Package ‘micromap’

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### alterForMedian

**Description**

Adds a median line to the DF table.

**Usage**

```r
alterForMedian(DF, a)
```

**Arguments**

- **DF**
  
  the DF table created by `create_DF_rank`.

- **a**
  
  the attributes list, which contains the user specified choice of whether to include a median row.

**Value**

Returns the DF table.

**Note**

See the Introduction Guide for a full list of the options available for altering micromaps.

**Author(s)**

Quinn Payton <Payton.Quinn@epa.gov>
assimilatePlot

Cleans a User Made Panel

Description

Sends a user made panel out to the graph "cleaning functions" in lmplot in order to properly display a user made panel seemlessly into the rest of an lmplot.

Usage

assimilatePlot(pl, i, a, limsx=NA, limsy=NA)

Arguments

pl the lmplot object.
i the panel number.
a the attribute list.
limsx limits of the x axis if desired.
limsy limits of the y axis if desired.

Value

Returns a cleaned plot object.

Note

See the Introduction Guide for a full list of the options available for altering micromaps.

Author(s)

Quinn Payton <Payton.Quinn@epagov>

create_map_table

Prepares A Polygon Table

Description

Takes the user supplied polygon table and prepares it to be plotted correctly with the lmplot function.

Usage

create_map_table(tmp.map, IDcolumn=NA, poly.thresh=.0001)
edPov

Arguments

tmp.map  a shapefile to be parsed into a flat table for use with ggplot2.
IDcolumn specify which column in the data file to use as a unique identifier.
poly.thresh specify the minimum polygon area which to keep. All polygons with less area will be dropped.

Value

A flat table of all the polygons in the shapefile with an entry for each vertex.

Author(s)

Quinn Payton <Payton.Quinn@epa.gov>

Examples

data("USstates")
head(USstates@data)
statePolys <- create_map_table(USstates, IDcolumn="ST")
head(statePolys)

---

edPov  
*Example Dataset: Education and Poverty Levels*

Description

A dataset comparing education and poverty levels among the states.

Usage

data(edPov)

Format

A data frame with 51 rows and the following 5 columns:

- **state**  full state name.
- **ed**  education rate.
- **pov**  poverty rate.
- **region**  major US region.
- **StateAb**  abbreviated state name.

Note

This is just an example data set.
**labels_att**

**Default Attribute Lists**

**Examples**

```r
data(edPov)
head(edPov)
```

**Description**

Creates a list of default attribute lists for each panel type.

**Usage**

```r
labels_att(show=FALSE)
```

**Arguments**

- `show` If `show` equals `FALSE`, then the resulting list is returned invisibly.

**Value**

A list of defaults to be stored in the overall attribute list.

**Author(s)**

Quinn Payton <Payton.Quinn@epa.gov>

---

**labels_build**

**Builds panels**

**Description**

Creates a panel of the user specified type using the attribute list to make adjustments.

**Usage**

```r
labels_build(pl, p, DF, att)
```

**Arguments**

- `pl` the lmplot object being constructed.
- `p` number of the panel within the plot.
- `DF` the data table of statistics to be referenced.
- `att` the attribute list to specify visual and graphical characteristics.
lmgroupedplot

Value
Returns a ggplot object to be printed later in the lmplot function.

Author(s)
Quinn Payton <Payton.Quinn@epa.gov>

lmgroupedplot
Linked Micromaps

Description
Creates a linked micromap, displaying specified polygons and their associated statistical summary displays; differentiated by color.

