

# Package ‘visTree’

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**Title** Visualization of Subgroups for Decision Trees

**Version** 0.8.1

**Description** Provides a visualization for characterizing subgroups defined by a decision tree structure. The visualization simplifies the ability to interpret individual pathways to subgroups; each sub-plot describes the distribution of observations within individual terminal nodes and percentile ranges for the associated inner nodes.

**Depends** R (>= 3.4.0)

**License** GPL-3

**Encoding** UTF-8

**Imports** partykit, rpart, colorspace

**LazyData** true

**RoxygenNote** 6.1.0

**Suggests** covr, knitr, rmarkdown, testthat

**VignetteBuilder** knitr

**NeedsCompilation** no

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blsdata	<i>Box Lunch Study - Baseline dataset</i>
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## Description

The variables are as follows:

## Usage

```
data(blsdata)
```

## Format

A data frame with 226 rows and 26 variables

## Details

- trt. Treatment
- sex. Sex
- bmi0. BMI
- snackkcal0. Snacking kilo calories
- srvgfv0. Serving size of fruits and vegetables
- srvgssb0. Serving size of beverages
- kcal24h0.
- edeq01.
- edeq02.
- edeq13.
- edeq14.
- edeq15.
- edeq22.
- edeq23.
- edeq25.
- edeq26.
- cdrsbody0. Body image
- weighfreq0. Weighing frequency
- freqff0. Fast food frequency

- age. Age
- tfactor1.
- tfactor2.
- tfactor3.
- mlhfbias0.
- fwahfbias0.
- rrvfood. Relative reinforcement of food

### Examples

```
data(blsdata)
```

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l_node	<i>Function for determining a pathway</i>
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### Description

Decision tree structure

### Usage

```
l_node(newtree, node_id = 1, start_criteria = character(0))
```

### Arguments

newtree	Decision tree generated as a party object
node_id	Node ID
start_criteria	Character vector

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makeTransparent	<i>Color Scheme</i>
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### Description

Function to adjust the transparency and define the color scheme within the visualization.

### Usage

```
makeTransparent(colortype, alpha)
```

### Arguments

colortype	Color palette
alpha	Transparency

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minmax_mat	<i>Minmax matrix</i>
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**Description**

Identifies splits and relevant criteria

**Usage**

```
minmax_mat(str, varnms, Y, interval)
```

**Arguments**

str	Structure of pathway from the root node in the decision tree to each terminal node
varnms	Names of covariates
Y	Response variable in the dataset
interval	logical. Continuous response (interval = FALSE) and Categorical response (interval = TRUE).

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path_node	<i>Function for determining a pathway</i>
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**Description**

Generates the pathway from the root node to individual terminal nodes of a decision tree generated as a party object using the partykit package.

**Usage**

```
path_node(newtree, idnumber = 0)
```

**Arguments**

newtree	Decision tree generated as a party object
idnumber	Terminal ID number

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plot\_minmax

*Generate individual subplots within the graphical visualization*


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### Description

This function is utilized to generate a series of sub-plots, where each subplot corresponds to individual terminal nodes within the decision tree structure. Each subplot is composed of a histogram (or a barchart) that displays the distribution for the relevant subgroup and colored horizontal bars that summarize the set of covariate splits.

### Usage

```
plot_minmax(My, X, Y, str, color.type, alpha, add.p.axis, add.h.axis,
            cond.tree, text.main, text.bar, text.round, text.percentile,
            density.line, text.title, text.axis, text.label)
```

### Arguments

My	A matrix to define the split points within the decision tree structure
X	Covariates
Y	Response variable
str	Structure of pathway from the root node in the decision tree to each terminal node
color.type	Color palettes. (rainbow_hcl = 1; heat_hcl = 2; terrain_hcl = 3; sequential_hcl = 4; diverge_hcl = 5)
alpha	Transparency of individual horizontal bars. Choose values between 0 to 1.
add.p.axis	logical. Add axis for the percentiles (add.p.axis = TRUE), remove axis for the percentiles (add.p.axis = FALSE).
add.h.axis	logical. Add axis for the outcome (add.h.axis = TRUE), remove axis for the outcome (add.h.axis = FALSE).
cond.tree	Tree as a party object
text.main	Change the size of the main titles
text.bar	Change the size of the text in the horizontal bar and below the bar plot
text.round	Round the threshold displayed on the bar
text.percentile	Change the size of the percentile title
density.line	Draw a density line
text.title	Change the size of the text in the title
text.axis	Change the size of the text of axis labels
text.label	Change the size of the axis annotation

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ptree_criteria	<i>Splitting Criteria</i>
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**Description**

Identifies the splitting criteria for the relevant node leading to lower level inner nodes or a terminal node.

