

Package ‘desplot’

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Title Plotting Field Plans for Agricultural Experiments

Version 1.10

Type Package

Description A function for plotting maps of agricultural field experiments that are laid out in grids. See Ryder (1981) <[doi:10.1017/S0014479700011601](https://doi.org/10.1017/S0014479700011601)>.

Imports ggplot2, grid, lattice, reshape2, rlang

Suggests agridat, knitr, rmarkdown, testthat

License GPL-3

URL <https://kwstat.github.io/desplot/>

BugReports <https://github.com/kwstat/desplot/issues>

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`desplot`*Plot the layout/data of a field experiment.*

Description

Use this function to plot the layout of a rectangular lattice field experiment and also the observed data values.

Usage

```
desplot(  
  data,  
  form = formula(NULL ~ x + y),  
  num = NULL,  
  num.string = NULL,  
  col = NULL,  
  col.string = NULL,  
  text = NULL,  
  text.string = NULL,  
  out1 = NULL,  
  out1.string = NULL,  
  out2 = NULL,  
  out2.string = NULL,  
  dq = NULL,  
  dq.string = NULL,  
  col.regions = RedGrayBlue,  
  col.text = NULL,  
  text.levels = NULL,  
  out1.gpar = list(col = "black", lwd = 3),  
  out2.gpar = list(col = "yellow", lwd = 1, lty = 1),  
  at,  
  midpoint = "median",  
  ticks = FALSE,  
  flip = FALSE,  
  main = NULL,  
  xlab,  
  ylab,  
  shorten = "abb",  
  show.key = TRUE,  
  key.cex,  
  cex = 0.4,  
  strip.cex = 0.75,  
  subset = TRUE,  
  gg = FALSE,  
  ...  
)
```

```

ggdesplot(
  data,
  form = formula(NULL ~ x + y),
  num = NULL,
  num.string = NULL,
  col = NULL,
  col.string = NULL,
  text = NULL,
  text.string = NULL,
  out1 = NULL,
  out1.string = NULL,
  out2 = NULL,
  out2.string = NULL,
  dq = NULL,
  dq.string = NULL,
  col.regions = RedGrayBlue,
  col.text = NULL,
  text.levels = NULL,
  out1.gpar = list(col = "black", lwd = 3),
  out2.gpar = list(col = "yellow", lwd = 1, lty = 1),
  at,
  midpoint = "median",
  ticks = FALSE,
  flip = FALSE,
  main = NULL,
  xlab,
  ylab,
  shorten = "abb",
  show.key = TRUE,
  key.cex,
  cex = 0.4,
  strip.cex = 0.75,
  subset = TRUE,
  gg = FALSE,
  ...
)

```

Arguments

<code>data</code>	A data frame.
<code>form</code>	A formula like <code>yield~x*y location</code> . Note <code>x,y</code> are numeric.
<code>num</code>	Bare name (no quotes) of the column of the data to use as a factor for number-coding the text in each cell.
<code>num.string</code>	String name of the column of the data to use as a factor for number-coding the text in each cell.
<code>col</code>	Bare name (no quotes) of the column of the data to use for color-coding the text shown in each cell.