Usage

```
lmgroupedplot(stat.data, map.data, panel.types, panel.data, map.link = NULL,
nPanels = length(panel.types), grp.by, cat, colors = brewer.pal(10,  
"Spectral"), map.color = "lightyellow", map.all = FALSE,  
print.file = "no", print.res = NA, panel.att = vector("list", nPanels),  
plot.header = NA, plot.header.size = NA, plot.header.color = NA,  
plot.footer = NA, plot.footer.size = NA, plot.footer.color = NA,  
plot.width = 7, plot.height = 7, map.spacing = 1,  
plot.grp.spacing = 1, plot.panel.spacing = 1, plot.panel.margins = c(0,  
0, 1, 0), ...)  
```

```
lmplot(stat.data, map.data = NULL, panel.types, panel.data, map.link = NULL,  
nPanels = length(panel.types), ord.by, rev.ord = FALSE, grouping,  
median.row = FALSE, vertical.align = "top", median.color = gray(0.5),  
colors = brewer.pal(max(grouping), "Spectral"), map.all = FALSE,  
map.color2 = "lightgray", two.ended.maps = FALSE, print.file = "no",  
print.res = 300, panel.att = vector("list", nPanels), plot.header = NA,  
plot.header.size = NA, plot.header.color = NA, plot.footer = NA,  
plot.footer.size = NA, plot.footer.color = NA, plot.width = 7,  
plot.height = 7, map.spacing = 1, plot.pGrp.spacing = 1,  
plot.panel.spacing = 1, plot.panel.margins = c(0, 0, 1, 0), ...)  
```

```
mmgroupedplot(stat.data, map.data, panel.types, panel.data, map.link = NULL,  
nPanels = length(panel.types), grp.by, cat, colors = brewer.pal(10,  
"Spectral"), map.color = "lightyellow", map.all = FALSE,  
print.file = "no", print.res = NA, panel.att = vector("list", nPanels),  
plot.header = NA, plot.header.size = NA, plot.header.color = NA,  
plot.footer = NA, plot.footer.size = NA, plot.footer.color = NA,  
plot.width = 7, plot.height = 7, map.spacing = 1,  
plot.grp.spacing = 1, plot.panel.spacing = 1, plot.panel.margins = c(0,  
0, 1, 0))  
```
lmgroupedplot(map.data, ...)  

## S3 method for class 'SpatialPolygonsDataFrame'
lmgroupedplot(map.data, ...)  

## Default S3 method:
lmgroupedplot(map.data, stat.data, panel.types, panel.data, map.link,  
nPanels = length(panel.types), ord.by, rev.ord = FALSE, grouping,  
median.row = FALSE, vertical.align = "top", median.color = gray(0.5),  
median.text.color = "black", median.text.size = 1,  
median.text.label = "Median", colors = brewer.pal(max(grouping),  
"Spectral"), map.all = FALSE, map.color2 = "lightgray",  
two.ended.maps = FALSE, trans = "identity", print.file = "no",  
print.res = 300, panel.att = vector("list", nPanels), plot.header = NA,  
plot.header.size = NA, plot.header.color = NA, plot.footer = NA,  
plot.footer.size = NA, plot.footer.color = NA, plot.width = 7,  
plot.height = 7, map.spacing = 1, plot.pGrp.spacing = 1,  
plot.panel.spacing = 1, plot.panel.margins = c(0, 0, 1, 0), ...)  

Arguments

- **stat.data**: table of statistics for display
- **map.data**: table of polygons to be associated with each item in stat.data.
- **panel.types**: vector of panel types to specify the layout of the plot (e.g. c('map', 'labels', 'dot.cl'))
- **panel.data**: a list (of lists) of data to be used with each panel (e.g. list(NA, 'Names', list('lower.bound','estimate','upper.bound')).
- **map.link**: a vector with the name of the columns from stat.data and map.data, respectively, on which to join.
- **nPanels**: the number of panels, which is not expected to be set by the user. The default is the length of panel.types.
- **grp.by**: The column name from stat.data with which to order the lines of the output graphic for a standard lmPlot or identifier column on which to group the categorized lmPlot.
- **cat**: category column within stats table for a categorization type lmPlot.
- **colors**: a vector of colors for the perceptual groups. The default is brewer.pal(max(grouping), 'Spectral') for lmPlot and brewer.pal(10, 'Spectral') for lmgroupedplot). The colors are passed to colorRampPalette to create a continuous color vector equal in length to the groupings.
- **map.color**: the color to fill in previously displayed polygons.
- **map.all**: by default, lmPlot will only plot the polygons associated with data in the stats table; map.all = TRUE will show all the polygons in the polygon table regardless of whether they are actively referred to.
- **print.file**: name of the file being created. The extension (.pdf, .tiff, jpeg, .png) tells lmPlot which image creation tool to use.
print.res the resolution of the image to use.
panel.att a list of panel specific attributes to be altered (see lmplot documentation).
plot.header the overall title to be placed on the lmPLot.
plot.header.size size of the overall title to be placed on the lmPLot.
plot.header.color color of the overall title to be placed on the lmPLot.
plot.footer the overall footer to be placed under the lmPLot.
plot.footer.size size of the overall footer to be placed under the lmPLot.
plot.footer.color color of the overall footer to be placed under the lmPLot.
plot.width width of the overall plot in inches. Defaults to 7.
plot.height height of the overall plot in inches. Defaults to 7.
map.spacing the vertical spacing between maps measured in lines. Perceptual group spacing does not affect map spacing so as to leave the maps as large as possible. The user can increase map spacing using this argument. Defaults to 1.