**Usage**

```
ptree_criteria(newtree, node_id, left)
```

**Arguments**

newtree	Decision tree
node_id	Node id
left	Splits to the left

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ptree_left	<i>Left split</i>
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**Description**

Identifies a node that corresponds to the left split

**Usage**

```
ptree_left(newtree, start_id)
```

**Arguments**

newtree	Decision tree generated as a party object
start_id	Character vector

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ptree\_right                      *Right Split*

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**Description**

Identifies a node that corresponds to the right split

**Usage**

```
ptree_right(newtree, start_id)
```

**Arguments**

newtree	Decision tree generated as a party object
start_id	Character vector

---

ptree\_y                              *Function for determining a pathway*

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**Description**

Identifies the predicted outcome value for the relevant node.

**Usage**

```
ptree_y(newtree, node_id)
```

**Arguments**

newtree	Decision tree generated as a party object
node_id	Node ID

---

trim                                      *Function for determining a pathway*

---

**Description**

Parsing function

**Usage**

```
trim(x)
```

**Arguments**

x	String
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**Description**

This visualization characterizes subgroups defined by a decision tree structure and identifies the range of covariate values associated with outcome values in each subgroup.

**Usage**

```
visTree(cond.tree, rng = NULL, interval = FALSE, color.type = 1,
        alpha = 0.5, add.h.axis = TRUE, add.p.axis = TRUE,
        text.round = 1, text.main = 1.5, text.bar = 1.5,
        text.title = 1.5, text.label = 1.5, text.axis = 1.5,
        text.percentile = 0.7, density.line = TRUE)
```

**Arguments**

cond.tree	Decision tree generated as a party object.
rng	Restrict plotting to a particular set of nodes. Default value is set as NULL.
interval	logical. Continuous outcome (interval = FALSE) and Categorical outcome (interval = TRUE).
color.type	Color palettes (rainbow_hcl = 1; heat_hcl = 2; terrain_hcl = 3; sequential_hcl = 4; diverge_hcl = 5)
alpha	Transparency for horizontal colored bars in each subplot. Values between 0 to 1.
add.h.axis	logical. Add axis for the outcome distribution (add.h.axis = TRUE), remove axis for the outcome (add.h.axis = FALSE).
add.p.axis	logical. Add axis for the percentiles (add.p.axis = TRUE) computed over covariate values, remove axis for the percentiles (add.p.axis = FALSE).
text.round	Round the threshold displayed on the horizontal bar
text.main	Change the size of the main titles
text.bar	Change the size of the text in the horizontal bar
text.title	Change the size of the text in the title
text.label	Change the size of the axis annotation
text.axis	Change the size of the text of axis labels
text.percentile	Change the size of the percentile title
density.line	logical. Draw a density line. (density.line = TRUE).

**Author(s)**

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**Examples**

```

data(blsdata)
newblsdata<-blsdata[,c(7,21, 22,23, 24, 25, 26)]
## Continuous response
ptree1<-partykit::ctree(kcal24h0~., data = newblsdata)
visTree(ptree1, text.axis = 1.3, text.label = 1.2, text.bar = 1.2, alpha = 0.5)

## Repeated covariates in the splits of the decision tree
ptree2<-partykit::ctree(kcal24h0~skcal+rrvfood+resteating+age, data = blsdata)
visTree(ptree2, text.axis = 1.3, text.label = 1.2, text.bar = 1.2, alpha = 0.5)

## Categorical response
blsdataedit<-blsdata[,-7]
blsdataedit$bin<-0
blsdataedit$bin<-cut(blsdata$skcal24h0, unique(quantile(blsdata$skcal24h0)),
include.lowest = TRUE, dig.lab = 4)
names(blsdataedit)[26]<-"kcal24h0"
ptree3<-partykit::ctree(kcal24h0~hunger+rrvfood+resteating+liking, data = blsdataedit)
visTree(ptree3, interval = TRUE, color.type = 1, alpha = 0.6,
text.percentile = 1.2, text.bar = 1.8)

## Other decision trees (e.g., rpart)
ptree4<-rpart::rpart(kcal24h0~wanting+liking+rrvfood, data = newblsdata,
control = rpart::rpart.control(cp = 0.029))
visTree(ptree4, text.bar = 1.8, text.label = 1.4, text.round = 1,
density.line = TRUE, text.percentile = 1.3)

## Change the color scheme and transparency of the horizontal bars
ptree1<-partykit::ctree(kcal24h0~., data = newblsdata)
visTree(ptree1, text.axis = 1.3, text.label = 1.2, text.bar = 1.2, alpha = 0.65,
color.type = 3)

## Remove the axes corresponding to the percentiles and the response values.
ptree1<-partykit::ctree(kcal24h0~., data = newblsdata)
visTree(ptree1, text.axis = 1.3, text.label = 1.2, text.bar = 1.2, alpha = 0.65,
color.type = 3, add.p.axis = FALSE, add.h.axis = FALSE)

# Remove the density line over the histograms
ptree1<-partykit::ctree(kcal24h0~., data = newblsdata)
visTree(ptree1, text.axis = 1.3, text.label = 1.2, text.bar = 1.2, alpha = 0.65,
color.type = 3, density.line = FALSE)

```

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