performance metric used for selecting the best value of MaxARParam based on validation set. Defaults to Metrics::mase.
PI A logical flag which, if true generates the confidence interval for the forecast horizon. Default is set to false.
xreg_train Optionally, a vector or matrix of external regressors, which must have the same number of rows as ts. Must be numeric.
ewnet

xreg_test  Optionally, a vector or matrix of external regressors, which must have the same number of rows as NForecast to be used for the forecast. Must be numeric.

ret_fit   A logical flag specifying that the fitted values of the model on the training set should be returned if true, otherwise, false (default).

Value

The parameters of the fitted model indicating the number of lagged observations included in the model and the number of nodes in the hidden layer. The forecast of the time series of size NForecast is generated along with the optional output of fitted values (ret_fit = TRUE) and confidence interval (PI = TRUE) for the forecast.

Author(s)

Madhurima Panja and Tanujit Chakraborty

References


Examples

ewnet(ts = datasets::lynx, MaxARParam = 1, NForecast = 3)
Index

ewnet, 2