plot.grp.spacing the vertical spacing between groups measured in lines. Defaults to 1.
plot.panel.spacing the vertical spacing between panels measured in lines. Defaults to 1.
plot.panel.margins the horizontal spacing between panels measured in lines. THIS IS LEGACY CODE AND SHOULD NOT BE USED.
... Additional arguments passed to or from other methods.
ord.by The column name from stat.data with which to order the lines of the output graphic for a standard lmPLot or identifier column on which to group the categorized lmPLot.
rev.ord specifies whether the plot should be displayed in reverse order of the ranking column. The default is FALSE.
grouping the number of lines per perceptual group (for the standard lmplot only). Can be a single number to have the same numer in each group or a vector of numbers for unequal groupings.
median.row specifies whether a median row should be included. If an odd number of data lines are supplied, a data line itself will be used as the median, otherwise median entries will be calculated from the supplied data. Note that without a median row maps are forced into proper size.
vertical.align controls vertical alignment of the median row.
median.color specifies color of the median row.
map.color2 the color to fill in previously displayed polygons.
two.ended.maps the resulting micromaps will highlight previously referenced polygons (see map.color2) up to the median perceptual group then switch to highlighting all polygons that are still to be referenced later.
lmgroupedplot

plot.pGrp.spacing
the vertical spacing between perceptual groups measured in lines. Defaults to 1.

median.text.color
specifies color of text in the median row.

median.text.size
specifies size of text in the median row.

median.text.label
specifies the label for text in the median row.

trans
chr string for axis transformations, passed to scale_x_continuous. Acceptable values are "asn", "atanh", "boxcox", "exp", "identity", "log", "log10", "log1p", "log2", "logit", "probability", "probit", "reciprocal", "reverse" or "sqrt". One value will be recycled to all panels as needed, otherwise one per panel can be used in a combined string. Applies only to panels with axes.

Value
A list of ggplot2 objects with entries for each individual panel.

Note
See the Introduction Guide for a full list of the options available for altering micromaps.

Author(s)
Quinn Payton <Payton.Quinn@epa.gov>

Examples

# initial example
data("USstates")
head(USstates@data)
statePolys <- create_map_table(USstates, 'ST')
head(statePolys)
data("edPov")

# basic figure 1
lmplot(stat.data = edPov,
   map.data = statePolys,
   panel.types = c('labels', 'dot', 'dot', 'map'),
   panel.data = list('state', 'pov', 'ed', NA),
   ord.by = 'pov',
   grouping = 5, median.row = TRUE,
   map.link = c('StateAb', 'ID'))

## Not run:
# publication figure 1a
lmplot(stat.data = edPov, map.data = statePolys,
   panel.types = c('labels', 'dot', 'dot', 'map'),
   panel.data = list('state', 'pov', 'ed', NA),
ord.by = 'pov',
grouping = 5,
median.row = TRUE,
map.link = c('StateAb','ID'),

plot.height = 9,
colors = c('red','orange','green','blue','purple'),
map.color2 = 'lightgray',

panel.att = list(
  list(1, header = 'States', panel.width = .8, align = 'left', text.size = .9),
  list(2, header = 'Percent Living Below Poverty Level',
       graph.bgcolor = 'lightgray', point.size = 1.5,
       xaxis.ticks = list(10,15,20), xaxis.labels = list(10,15,20),
       xaxis.title = 'Percent'),
  list(3, header = 'Percent Adults With\n4+ Years of College',
       graph.bgcolor = 'lightgray', point.size = 1.5,
       xaxis.ticks = list(0,20,30,40), xaxis.labels = list(0,20,30,40),
       xaxis.title = 'Percent'),
  list(4, header = 'Light Gray Means\nHighlighted Above',
       inactive.border.color = gray(.7), inactive.border.size = 2,
       panel.width = .8)))

edPov$points <- 0

# publication figure 1b
lmplot (stat.data = edPov, map.data = statePolys,
        panel.types = c('dot', 'labels', 'dot', 'dot', 'map'),
        panel.data = list('points', 'state', 'pov', 'ed', NA),
        map.link = c('StateAb','ID'),
        ord.by = 'pov',
        grouping = 5,
        median.row = TRUE,

plot.height = 9,
colors = c('red','orange','green','blue','purple'),
map.color2 = 'lightgray',

