# Package 'WaveletML'

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**Type** Package

**Title** Wavelet Decomposition Based Hybrid Machine Learning Models

**Version** 0.1.0

**Author** Mr. Sandip Garai [aut, cre],
Dr. Ranjit Kumar Paul [aut],
Dr. Md Yeasin [aut]

**Maintainer** Mr. Sandip Garai <sandipnicksandy@gmail.com>

**Description** Wavelet decomposes a series into multiple sub series called detailed and smooth components which helps to capture volatility at multi resolution level by various models. Two hybrid Machine Learning (ML) models (Artificial Neural Network and Support Vector Regression have been used) have been developed in combination with stochastic models, feature selection, and optimization algorithms for prediction of the data. The algorithms have been developed following Paul and Garai (2021) <doi:10.1007/s00500-021-06087-4>.

**License** GPL-3

**Encoding** UTF-8

**Imports** stats, utils, wavelets, tseries, forecast, fGarch, aTSA,
FinTS, LSTS, earth, caret, neuralnet, e1071, pso

**RoxygenNote** 7.2.1

**NeedsCompilation** no

**Repository** CRAN

**Date/Publication** 2023-04-05 18:33:20 UTC

## Contents

warigaan *Wavelet Decomposition-Based ARIMA-GARCH-ANN Hybrid Modeling*

## Description

Wavelet Decomposition-Based ARIMA-GARCH-ANN Hybrid Modeling

## Usage

```
warigaan(Y, ratio = 0.9, n_lag = 4, l = 6, f = 'haar')
```

## Arguments

| | |
|---|---|
| Y | Univariate time series |
| ratio | Ratio of number of observations in training and testing sets |
| n_lag | Lag of the provided time series data |
| l | Level of decomposition |
| f | Filter of decomposition |

## Value

- Train_fitted: Train fitted result
- Test_predicted: Test predicted result
- Accuracy: Accuracy

## References


- Paul, R. K., & Garai, S. (2021). Performance comparison of wavelets-based machine learning technique for forecasting agricultural commodity prices. Soft Computing, 25(20), 12857-12873.
- Paul, R. K., & Garai, S. (2022). Wavelets based artificial neural network technique for forecasting agricultural prices. Journal of the Indian Society for Probability and Statistics, 23(1), 47-61.
- Garai, S., Paul, R. K., Rakshit, D., Yeasin, M., Paul, A. K., Roy, H. S., Barman, S. & Manjunatha, B. (2023). An MRA Based MLR Model for Forecasting Indian Annual Rainfall Using Large Scale Climate Indices. International Journal of Environment and Climate Change, 13(5), 137-150.


## Examples

```
Y <- rnorm(100, 100, 10)
result <- warigaan(Y, ratio = 0.8, n_lag = 4)
```

warigas *Wavelet Decomposition-Based ARIMA-GARCH-SVR Hybrid Modeling*

## Description

Wavelet Decomposition-Based ARIMA-GARCH-SVR Hybrid Modeling

## Usage

```
warigas(Y, ratio = 0.9, n_lag = 4, l = 6, f = 'haar')
```

## Arguments

| | |
|---|---|
| Y | Univariate time series |
| ratio | Ratio of number of observations in training and testing sets |
| n_lag | Lag of the provided time series data |
| l | Level of decomposition |
| f | Filter of decomposition |

## Value

- Train_fitted: Train fitted result
- Test_predicted: Test predicted result
- Accuracy: Accuracy

## References


- Paul, R. K., & Garai, S. (2021). Performance comparison of wavelets-based machine learning technique for forecasting agricultural commodity prices. Soft Computing, 25(20), 12857-12873.
- Paul, R. K., & Garai, S. (2022). Wavelets based artificial neural network technique for forecasting agricultural prices. Journal of the Indian Society for Probability and Statistics, 23(1), 47-61.
- Garai, S., Paul, R. K., Rakshit, D., Yeasin, M., Paul, A. K., Roy, H. S., Barman, S. & Manjunatha, B. (2023). An MRA Based MLR Model for Forecasting Indian Annual Rainfall Using Large Scale Climate Indices. International Journal of Environment and Climate Change, 13(5), 137-150.


## Examples

```
Y <- rnorm(100, 100, 10)
result <- warigas(Y, ratio = 0.8, n_lag = 4)
```

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