**alterForMedian**

*Insert a Median Line*

**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@epa.gov>

---

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)
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 vertice.

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**

**Examples**

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

---

**Default Attribute Lists**

**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 Implot 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), ... )
lmgroupedplot

\texttt{lmplot(}
\begin{verbatim}
  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), 
  ...
\end{verbatim}
\texttt{)}

mmgroupedplot

\texttt{mmgroupedplot(}
\begin{verbatim}
  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", 
\end{verbatim}
\texttt{)}
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)
)

mmplot(map.data, ...)

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

## S3 method for class 'sf'
mmplot(map.data, ...)

## Default S3 method:
mmplot(
  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,
lmgroupedplot

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 cate-
gorized 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.
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.
**lmgroupedplot**

*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**

```r
# 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'),
   trans = "atanh")
```
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 \n 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 \n 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(4, header = 'Percent Adults With\n4+ Years of College',
        graph.bgcolor = 'lightgray', point.size = 1.5,
        xaxis.ticks = list(20,30,40),
# publication figure lc
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',
axiss.text.display = FALSE, axiss.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.tif', 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

data(OrEcoLevel3)

Format

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

Note

This is just an example data set.

Examples

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

## 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(plobject, name, res)

Arguments

- plobject: 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 subtringed.
i  number of characters to substring.

Value

A character value containing the subtring.

Author(s)

Quinn Payton <Payton.Quinn@epa.gov>

sample_att  Sample Attribute List Creator

Description

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

Usage

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 inhereted from lmplot/lmGroupedplot.
grouping  argument inhereted from lmplot/lmGroupedplot.
colors  argument inhereted from lmplot/lmGroupedplot.
plot.pGrp.spacing  argument inhereted from lmplot/lmGroupedplot.
plot.panel.margins  argument inhereted from lmplot/lmGroupedplot.
panel.data  argument inhereted from lmplot/lmGroupedplot.
median.row  argument inhereted 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

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

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**

```r
data(USstates)
```

**Format**

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

**Note**

This is just an example data set.

**Examples**

```r
data(USstates)
plot(USstates)
```

### vegCov

**Example Dataset: Vegetation Coverage Percentages**

**Description**

A subset of a larger vegetation coverage analysis dataset.

**Usage**

```r
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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