panel.att = list(
  list(1, panel.width = .15, point.type = 20,
       graph.border.color = 'white',
       xaxis.text.display = FALSE, xaxis.line.display = FALSE,
       graph.grid.major = FALSE),
  list(2, header = 'States', panel.width = .8,
       align = 'left', text.size = .9),
  list(3, header = 'Percent Living Below\nPoverty Level',
       graph.bgcolor = 'lightgray', point.size = 1.5,
       xaxis.ticks = list(10,15,20),
       xaxis.labels = list(10,15,20),
       xaxis.title = 'Percent'),
  list(4, header = 'Light Gray Means\nHighlighted Above',
       inactive.border.color = gray(.7), inactive.border.size = 2,
       panel.width = .8)))
list(4, header = 'Percent Adults With\n4+ Years of College',
  graph.bgcolor = 'lightgray', point.size = 1.5,
  xaxis.ticks = list(20,30,40),
  xaxis.labels = list(20,30,40),
  xaxis.title = 'Percent'),

list(5, header = 'Light Gray Means\nHighlighted Above',
  inactive.border.color = gray(.7), inactive.border.size = 2,
  panel.width = .8)))

# publication figure 1c
myPlot <- lmplot(stat.data = edPov, map.data = statePolys,
  panel.types = c('map', 'dot', 'labels', 'dot', 'dot'),
  panel.data = list(NA, 'points', 'state', 'pov', 'ed'),
  map.link = c('StateAb', 'ID'),
  ord.by = 'pov',
  grouping = 5,
  median.row = TRUE,
  plot.height = 9,
  colors = c('red', 'orange', 'green', 'blue', 'purple'),
  map.color2 = 'lightgray',
  panel.att = list(list(2, panel.width = .15, point.type = 20,
    graph.border.color = 'white',
    xaxis.text.display = FALSE, xaxis.line.display = FALSE,
    graph.grid.major = FALSE),
    list(3, header = 'States', panel.width = .8,
      align = 'left', text.size = .9),
    list(4, header = 'Percent Living Below\nPoverty Level',
      graph.bgcolor = 'lightgray', point.size = 1.5,
      xaxis.ticks = list(10,15,20), xaxis.labels = list(10,15,20),
      xaxis.title = 'Percent'),
    list(5, header = 'Percent Adults With\n4+ Years of College',
      graph.bgcolor = 'lightgray', point.size = 1.5,
      xaxis.ticks = list(20,30,40),
      xaxis.labels = list(20,30,40),
      xaxis.title = 'Percent'),
    list(1, header = 'Light Gray Means\nHighlighted Above',
      inactive.border.color = gray(.7), inactive.border.size = 2,
      panel.width = .8)))

print(myPlot, name = 'myExhibit.tiff', res = 300)

## End(Not run)
Description

Lung mortality rates for all 50 states and Washington D.C.

Usage

data(lungMort)

Format

A data frame with 51 rows and the following 14 columns:

StateAb  abbreviation of state name.
Rate_95  mortality rate estimate for 1995.
Count_95 estimated number of cases in 1995.
Lower_95 lower bound of a 95 percent confidence interval for 1995 mortality rate.
Upper_95 lower bound of a 95 percent confidence interval for 1995 mortality rate.
Pop_95  population in 1995.
StdErr_95 estimated standard error of the estimated mortality rate in 2000.
Rate_00  mortality rate estimate for 2000.
Count_00 estimated number of cases in 2000.
Lower_00 lower bound of a 95 percent confidence interval for 2000 mortality rate.
Upper_00 lower bound of a 95 percent confidence interval for 2000 mortality rate.
Pop_00  population in 2000.
StdErr_00 estimated standard error of the estimated mortality rate in 2000.
State  full state name.

Note

This is just an example data set.

Examples

data(lungMort)
head(lungMort)
**Example Dataset: Oregon Level 3 Ecoregion Shapefile**

**Description**

An object of class 'SpatialPolygonsDataFrame' that was created from a shapefile detailing boundaries of the level 3 ecoregion borders of Oregon.

**Usage**

```r
data(OrEcoLevel3)
```

**Format**

The format is: Formal class 'SpatialPointsDataFrame' [package "sp"].

**Note**

This is just an example data set.

**Examples**

```r
data(OrEcoLevel3)
spplot(OrEcoLevel3, zcol="US_L3NAME", col.regions=rainbow(9, s=0.75))
```

---

**Print lmplot Object to a File**

**Description**

Takes a stored lmplot object of class mm and prints to a file whose type is implied by the file name.

**Usage**

```r
## S3 method for class 'mm'
print(x, name, res, ...)
```

**Arguments**

- `x` name of the lmplot object.
- `name` name of the file to be produced. tiff, png, jpeg, and pdf are recognized.
- `res` resolution in dpi.
- `...` Additional arguments. (Currently ignored.)
Value

Returns nothing.

