Package: NumericEnsembles (via r-universe)

October 19, 2026

Type Package

Title Multi-Model Stacking Optimization and Continuous Regression Ensembles

Version 1.2.1

Description Automated parallelized regression ensemble pipeline executing concurrent evaluations across 17 base machine learning architectures, 6 specialized stacking meta-learners, and 136 pairwise hybrid combinations. The package implements dynamic performance-weighted stacking blends alongside internal data dictionary profiling metrics. It provides iterative multicollinearity pruning via Variance Inflation Factors (VIF) and automated executive Quarto report generation.

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Encoding UTF-8

LazyData true

Depends R (>= 4.1.0)

Imports car, caret, doParallel, dplyr, foreach, ggplot2, ggrepel, parallel, party, patchwork, quarto, rstudioapi, shiny, stats, tidyr, tidyselect

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

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VignetteBuilder knitr

URL https://github.com/InfiniteCuriosity/NumericEnsembles

BugReports https://github.com/InfiniteCuriosity/NumericEnsembles/issues

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`Concrete` *Concrete - This is the strength of concrete daa set originally posted on UCI*

Description

Concrete is the most important material in civil engineering. The concrete compressive strength is a highly nonlinear function of age and ingredients.

Usage

```
Concrete
```

Format

Concrete A data frame with 1030 rows and 9 columns:

Cement quantitative – kg in a m3 mixture – Input Variable

Blast_Furnace_Slag quantitative – kg in a m3 mixture – Input Variable

Fly_Ash quantitative – kg in a m3 mixture – Input Variable

Water quantitative – kg in a m3 mixture – Input Variable

Superplasticizer quantitative – kg in a m3 mixture – Input Variable

Coarse_Aggregate quantitative – kg in a m3 mixture – Input Variable

Fine_Aggregate quantitative – kg in a m3 mixture – Input Variable

Age Day (1~365) – Input Variable

Strength quantitative – MPa – Output Variable

Source

https://archive.ics.uci.edu/dataset/165/concrete+compressive+strength

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ExportNumericResults *Export Tables and High-Resolution Visualization Panels*

Description

Export Tables and High-Resolution Visualization Panels

Usage

```
ExportNumericResults(pipeline_object = NULL, export_directory = NULL)
```

Arguments

`pipeline_object`
: A trained `numeric_pipeline` asset.

`export_directory`
: Character path detailing target output folder destination.

Value

Invisible string path location where files were compiled.

Insurance *Insurance - The data is from UCI*

Description

This dataset contains detailed information about insurance customers, including their age, sex, body mass index (BMI), number of children, smoking status and region. Having access to such valuable insights allows analysts to get a better view into customer behaviour and the factors that contribute to their insurance charges.

Usage

```
Insurance
```

Format

Insurance A data frame with 1338 rows and 7 columns Credit to Bob Wakefield

Age The age of the customer. (Integer)

Children The number of children the customer has. (Integer)

Smoker Whether or not the customer is a smoker. (Boolean)

Region The region the customer lives in. (String)

Charges The insurance charges for the customer. (Float)

Source

https://www.kaggle.com/datasets/thedevastator/prediction-of-insurance-charges-using-age-gender

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`LaunchNumericApp` *Launch Interactive Shiny Application Portal*

Description

Launch Interactive Shiny Application Portal

Usage

```
LaunchNumericApp()
```

Value

Activated browser session running the dashboard interface.

`load_pipeline` *Load and Decompress Package Pipeline Footprints*

Description

Load and Decompress Package Pipeline Footprints

Usage

```
load_pipeline(file_path)
```

Arguments

`file_path`	Character path mapping to a serialized rds file.

Value

A deserialized `numeric_pipeline` object.

Numeric *Comprehensive Continuous Regression Ensemble Pipeline Engine*

Description

Orchestrates high-velocity multi-model exploration across continuous regression domains, managing automated data dictionary profiling, iterative collinearity pruning, model training, competitive stacking meta-learners, and advanced visual diagnostics matrices.

Usage

```
Numeric(
  dataset = NULL,
  target_col = NULL,
  facet_col = "",
  color_col = "",
  stratify_col = "",
  palette_style = c("standard", "viridis", "modern"),
  config = NumericEnsemblesConfig(),
  verbose = TRUE
)
```

Arguments

dataset	A data frame containing the predictors and target variable.
target_col	Character string specifying the name of the target continuous numeric column.
facet_col	Character string specifying an optional categorical column to facet EDA charts by. Default is "".
color_col	Character string specifying an optional column to color exploratory EDA charts by. Default is "".
stratify_col	Character string specifying an optional categorical column to anchor stratified sampling splits. Default is "".
palette_style	Character choice layout. Visual color scheme for plot vectors: "standard", "viridis", or "modern".
config	A pre-configured architecture configuration parameter matrix list from `NumericEnsemblesConfig()`.
verbose	Logical. If TRUE, logs operational pipeline milestones to console. Default is TRUE.

Value

An object of class `numeric_pipeline` containing complete metrics matrices, model instances, data dictionaries, and analytical plots.

