Package 'organik'

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Type Package

Title Multi-Horizon Probabilistic Ensemble with Copulas for Time Series Forecasting

Version 1.0.1

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Description Trains per-horizon probabilistic ensembles from a univariate time series. It supports 'rpart', 'glmnet', and 'kNN' engines with flexible residual distributions and heteroscedastic scale models, weighting variants by calibration-aware scores. A Gaussian/t copula couples the marginals to simulate joint forecast paths, returning quantiles, means, and step increments across horizons.

License GPL-3

RoxygenNote 7.3.3

Imports rpart (>= 4.1.24), glmnet (>= 4.1-10), Matrix (>= 1.7-3), MASS (>= 7.3-65), imputeTS (>= 3.4)

Encoding UTF-8

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

Suggests knitr, testthat (>= 3.0.0)

Config/testthat/edition 3

Depends R (>= 4.1.0)

NeedsCompilation no

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organik *Multi-Horizon Probabilistic Ensemble with Copulas for Time Series Forecasting*

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Usage

```
organik(
  ts,
  horizon,
  n_variants = 10,
  engines = c("rpart", "glmnet", "knn"),
  dists = c("gaussian", "laplace", "student", "logistic", "asymmetric_laplace",
    "skew_normal", "skew_t"),
  h_options = c("tree", "ridge"),
  alpha = 1,
  beta = 1,
  temperature = 1,
  dates = NULL,
  ci = 0.95,
  n_testing = 30,
  seed = 42
)
```

Arguments

ts	Numeric vector (time series levels).
horizon	Integer, number of steps ahead.
n_variants	Integer, number of model variants per horizon (ensemble size).
engines	Character vector of supported mean-model engines ('rpart', 'glmnet', 'knn').
dists	Character vector of supported residual distributions (gaussian, laplace, student, logistic, asymmetric_laplace, skew_normal, skew_t.
h_options	Character vector for supported heteroscedastic scale models (tree, ridge).
alpha, beta	Numeric weights combining CRPS and calibration error.
temperature	Softmax temperature for ensemble weighting (>0).
dates	Vector for date formats. Default: NULL.
ci	Numeric scalar, confidence interval for plot. Default: 0.9.
n_testing	Backtest spacing used inside components.
seed	Optional integer seed for reproducibility.

Value

A list of class ‘c("organik","list")‘ with elements:

- ‘model_list‘: list of horizon-wise ensemble models.
- ‘growth_pred_funs‘: list of marginal predictors for growth.
- ‘level_pred_funs‘: list of marginal predictors for level.
- ‘cor_mat‘: horizon-by-horizon correlation (after cleaning / nearPD).
- ‘path_prediction(n_paths, probs, copula=c("gaussian","t"), df, return_increments, seed)‘: function that simulates joint paths and returns summaries (means, quantiles, cumulative growth paths, level paths, and incremental returns if requested).
- ‘plot‘: plot with prediction in the confidence interval.

Author(s)

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See Also

Useful links:

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

Examples

```
set.seed(1)
y <- cumsum(rnorm(200, sd = 0.5)) + 10
obj <- organik(y, horizon = 4,
  n_variants = 3,
  engines = "knn",
  dists = c("gaussian","laplace"),
  h_options = "tree",
  n_testing = 3, seed = 123)
# joint path simulation for next 4 steps:
path <- obj$path_prediction(n_paths = 100)
str(path$level_quants)
```

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