Package ‘CollapseLevels’

October 12, 2022

Type Package

Title Collapses Levels, Computes Information Value and WoE

Version 0.3.0

Author Krishanu Mukherjee

Maintainer Krishanu Mukherjee <toton1181@gmail.com>

Description Contains functions to help in selecting and exploring features (or variables) in binary classification problems.

Provides functions to compute and display information value and weight of evidence (WoE) of the variables, and to convert numeric variables to categorical variables by binning.

Functions are also provided to determine which levels (or categories) of a categorical variable can be collapsed (or combined) based on their response rates.

The functions provided only work for binary classification problems.

License GPL-2

Encoding UTF-8

LazyData true

RoxygenNote 7.1.0

Imports dplyr, lazyeval, ggplot2

Depends magrittr

Suggests knitr, rmarkdown

VignetteBuilder knitr

NeedsCompilation no

Repository CRAN

Date/Publication 2020-06-04 13:20:02 UTC

R topics documented:

displayIV .......................................................... 2
displayResponseRatebyLevels .................................. 3
displayWOE ......................................................... 4

German_Credit ..................................................... 4
**displayIV**

This function displays the Information Values of the levels of an attribute.

**Usage**

```r
displayIV(dset, col = "xyz", resp = "y", adjFactor = 0.5, bins = 10)
```

**Arguments**

- `dset`: The data frame containing the data set
- `col`: A character representing the name of the attribute. The attribute can either be numeric or categorical
- `resp`: A character representing the name of the binary outcome variable. The binary outcome variable may be a factor with two levels or an integer (or numeric) with two unique values
- `adjFactor`: A number or a decimal denoting what is to be added to the number of responses (binary outcome variable is 1) or to the number of non-responses (binary outcome variable is 0) if either is zero for any level of the attribute
- `bins`: A number denoting the number of bins. Default value is 10

**Examples**

```r
# Load the German_Credit data set supplied with this package

data("German_Credit")

displayIV(German_Credit,col="Credit_History",resp="Good_Bad")
```
Description

This function displays the response percents of the levels of an attribute.

Usage

displayResponseRatebyLevels(
  dset,
  col = "job",
  resp = "Good_Bad",
  bins = 10,
  adjFactor = 0.5
)

Arguments

dset The data frame containing the data set
col A character representing the name of the attribute. The attribute can either be numeric or categorical
resp A character representing the name of the binary outcome variable. The binary outcome variable may be a factor with two levels or an integer (or numeric) with two unique values
bins A number denoting the number of bins. Default value is 10
adjFactor A number or a decimal denoting what is to be added to the number of responses (binary outcome variable is 1) or to the number of non-responses (binary outcome variable is 0) if either is zero for any level of the attribute

Examples

# Load the German_Credit data set supplied with this package

data("German_Credit")

displayResponseRatebyLevels(German_Credit,col="Credit_History",resp="Good_Bad")
**displayWOE**

**Description**

This function displays the Weight of Evidence of the levels of an attribute.

**Usage**

```r
displayWOE(dset, col = "xyz", resp = "y", adjFactor = 0.5, bins = 10)
```

**Arguments**

- `dset`: The data frame containing the data set
- `col`: A character representing the name of the attribute. The attribute can either be numeric or categorical
- `resp`: A character representing the name of the binary outcome variable. The binary outcome variable may be a factor with two levels or an integer (or numeric) with two unique values
- `adjFactor`: A number or a decimal denoting what is to be added to the number of responses (binary outcome variable is 1) or to the number of non-responses (binary outcome variable is 0) if either is zero for any level of the attribute
- `bins`: A number denoting the number of bins. Default value is 10

**Examples**

```r
# Load the German_Credit data set supplied with this package

data("German_Credit")

displayWOE(German_Credit, col="Credit_History", resp="Good_Bad")
```

**German_Credit**

**German Credit data set**

**Description**

This data set classifies customers as "Good" or "Bad" as per their credit risks. This data set was contributed by Professor Dr. Hans Hofmann, and can be downloaded from the UCI Machine Learning Repository.

**Usage**

```r
data("German_Credit")
```
Format

A data frame with 1000 observations on the following 21 variables.

- **Account_Balance**: a factor with levels A11 A12 A13 A14
- **Duration**: a numeric vector
- **Credit_History**: a factor with levels A30 A31 A32 A33 A34
- **Purpose**: a factor with levels A40 A41 A410 A42 A43 A44 A45 A46 A48 A49
- **Credit_Amount**: a numeric vector
- **Saving_Accounts_Bonds**: a factor with levels A61 A62 A63 A64 A65
- **Current_Employment_Length**: a factor with levels A71 A72 A73 A74 A75
- **Installment_Rate**: a numeric vector
- **MaritalStatusGender**: a factor with levels A91 A92 A93 A94
- **Guarantors**: a factor with levels A101 A102 A103
- **‘Duration in Current Address’**: a numeric vector
- **Valuable_Asset**: a factor with levels A121 A122 A123 A124
- **Age**: a numeric vector
- **Other_Credit**: a factor with levels A141 A142 A143
- **Housing**: a factor with levels A151 A152 A153
- **Existing_Credits**: a numeric vector
- **Job**: a factor with levels A171 A172 A173 A174
- **Dependents**: a numeric vector
- **Telephone**: a factor with levels A191 A192
- **ForeignWorker**: a factor with levels A201 A202
- **Good_Bad**: a numeric vector

Source

https://archive.ics.uci.edu/ml/datasets/statlog+(german+credit+data)

Examples

data(German_Credit)
str(German_Credit)
**Description**

This function displays the Information Values by the levels of an attribute. This information is displayed for all attributes in the data set.