Author(s)

Quinn Payton <Payton.Quinn@epa.gov>

printLMPlot  Print lmplot Object to a File

Description

Takes a stored lmplot object and uses the print method for objects of class mm to print to a file whose type is implied by the file name.

Usage

printLMPlot(pobject, name, res)

Arguments

pobject  name of the lmplot object.
name  name of the file to be produced. Tiff, png, jpeg, and pdf are recognized.
res  resolution in dpi.

Value

Returns nothing.

Author(s)

Quinn Payton <Payton.Quinn@epa.gov>

right  Substring Function

Description

Mimics the Excel Function of the Same Name

Usage

right(txt, i)
sample_att

Arguments

txt        string to be substringed.
i          number of characters to substring.

Value

A character value containing the substring.

Author(s)

Quinn Payton <Payton.Quinn@epa.gov>

Description

Creates a sample attribute list for use in the creation of new panel types.

Usage

```r
sample_att(size=1, type=rep("standard", size), ord.by=NA, grouping=5,
           colors=brewer.pal(max(grouping), "Spectral"), plot.pGrp.spacing=0.05,
           plot.panel.margins=c(0,1,0,0), panel.data=list(NA), median.row=FALSE,
           show=FALSE)
```

Arguments

- `size`: specify the number of attributes lists to be created.
- `type`: match the attributes to which type of default panel.
- `ord.by`: argument inherited from lmplot/lmGroupedplot.
- `grouping`: argument inherited from lmplot/lmGroupedplot.
- `colors`: argument inherited from lmplot/lmGroupedplot.
- `plot.pGrp.spacing`: argument inherited from lmplot/lmGroupedplot.
- `plot.panel.margins`: argument inherited from lmplot/lmGroupedplot.
- `panel.data`: argument inherited from lmplot/lmGroupedplot.
- `median.row`: argument inherited from lmplot/lmGroupedplot.
- `show`: controls whether to print the resulting attribute list.

Value

A list of attributes to be used in the creation of a panel
Note

See the Introduction Guide for a full list of the options available for altering micromaps.

Author(s)

Quinn Payton <Payton.Quinn@epa.gov>

---

**statesFlatfile**  
*Example Dataset: A Table of State Polygons*

Description

Polygon vertices for each state.

Usage

```r
data(statesFlatfile)
```

Format

A data frame with 434 rows and the following 4 columns:

- **ID** abbreviation or state name.
- **coordsx** x coordinates for each polygon vertice.
- **coordsy** y coordinates for each polygon vertice.
- **poly** individual polygon identifier within each state.

Note

This is just an example data set.

Examples

```r
data(statesFlatfile)
head(statesFlatfile)
```
USstates

Example Dataset: U.S. States Polygons

Description
An object of class 'SpatialPolygonsDataFrame' that was created from a shapefile of U.S. state borders.

Usage
data(USstates)

Format
The format is: Formal class 'SpatialPolygonsDataFrame' [package "sp"].

Note
This is just an example data set.

Examples
data(USstates)
pplot(USstates)

vegCov

Example Dataset: Vegetation Coverage Percentages

Description
A subset of a larger vegetation coverage analysis dataset.

Usage
data(vegCov)

Format
A data frame with 12 rows and the following 13 columns:

Type  the population name.
Subpopulation the subpopulation name, either national or level 3 ecoregion.
Indicator the ecological variable (indicator)
Category category of disturbance.
NResp sample size.
**Estimate.P** estimated percentage of vegetation coverage with a given classification.

**StdError.P** standard error of the percentage estimate.

**LCB95Pct.P** lower bound of a 95 percent confidence interval for the estimated percentage.

**UCB95Pct.P** upper bound of a 95 percent confidence interval for the estimated percentage.

**Estimate.U** estimated area of vegetation coverage with a given classification.

**StdError.U** standard error of the area estimate.

**LCB95Pct.U** lower bound of a 95 percent confidence interval for the estimated area.

**UCB95Pct.U** upper bound of a 95 percent confidence interval for the estimated area.

**Note**

This is just an example data set.

**Examples**

```r
data(vegCov)
head(vegCov)
```

---

**WSA3**  
*Example Dataset: Major U.S. EcoRegions*

**Description**

An object of class 'SpatialPolygonsDataFrame' that was created from a shapefile of the U.S. level 3 ecoregion boundaries.

**Usage**

```r
data(WSA3)
```

**Format**

The format is: Formal class 'SpatialPointsDataFrame' [package "sp"].

**Note**

This is just an example data set.

**Examples**

```r
data(WSA3)
spplot(WSA3, zcol="WSA_3_NM", col.regions=rainbow(3, s=0.75))
```
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