Package ‘tree.bins’

June 14, 2018

Type  Package
Title  Recategorization of Factor Variables by Decision Tree Leaves
Version  0.1.1
Date  2018-06-13
Maintainer  Piro Polo <piropolo98@gmail.com>
Description  Provides users the ability to categorize categorical variables dependent on a response variable. It creates a decision tree by using one of the categorical variables (class factor) and the selected response variable. The decision tree is created from the rpart() function from the 'rpart' package. The rules from the leaves of the decision tree are extracted, and used to recategorize the appropriate categorical variable (predictor). This step is performed for each of the categorical variables that is fed into the data component of the function. Only variables containing more than 2 factor levels will be considered in the function. The final output generates a data set containing the recategorized variables or a list containing a mapping table for each of the candidate variables. For more details see T. Hastie et al (2009, ISBN: 978-0-387-84857-0).
License  GPL-2
Encoding  UTF-8
LazyData  TRUE
Depends  R (>= 3.4.0)
Imports  dplyr (>= 0.7.4), rpart (>= 4.1-11), rpart.utils (>= 0.5), data.table (>= 1.10.4-3)
RoxygenNote  6.0.1
Suggests  knitr, rmarkdown, testthat, rpart.plot, ggplot2, ggthemes
VignetteBuilder  knitr
NeedsCompilation  no
Author  Piro Polo [aut, cre]
Repository  CRAN
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AmesImp

A Subset of the Ames Data Set with Imputed Values

Description
A randomly selected subset of the Ames data set. The dataset has had its values imputed and any remaining NA values removed.

Usage
AmesImp

Format
A data frame with 2047 observations on 74 variables.

Source

Examples
str(AmesImp)
plot(AmesImp$Neighborhood, y = AmesImp$SalePrice)

AmesImpFctrs
A Subset of the Ames Data Set with Imputed Values Only Including Factor Variables and Sale Price

Description
A randomly selected subset of the Ames data set. The dataset contains only factor class variables and the SalePrice variable. Missing values have been imputed.

Usage
AmesImpFctrs
AmesSubset

**Format**

A data frame with 2049 observations on 39 variables.

**Source**


**Examples**

```
str(AmesImpFctrs)
pplot(AmesImpFctrs$Neighborhood, y = AmesImpFctrs$SalePrice)
```

---

<table>
<thead>
<tr>
<th>AmesSubset</th>
<th>A Subset of the Ames Data Set</th>
</tr>
</thead>
</table>

**Description**

A randomly selected subset of the Ames data set.

**Usage**

AmesSubset

**Format**

A data frame with 2049 observations on 82 variables.

**Source**


**Examples**

```
str(AmesSubset)
pplot(AmesSubset$Neighborhood, y = AmesSubset$SalePrice)
```
Recategorization of Variables by Mapping Tables Within a List

**Description**

The functions purpose is to recategorize a data.frame’s variables by the elements identified in a list. Each element of the list must contain two columns. The first column contains the original values, and the second column contains the new values. The first column name of each element of the list must be a variable name in the data.frame. Effectively, each element of the list is a mapping table. The list generated from the tree.bins() function can be directly passed as an element to this function.

**Usage**

```r
bin.oth(list, data)
```

**Arguments**

- `list`: A list generated from the tree.bins() function or created by the user to the specifications laid out in the description.
- `data`: A data.frame.

**See Also**

- `tree.bins`, `fct_relevel`, `factor`, `left_join`

**Examples**

```r
# Allows the user to generate a list from the tree.bins() function
sample.df <- AmesImpFctrs[, c("Neighborhood", "MS.Zoning", "SalePrice")]
lookup.list <- tree.bins(data = sample.df, y = SalePrice, return = "lkup.list")

# Create a new data.frame and use the created list to map recategorize its values
new.df <- head(AmesImpFctrs[, c("Neighborhood", "MS.Zoning", "Lot.Shape", "SalePrice")], 100)
oth.binned.df <- bin.oth(list = lookup.list, data = new.df)
```

Recategorization of Factor Variables by Decision Tree Leaves

**Description**

The function takes in a data set that contains categorical variable(s) and a response variable. It creates a decision tree by using one of the categorical variables (class factor) and the response variable. The decision tree is created from the rpart() function from the 'rpart' package. The rules from the leaves of the decision tree are extracted, and used to recategorize the appropriate categorical variable (predictor). This step is performed for each of the categorical (class factor) variables that is fed into the data component of the function. Only variables containing more than 2 factors will be considered in the function. The final output generates a data set containing the recategorized variables or a list containing a mapping table for each of the candidate variables.
Usage

tree.bins(data, y, bin.nm = "Group.", method = NULL, control = NULL,
return = "new.fctrs")

Arguments

data A data.frame.
y The response variables to be used in the rpart() function.
bin.nm The string that will be used to categorize the variables. The default "Group." will
be assigned. E.g. If a variable of 6 factors is recategorized into 3 factors, then
setting bin.name equal to "Group." will name the three new factors to "Group.1",
"Group.2", and "Group.3"
method This is the method that will be used in the rpart() function. If null, the default
method will be used. See rpart() for further detail.
control This is the control that will be used in the rpart() function. The user has 3
options, one of which is the default selected control by the rpart() function. The
remaining two option are: 1) Specify a cp value which will prune each decision
tree by the specified value or 2) Specify a two-dimensional data.frame() that
contains the variable name(s) as identified in the data component for the first
column and the respective cp of each variable in the second column. Variable(s)
not included in this data.frame() will use the cp generated by the rpart() function.
See rpart() and rpart.control() for further detail.
return This is what the function will return. There are three options: 1) new.fctrs - will
provide a data.frame with the recategorized categorical variables. 2) lkup.list -
will provide a list of lookup tables. Each element will contain the original to
new mapping for each recategorized variable. 3) both - it will return both: the
new.fctrs and lkup.list objects.

See Also

bin.oth, rpart, rpart.control, rpart.list

Examples

#Returns a data.frame of recategorized variables
library(rpart)
sample.df <- AmesImpFctrs[, c("Neighborhood", "MS.Zoning", "SalePrice")]
tree.bins(data = sample.df, y = SalePrice)

#Returns a list of mapping tables generated from tree.bins()
tree.bins(data = sample.df, y = SalePrice, return = "lkup.list")

#Allows the user to choose the naming convention for the attribute naming convention
tree.bins(data = sample.df, y = SalePrice, bin.nm = "bin#")

#Allows user to manually assign a cp to each decision tree evaluated in rpart()
tree.bins(data = sample.df, y = SalePrice, control = rpart.control(cp = .01))
# Allows user to manually assign a cp to specified variables

demo.df <- data.frame(Variables = c("Neighborhood", "MS.Zoning"), CP = c(.001, .2))
tree.bins(data = sample.df, y = SalePrice, control = demo.df)
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