**Usage**

```r
IVCalc(dset, resp = "y", bins = 10, adjFactor = 0.5)
```

**Arguments**

- `dset` The data frame containing the data set
- `resp` A character representing the name of the binary outcome variable. The binary outcome variable may be a factor with two levels or an integer (or numeric) with two unique values.
- `bins` A number denoting the number of bins. Default value is 10.
- `adjFactor` A number or a decimal denoting what is to be added to the number of responses (binary outcome variable is 1) or to the number of non-responses (binary outcome variable is 0) if either is zero for any level of the attribute.

**Value**

A list containing the tables of Information Values by levels for every attribute.

**Examples**

```r
# Load the German_Credit data set supplied with this package

data("German_Credit")

l<-list()

# Call the function as follows

l<-IVCalc(German_Credit,resp="Good_Bad",bins=10)

# Information Value for the attribute Account_Balance in the German_Credit data

l$Account_Balance
```
Description

This function displays the Information Values of all the attributes in the data set.

Usage

IVCalc2(dset, resp = "y", bins = 10, adjFactor = 0.5)

Arguments

dset
The data frame containing the data set

resp
A character representing the name of the binary outcome variable. The binary outcome variable may be a factor with two levels or an integer (or numeric) with two unique values.

bins
A number denoting the number of bins. Default value is 10.

adjFactor
A number or a decimal denoting what is to be added to the number of responses (binary outcome variable is 1) or to the number of non-responses (binary outcome variable is 0) if either is zero for any level of the attribute.

Value

A data frame containing the Information Values for every attribute.

Examples

# Load the German_Credit data set supplied with this package

data("German_Credit")

d<-data.frame()

# Call the function as follows

d<-IVCalc2(German_Credit, resp="Good_Bad", bins=10)

# Information Value for all the attributes in the German_Credit data

d
Description

This function displays the response rates by the levels of an attribute Levels with similar response rates may be combined.

Usage

levelsCollapser(dset, resp = "y", bins = 10)

Arguments

dset The data frame containing the data set
resp A character representing the name of the binary outcome variable The binary outcome variable may be a factor with two levels or an integer (or numeric) with two unique values
bins A number denoting the number of bins. Default value is 10

Value

A list containing the tables of response rate by levels for every attribute

Examples

# Load the German_Credit data set supplied with this package
data("German_Credit")

# Create an empty list
l<-list()

# Call the function as follows
l<-levelsCollapser(German_Credit, resp="Good_Bad", bins=10)

# response rate by levels of the Account_Balance in the German_Credit data
l$Account_Balance

# Collapse levels with similar response percentages.
**numericToCategorical**

**Description**

This function categorizes a numerical variable by binning.

**Usage**

`numericToCategorical(dset, col = "job", resp = "y", bins = 10, adjFactor = 0.5)`

**Arguments**

- **dset**: The data frame containing the data set.
- **col**: A character representing the name of the numeric attribute which we want to categorize.
- **resp**: A character representing the name of the binary outcome variable. The binary outcome variable may be a factor with two levels or an integer (or numeric) with two unique values.
- **bins**: A number denoting the number of bins. Default value is 10.
- **adjFactor**: A number or a decimal denoting what is to be added to the number of responses (binary outcome variable is 1) or to the number of non-responses (binary outcome variable is 0) if either is zero for any level of the attribute.

**Value**

A list containing:
- The categorized attribute.
- A table of Information Values for the levels of the categorized attribute.
- The Information Value for the entire attribute.
- A table showing the response rates of the levels of the categorized attribute.

**Examples**

```r
# Load the German_Credit data set supplied with this package
data("German_Credit")

# Create an empty list
l<-list()

# Call the function as follows.
# This will categorize the numeric variable Duration in the German_Credit dataset.
l<-numericToCategorical(German_Credit,col="Duration",resp="Good_Bad")
```
# To view the categorized variable
l$categoricalVariable

# To view the IV table of the levels of the categorized variable
l$IVTable

# To view the total IV value of the categorized variable
l$IV

# To view the response rates of the levels of the categorized variable
l$collapseLevels
Index

* datasets
  - German_Credit, 4

  displayIV, 2
  displayResponseRatebyLevels, 3
  displayWOE, 4

  German_Credit, 4

  IVCalc, 6
  IVCalc2, 7

  levelsCollapser, 8

  numericToCategorical, 9