<code>col.string</code>	String name of the column of the data to use for color-coding the text shown in each cell.
<code>text</code>	Bare name (no quotes) of the column of the data to use for the actual text shown in each cell.
<code>text.string</code>	String name of the column of the data to use for the actual text shown in each cell.
<code>out1</code>	Bare name (no quotes) of the column of the data to use for first-level outlining around blocks of cells.
<code>out1.string</code>	String name of the column of the data to use for first-level outlining around blocks of cells.
<code>out2</code>	Bare name (no quotes) of the column of the data to use for second-level outlining around blocks of cells.
<code>out2.string</code>	String name of the column of the data to use for second-level outlining around blocks of cells.
<code>dq</code>	Bare name (no quotes) of the column of the data to use for indicating bad data quality with diagonal lines. This can either be a numeric vector or a factor/text. Cells with 1/"Q"/"Questionable" have one diagonal line. Cells with 2/"B"/"Bad", "S", "Suppressed" have crossed diagonal lines.
<code>dq.string</code>	String name of the column of the data to use for indicating bad data quality with diagonal lines.
<code>col.regions</code>	Colors for the fill color of cells.
<code>col.text</code>	Vector of colors for text strings.
<code>text.levels</code>	Character strings to use instead of default 'levels'.
<code>out1.gpar</code>	A list of graphics parameters for first-level outlining. Can either be an ordinary <code>list()</code> or a call to <code>gpar()</code> from the <code>grid</code> package.
<code>out2.gpar</code>	Graphics parameters for second-level of outlining.
<code>at</code>	Breakpoints for the color ribbon. Use this instead of 'zlim'. Note: using 'at' causes 'midpoint' to be set to NULL.
<code>midpoint</code>	Method to find midpoint of the color ribbon. One of 'midrange', 'median', or a numeric value.
<code>ticks</code>	If TRUE, show tick marks along the bottom and left sides.
<code>flip</code>	If TRUE, vertically flip the image.
<code>main</code>	Main title.
<code>xlab</code>	Label for x axis.
<code>ylab</code>	Label for y axis.
<code>shorten</code>	Method for shortening text in the key, either 'abb', 'sub', 'no', or FALSE.
<code>show.key</code>	If TRUE, show the key on the left side. (This is not the ribbon.)
<code>key.cex</code>	Left legend cex.
<code>cex</code>	Expansion factor for text/number in each cell.
<code>strip.cex</code>	Strip cex.
<code>subset</code>	An expression that evaluates to logical index vector for subsetting the data.
<code>gg</code>	If TRUE, <code>desplot()</code> switches to <code>ggdesplot()</code> .
<code>...</code>	Other.

Details

To create the plot using lattice graphics: 1. `desplot(...)`.

To create the plot using ggplot2 graphics, use one of the following: 1. `ggdesplot(...)`. 2. `desplot(..., gg=TRUE)`. 3. `options(desplot.gg=TRUE); desplot(...)`. Method 3 is useful to modify all results from existing scripts.

The lattice version is complete, mature, and robust. The ggplot2 version is incomplete. The legend can only show colors, and some function arguments are ignored. In general, lattice graphics are about 4-5 times faster than ggplot2 graphics. Not all lattice parameters are passed down to `xypplot`, but it is possible to make almost any change to the plot by assigning the `desplot` object to a variable and then edit the object by hand or use `update` to modify the object. Then print it manually. See the first example below.

Use `col.regions` to specify fill colors. This can either be a vector of colors or a function that produces a vector of colors. If the response variable is a factor and `col.regions` is a *function*, it will be ignored and the cells are filled with default light-colored backgrounds and a key is placed on the left. If the response variable is *numeric*, the cells are colored according to `col.regions`, and a ribbon key is placed on the right.

Use `shorten='abb'` (this is default) to shorten the cell text to 2 characters using the `abbreviate` function. Use `shorten='sub'` to use a 3-character substring. Use `shorten='no'` or `shorten=FALSE` for no shortening.

Note that two sub-plots with identical levels of the split-plot factor can be adjacent to each other by virtue of appearing in different whole-plots. To correctly outline the split-plot factor, simply concatenate the whole-plot factor and sub-plot factor together.

To get a map of a field with a true aspect ratio (lattice version only), include `'aspect=ylen/xlen'` in the call, where `'ylen'` is the vertical length of the field and `'xlen'` is the horizontal length of the field.

To call this function inside another function, you can hack like this: `vr <- "yield"; vx <- "x"; vy <- "y"; eval(parse(text=paste("desplot(", vr, "~", vx, "*", vy, ", data=yates.oats"))))`

Value

A lattice or ggplot2 object

Author(s)

Kevin Wright

References

K. Ryder (1981). Field plans: why the biometrician finds them useful. *Experimental Agriculture*, 17, 243–256.

Examples

```
if(require(agridat)){

# Show how to customize any feature. Here: make the strips bigger.
data(besag.met)
d1 <- desplot(besag.met,
```

```

        yield ~ col*row|county,
        main="besag.met",
        out1=rep, out2=block, out2.gpar=list(col="white"), strip.cex=2)
d1 <- update(d1, par.settings = list(layout.heights=list(strip=2)))
print(d1)

# Show experiment layout
data(yates.oats)
desplot(yates.oats,
        yield ~ col+row,
        out1=block, out2=gen)

desplot(yates.oats,
        block ~ col+row,
        col=nitro, text=gen, cex=1, out1=block,
        out2=gen, out2.gpar=list(col = "gray50", lwd = 1, lty = 1))

}

```

geom_tileborder	<i>Borders between tiles</i>
-----------------	------------------------------

Description

‘geom_tileborder’ draws a border between tiles of different classes. The required aesthetics are ‘aes(x,y,grp)’, where ‘grp’ is the grouping classification that separates tiles.

