

Package ‘nonet’

October 13, 2022

Title Weighted Average Ensemble without Training Labels

Version 0.4.0

Description It provides ensemble capabilities to supervised and unsupervised learning models predictions without using training labels. It decides the relative weights of the different models predictions by using best models predictions as response variable and rest of the mo. User can decide the best model, therefore, It provides freedom to user to ensemble models based on their design solutions.

Depends R (>= 3.5.0)

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Encoding UTF-8

LazyData TRUE

Imports caret (>= 6.0.78), dplyr, randomForest, ggplot2, rlist (>= 0.4.6.1), glmnet, tidyverse, e1071, purrr, pROC (>= 1.13.0), rlang (>= 0.2.1),

RoxygenNote 6.1.1

Suggests testthat, knitr, rmarkdown, ClusterR

URL <https://open.gslab.com/nonet/>

BugReports <https://github.com/GSLabDev/nonet/issues>

VignetteBuilder knitr

NeedsCompilation no

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banknote_authentication

Bank Note Authentication Data Set

Description

Bank Note Authentication Data Set is used to show the functionality of nonet package. This Data Set has below attribute information as variance of Wavelet Transformed image (continuous), skewness of Wavelet Transformed image (continuous), curtosis of Wavelet Transformed image (continuous), entropy of image (continuous), class (integer).

Usage

```
data("banknote_authentication")
```

Format

A data frame with 1372 observations on the following 5 variables.

variance a numeric vector

skewness a numeric vector

curtosis a numeric vector

entropy a numeric vector

class a numeric vector

Details

Data were extracted from images that were taken from genuine and forged banknote-like specimens. For digitization, an industrial camera usually used for print inspection was used. The final images have 400x 400 pixels. Due to the object lens and distance to the investigated object gray-scale pictures with a resolution of about 660 dpi were gained. Wavelet Transform tool were used to extract features from images.

Source

This DataSet is fetched from UCI Website. URL is <https://archive.ics.uci.edu/ml/datasets/banknote+authentication>

References

Owner of database: Volker Lohweg (University of Applied Sciences, Ostwestfalen-Lippe, volker.lohweg '@' hs-owl.de) Donor of database: Helene Dörksen (University of Applied Sciences, Ostwestfalen-Lippe, helene.doerksen '@' hs-owl.de) Date received: August, 2012

Examples

```
data(banknote_authentication)
dataframe <- data.frame(banknote_authentication)
head(dataframe)
str(banknote_authentication)
```

nonet_ensemble	<i>Ensemble Prediction without using training labels</i>
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Description

Ensemble Prediction without using training labels

Usage

```
nonet_ensemble(object, best_modelname)
```

Arguments

object prediction_list object, as from 'tune_models'

best_modelname Best model name is one which performance better while evaluating using any evaluation matrix like confusion matrix.

Value

A list of ensembled predictions. You can evaluate the performance of ensembled prediction using the evaluation matrix as Confusion matrix or AUROC.

Examples

```
# nonet_ensemble functionality can be explained via below example
# Setup
library(caret)
library(nonet)
library(rlist)

# Load Data
dataframe <- data.frame(banknote_authentication[600:900, ])
dataframe$class <- as.factor(ifelse(dataframe$class >= 1, 'Yes', 'No'))

# First Model
# Splitting into train and test
index <- createDataPartition(dataframe$class, p=0.75, list=FALSE)
trainSet <- dataframe[ index,]
testSet <- dataframe[-index,]

#Feature selection
control <- rfeControl(functions = rfFuncs,
  method = "repeatedcv",
```

```

repeats = 1,
verbose = FALSE)

outcomeName <- 'class'
predictors <- c("variance", "skewness")

banknote_rf <- train(trainSet[,predictors],trainSet[,outcomeName],method='rf')
preds_rf_first <- predict.train(object=banknote_rf,testSet[,predictors],type="prob")
preds_rf_first_raw <- predict.train(object=banknote_rf,testSet[,predictors],type="raw")

# Second Model
# Splitting into train and test
index <- createDataPartition(dataframe$class, p=0.75, list=FALSE)
trainSet <- dataframe[ index,]
testSet <- dataframe[-index,]

#Feature selection
control <- rfeControl(functions = rffuncs,
  method = "repeatedcv",
  repeats = 2,
  verbose = FALSE)

outcomeName <- 'class'
predictors <- c("curtosis", "entropy")

banknote_rf <- train(trainSet[,predictors],trainSet[,outcomeName],method='rf')
preds_rf_second <- predict.train(object=banknote_rf,testSet[,predictors],type="prob")
preds_rf_second_raw <- predict.train(object=banknote_rf,testSet[,predictors],type="raw")

Stack_object <- list(preds_rf_first$Yes, preds_rf_second$Yes)
names(Stack_object) <- c("model_rf_first", "model_rf_second")

# Prediction using nonet_ensemble function
prediction_nonet <- nonet_ensemble(Stack_object, "model_rf_second")

```

nonet_plot

Plot the predictions or results of nonet_ensemble

Description

Plot the predictions or results of nonet_ensemble

Usage

```

nonet_plot(x, y, dataframe, plot_type = NULL, nonet_size = 20,
  nonet_alpha = 0.3, nonet_bins = 25)

```

Arguments

x	x axis variable name or histogram entity name
y	y axis variable name
dataframe	dataframe which is used for plotting purpose.
plot_type	type of plot, if not provided it takes "NULL"
nonet_size	size of plot need to feed in ggplot
nonet_alpha	value of alpha for ggplot
nonet_bins	number of bins for histogram

Value

plotted for the plot results provided as input.

Examples

```
# nonet_plot functionality can be explained via below example
# Setup
library(caret)
library(nonet)
library(ggplot2)

# Load Data
dataframe <- data.frame(banknote_authentication[600:900, ])
dataframe$class <- as.factor(ifelse(dataframe$class >= 1, 'Yes', 'No'))

# Splitting into train and test
index <- createDataPartition(dataframe$class, p=0.75, list=FALSE)
trainSet <- dataframe[ index,]
testSet <- dataframe[-index,]

# Feature selection
control <- rfeControl(functions = rfFuncs,
  method = "repeatedcv",
  repeats = 2,
  verbose = FALSE)

outcomeName <- 'class'
predictors <- c("curtosis", "entropy")

# Model Training & predictions
banknote_rf <- train(trainSet[,predictors],trainSet[,outcomeName],method='rf')
predictions_rf_raw <- predict.train(object=banknote_rf,testSet[,predictors],type="raw")

# Results
nonet_eval_rf <- confusionMatrix(predictions_rf_raw,testSet[,outcomeName])
eval_rf_df <- data.frame(nonet_eval_rf$table)
nonet_plot(eval_rf_df$Prediction, eval_rf_df$Reference, eval_rf_df, plot_type = "point")
```

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