Package: dymo (via r-universe)

February 22, 2025

Type Package

Title Dynamic Mode Decomposition for Multivariate Time Feature Prediction

Version 1.1.0

Description An application of Dynamic Mode Decomposition for prediction of time features. Automatic search for the best model across the space of all possible feature combinations and ranks of Singular Value Decomposition.

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Depends R (>= 4.1)

Imports purrr (>= 0.3.4), ggplot2 (>= 3.3.5), readr (>= 2.1.2), lubridate (>= 1.7.10), imputeTS (>= 3.2), fANCOVA (>= 0.6-1), scales (>= 1.1.1), tictoc (>= 1.0.1), modeest (>= 2.4.0), moments (>= 0.14), greybox (>= 1.0.1), MASS (>= 7.3-54), matlib (>= 0.9.5), narray (>= 0.4.1.1)

URL https://rpubs.com/giancarlo_vercellino/dymo

NeedsCompilation no

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Config/pak/sysreqs cmake libfreetype6-dev libglu1-mesa-dev make texlive libicu-dev libjpeg-dev libpng-dev libxml2-dev libgl1-mesa-dev libssl-dev libx11-dev zlib1g-dev

Repository https://pigian.r-universe.dev

RemoteUrl https://github.com/cran/dymo

RemoteRef HEAD

RemoteSha 5d879162be1622511c9eaa104a97d06f540ac3aa

Contents

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dymo *dymo*

Description

Dynamic Mode Decomposition for Multivariate Time Feature Prediction

Usage

```
dymo(
  df,
  seq_len,
  n_windows = 10,
  ci = 0.8,
  smoother = FALSE,
  min_feats = NULL,
  max_feats = NULL,
  dates = NULL,
  error_scale = "naive",
  error_benchmark = "naive",
  seed = 42
)
```

Arguments

df	A data frame with time features on columns. You need at least two time features. In case of missing values, automatic missing imputation through kalman filter will be performed.
seq_len	Positive integer. Time-step number of the forecasting sequence. Default: NULL (automatic selection between 1 and the square root of full length).
n_windows	Positive integer. Number of validation windows to test prediction error. Default: 10.
ci	Confidence interval for prediction. Default: 0.8
smoother	Logical. Flag to TRUE for loess smoothing. Default: FALSE.
min_feats	Positive integer. Minimum number of time features to combine. Default: NULL (set equal to the total number of features)
max_feats	Positive integer. Maximum number of time features to combine. Default: NULL (set equal to the total number of features)
dates	Date. Vector with dates for time features.

`error_scale` String. Scale for the scaled error metrics. Two options: "naive" (average of naive one-step absolute error for the historical series) or "deviation" (standard error of the historical series). Default: "naive".

`error_benchmark` String. Benchmark for the relative error metrics. Two options: "naive" (sequential extension of last value) or "average" (mean value of true sequence). Default: "naive".

`seed` Positive integer. Random seed. Default: 42.

Value

This function returns a list including:

- comb_metrics: error metrics for all possible combinations of time features (for each combination, pred_score, me, mae, mse, rmsse, mpe, mape, rmae, rrmse, rame, mase, smse, sce, gmrae, are averaged across features, ranks and validation windows)
- best_model: best combination resulting from the average prediction score across different ranks and features, including:
  - best_combination: combination of indexes and rank for the best model
  - testing_errors: testing errors for each time feature averaged across validation windows
  - quant_preds: min, max, q25, q50, q75, quantiles at selected ci, mean, sd, mode, skewness, kurtosis, IQR to range, median range ratio, upside probability and divergence for each point fo predicted sequences
  - plots: standard plot with confidence interval for each time feature
- time_log

Author(s)

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See Also

Useful links:

- https://rpubs.com/giancarlo_vercellino/dymo

Examples

```
dymo(time_features[,c(2, 3, 4)], seq_len = 10, dates = time_features$dates)
```

`time_features` *time features example: IBM, AAPL, AMZN, GOOGL and MSFT Close Prices*

Description

A data frame with with daily with daily prices for some Big Tech Companies since March 2017.

Usage

```
time_features
```

Format

A data frame with 6 columns and 1336 rows.

Source

finance.yahoo.com

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