Package ‘mob’

February 29, 2020

Title Monotonic Optimal Binning
Version 0.1.0
Description Generate the monotonic binning and
perform the woe (weight of evidence) transformation for the logistic regression
used in the consumer credit scorecard development. The woe transformation is a piecewise
transformation that is linear to the log odds. For a numeric variable, all of its monotonic
functional transformations will converge to the same woe transformation.
License GPL (>= 2)
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arb_bin  Monotonic binning based on the decision tree

Description
The function arb_bin implements the monotonic binning based on the decision tree by calling the Rborist() function in the Rborist package.

Usage
arb_bin(data, y, x)

Arguments
- **data**: A input dataframe
- **y**: The name of Y with 0/1 binary values
- **x**: The name of X with numeric values

Value
A list of binning outcomes, including a list of cut points and a summary dataframe

Examples
```r
data(hmeq)
arb_bin(hmeq, BAD, DEROG)
```

bad_bin  Monotonic binning based on bads only

Description
The function bad_bin implements the monotonic binning only based on bads, e.g. Y = 1, by the iterative discretization.

Usage
bad_bin(data, y, x)

Arguments
- **data**: A input dataframe
- **y**: The name of Y with 0/1 binary values
- **x**: The name of X with numeric values
Value

A list of binning outcomes, including a list of cut points and a summary dataframe

Examples

data(hmeq)
bad_bin(hmeq, BAD, DEROG)

Description

The function `cal_woe` performs the WoE transformation of a numeric variable based on the output specification from a binning function, e.g. `qtl_bin()` or `iso_bin()`.

Usage

cal_woe(data, xname, spec)

Arguments

data A input dataframe
xname The name string of X with numeric values to which the WoE is applied
spec The output table from the binning function, e.g. `qtl_bin()` or `iso_bin()`

Value

A list of WoE transformation outputs, including a dataframe with the transformed variable and a PSI summary

Examples

data(hmeq)
bin_out <- qtl_bin(hmeq, BAD, DEROG)
cal_woe(hmeq, "DEROG", bin_out$df)
gbm_bin  

Monotonic binning based on the generalized boosted regression model (GBM)

Description

The function gbm_bin implements the monotonic binning based on the generalized boosted regression model (GBM) by calling the gbm library.

Usage

gbm_bin(data, y, x)

Arguments

data  A input dataframe
y     The name of Y with 0/1 binary values
x     The name of X with numeric values

Value

A list of binning outcomes, including a list of cut points and a summary dataframe

Examples

data(hmeq)
gbm_bin(hmeq, BAD, DEROG)

hmeq  Credit attributes of 5,960 home equity loans

Description

A dataset containing characteristics and delinquency information for 5,960 home equity loans.

Usage

hmeq
**iso_bin**

**Format**

A data frame with 5960 rows and 13 variables:

- **BAD** indicator of applicant defaulted on loan or seriously delinquent
- **LOAN** Amount of the loan request, in dollar
- **MORTDUE** Amount due on existing mortgage, in dollar
- **VALUE** Value of current property, in dollar
- **REASON** DebtCon = debt consolidation; HomeImp = home improvement
- **JOB** Occupational categories
- **YOJ** Years at present job
- **DEROG** Number of major derogatory reports
- **DELINQ** Number of delinquent credit lines
- **CLAGE** Age of oldest credit line in months
- **NINQ** Number of recent credit inquiries
- **CLNO** Number of credit lines
- **DEBTINC** Debt-to-income ratio

**Source**

http://www.creditriskanalytics.net/datasets-private2.html

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**iso_bin**  
*Monotonic binning based on isotonic regression*

**Description**

The function `iso_bin` implements the monotonic binning based on the isotonic regression by calling the `isoreg()` function in the `stat` library.

**Usage**

`iso_bin(data, y, x)`

**Arguments**

- **data** A input dataframe
- **y** The name of Y with 0/1 binary values
- **x** The name of X with numeric values

**Value**

A list of binning outcomes, including a list of cut points and a summary dataframe

**Examples**

```r
data(hmeq)
iso_bin(hmeq, BAD, DEROG)
```
manual_bin  

**Binning based on cut points**

**Description**

The function `manual_bin` implements the monotonic binning based on a list of cut points. It is supposed to be a low level function called by various binning functions in the package.

**Usage**

```r
manual_bin(df, yname, xname, cuts)
```

**Arguments**

- `df`: A input dataframe
- `yname`: The name string of Y with 0/1 binary values
- `xname`: The name string of X with numeric values
- `cuts`: A list of numeric values as cut points

**Value**

A summary dataframe

**Examples**

```r
data(hmeq)
manual_bin(hmeq, "BAD", "DEROG", c(0, 1, 2))
```

qtl_bin  

**Monotonic binning by quantile**

**Description**

The function `qtl_bin` implements the quantile-based monotonic binning by the iterative discretization.

**Usage**

```r
qtl_bin(data, y, x)
```

**Arguments**

- `data`: A input dataframe
- `y`: The name of Y with 0/1 binary values
- `x`: The name of X with numeric values
Value

A list of binning outcomes, including a list of cut points and a summary dataframe

Examples

data(hmeq)
qtl_bin(hmeq, BAD, DEROG)
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