Usage

```

geom_tileborder(
  mapping = NULL,
  data = NULL,
  geom = "segment",
  position = "identity",
  na.rm = TRUE,
  show.legend = NA,
  inherit.aes = TRUE,
  ...
)

```

Arguments

mapping	Set of aesthetic mappings created by aes() . If specified and inherit.aes = TRUE (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	The data to be displayed in this layer. There are three options: If NULL, the default, the data is inherited from the plot data as specified in the call to ggplot() .

	A data.frame, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <code>fortify()</code> for which variables will be created.
	A function will be called with a single argument, the plot data. The return value must be a data.frame, and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(.x, 10)</code>).
<code>geom</code>	The geometric object to use to display the data, either as a ggproto Geom subclass or as a string naming the geom stripped of the <code>geom_</code> prefix (e.g. "point" rather than "geom_point")
<code>position</code>	Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use <code>position_jitter</code>), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.
<code>na.rm</code>	If FALSE, the default, missing values are removed with a warning. If TRUE, missing values are silently removed.
<code>show.legend</code>	logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.
<code>inherit.aes</code>	If FALSE, overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. <code>borders()</code> .
<code>...</code>	Other arguments passed on to <code>layer()</code> . These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code> . They may also be parameters to the paired geom/stat.

Details

Note, we cannot use `'aes(group)'` because it groups the interaction of ALL discrete variables including facets. Since we do not want to draw a border between facets, we had to define a new aesthetic. See: http://ggplot2.tidyverse.org/reference/aes_group_order.html

Also, we do not want to split the data into separate groups for each level of `'grp'`, so we need to include `'aes(group=1)'`.

Examples

```
dd <- data.frame(
  x=c(1,2,1,2,3,1,2,1,2,3),
  y=c(2,2,2,2,2,1,1,1,1,1),
  loc=factor(c(1,1,2,2,2,1,1,2,2,2)),
  rep=factor(c(2,2,1,2,3,1,1,1,2,3)))
library(ggplot2)
ggplot(dd, aes(x=x, y=y)) +
  facet_wrap( ~ loc) +
  geom_tile(aes(fill=rep)) +
  geom_tileborder(aes(group=1, grp=rep), lwd=1.5)
# Compare to lattice version of desplot
# desplot::desplot(rep ~ x*y|loc, data=dd, out1=rep)
```

panel.outlinelevelplot

Panel Function for desplot

Description

This is a panel function for desplot which fills cells with a background color and adds outlines around blocks of cells.

Usage

```
panel.outlinelevelplot(
  x,
  y,
  z,
  subscripts,
  at,
  ...,
  alpha.regions = 1,
  out1f,
  out1g,
  out2f,
  out2g,
  dq
)
```

Arguments

x	Coordinates
y	Coordinates
z	Value for filling each cell.
subscripts	For compatibility.
at	Breakpoints for the colors.
...	Other
alpha.regions	Transparency for fill colors. Not well tested.
out1f	Factor to use for outlining (level 1).
out1g	Factor to use for outlining (level 2).
out2f	Graphics parameters to use for outlining.
out2g	Graphics parameters to use for outlining.
dq	Indicator of which cells should be flagged for data quality.

Details

It does not add the text labels, numbers, or colors.

The rule for determining where to draw outlines is to compare the levels of the factor used for outlining. If bordering cells have different levels of the factor, then a border is drawn. 'NA' values are ignored (otherwise, too many lines would be drawn).

The code works, but is probably overkill and has not been streamlined.

References

None

RedGrayBlue	<i>Function to create a Red-Gray-Blue palette</i>
-------------	---

Description

A function to create a Red-Gray-Blue palette.

Usage

```
RedGrayBlue(n)
```

Arguments

n	Number of colors to create
---	----------------------------

Details

Using gray instead of white allows missing values to appear as white (actually, transparent).

Value

A vector of n colors.

Author(s)

Kevin Wright

Examples

```
pie(rep(1,11), col=RedGrayBlue(11))  
title("RedGrayBlue(11)")
```

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