Package 'WaveletML'

July 21, 2025

Type Package

Title Wavelet Decomposition Based Hybrid Machine Learning Models

Version 0.1.0

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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

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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.
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Examples

```
Y <- rnorm(100, 100, 10)
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