NumericEnsemblesConfig *Configuration Parameters Matrix for Numeric Ensemble Pipeline*

Description

Houses cross-validation fold structures, train-test split dimensions, multicollinearity VIF thresholds, and tuning grids to decouple hyperparameter states from core execution loops.

Usage

```
NumericEnsemblesConfig(
  cv_folds = 5,
  train_pct = 0.6,
  vif_threshold = 5,
  transform_steps = c("nzv", "medianImpute", "center", "scale", "YeoJohnson"),
  rf_grid = NULL,
 glmnet_grid = expand.grid(alpha = seq(0, 1, length = 5), lambda = seq(0.001, 0.2,
    length = 10)),
  svm_tune_length = 8,
  mars_tune_length = 5,
  pcr_tune_length = 10,
  tree_tune_length = 10,
  cooks_threshold = 999
)
```

Arguments

cv_folds	Integer. The number of cross-validation folds. Default is 5.
train_pct	Numeric. The training data proportion as a decimal between 0 and 1. Default is 0.60.
vif_threshold	Numeric. Variance Inflation Factor threshold for filtering multicollinear predictors. Default is 5.
transform_steps	Character vector. Preprocessing transforms to pass to caret. Default is c("nzv", "medianImpute", "center", "scale", "YeoJohnson").
rf_grid	Optional custom tuning grid for Random Forest models. Default is NULL.
glmnet_grid	Custom tuning grid for Elastic Net models.
svm_tune_length	Integer. Tuning length parameter for SVM models. Default is 8.
mars_tune_length	Integer. Tuning length parameter for MARS models. Default is 5.
pcr_tune_length	Integer. Tuning length parameter for PCR/PLS models. Default is 10.

`tree_tune_length`
: Integer. Tuning length parameter for tree-based models. Default is 10.

`cooks_threshold`
: Numeric. Leverage cutoff multiplier relative to 4/n benchmark threshold. Values between 1-5 enforce pruning; 999 deactivates filter. Default is 999.

Value

A structured list containing isolated operational tuning parameters.

NumericEnsemblesDemo *Run Fast Validation Regression Demo Suite*

Description

Run Fast Validation Regression Demo Suite

Usage

```
NumericEnsemblesDemo()
```

Value

An invisible trained `numeric_pipeline` object run over simulated macroeconomic metrics.

NumericEnsemblesFastConfig *Fast-Execution Configuration Matrix for Regression Testing*

Description

Fast-Execution Configuration Matrix for Regression Testing

Usage

```
NumericEnsemblesFastConfig()
```

Value

A fast-track parameter subset list optimized for rapid package verification checks.

plot.numeric_pipeline *Plot Numeric Pipeline Performance Metrics and Visual Diagnostics*

Description

Plot Numeric Pipeline Performance Metrics and Visual Diagnostics

Usage

```
## S3 method for class 'numeric_pipeline'
plot(x, pace_output = TRUE, ...)
```

Arguments

x	A numeric_pipeline object generated by the Numeric() engine.
pace_output	Logical. If TRUE and session is interactive, paces chart rendering frames via devAskNewPage. Default is TRUE.
...	Additional arguments passed to underlying plot methods.

predict.numeric_pipeline *Predict with Numeric Pipeline Framework*

Description

Predict with Numeric Pipeline Framework

Usage

```
## S3 method for class 'numeric_pipeline'
predict(object, newdata, model_name = "best", ...)
```

Arguments

object	A numeric_pipeline object trained by the engine.
newdata	A data frame containing incoming new samples to score.
model_name	Character string specifying the target model from the leaderboard to score. Default is "best".
...	Additional arguments passed to underlying predict methods.

Value

A numeric vector of predictions.

predict_production *Executive Production Projections with Row-Level 95 percent Confidence Intervals*

Description

Evaluates champion architectures against un-indexed datasets, appending row-level projection metrics and interval boundaries.

Usage

```
predict_production(object, newdata)
```

Arguments

object	A trained numeric_pipeline asset.
newdata	A data frame containing incoming raw manufacturing features.

Details

Production Prediction Wrapper

Value

A data frame matching input dimensions appended with prediction vectors and confidence interval boundaries for the top 3 models.

print.numeric_pipeline *Print Numeric Pipeline Summary Profiles Report*

Description

Print Numeric Pipeline Summary Profiles Report

Usage

```
## S3 method for class 'numeric_pipeline'
print(x, ...)
```

Arguments

x	A numeric_pipeline object generated by the Numeric() engine.
...	Additional arguments passed to underlying print methods.

RenderExecutiveReport *Compile and Render Automated Executive Summary Report*

Description

Compile and Render Automated Executive Summary Report

Usage

```
RenderExecutiveReport(pipeline_object, output_directory = getwd())
```

Arguments

pipeline_object	A trained numeric_pipeline asset.
output_directory	Character path mapping where summary files are rendered.

Value

Invisible NULL.

save_pipeline *Compress and Save Trained Pipeline Assets*

Description

Compress and Save Trained Pipeline Assets

Usage

```
save_pipeline(object, file_path)
```

Arguments

object	A trained numeric_pipeline asset.
file_path	Character path mapping where to save the binary output.

Value

Invisible NULL.

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