Package 'microplot'

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Type Package

Title R Graphics as Microplots (Sparklines) in 'LaTeX', 'HTML', 'Excel'

Version 1.0-16

Date 2017-01-18

Author Richard M. Heiberger, with contributions from Karen Byron and Nooreen Dabbish.

Maintainer Richard M. Heiberger <rmh@temple.edu>

Description Prepare lists of R graphics files to be used as microplots (sparklines) in tables in either 'LaTeX', 'HTML', or 'Excel' files. For 'LaTeX', use the 'Hmisc::latex' function or 'xtable::xtable' function with 'Sweave', 'knitr', 'rmarkdown', or 'Emacs' 'org-mode' to construct 'latex' tabular environments which include the graphs. For 'HTML' files, use either 'Emacs' 'org-mode' or the 'htmlTable::htmlTable' function to construct an 'HTML' file containing tables which include the graphs. For 'Excel' use on 'Windows', the file 'examples/irisExcel.xls' includes 'VBA' code which brings the individual panels into individual cells in the spreadsheet. Examples in the 'examples' subdirectory and demos are shown with 'lattice' graphics, 'base' graphics, and 'ggplot2' graphics. Examples for 'LaTeX' include 'Sweave' (both 'LaTeX'-style and 'Noweb'-style), 'knitr', 'emacs' 'org-mode', and 'rmarkdown' input files and their 'pdf' output files. Examples for 'HTML' include 'org-mode' and 'Rmd' input files and their webarchive 'HTML' output files. In addition, the 'as.orgtable' function can display a 'data.frame' in an 'org-mode' document.

Imports Hmisc

Suggests HH, lattice, ggplot2, reshape2, grid, latticeExtra, xtable, markdown, rmarkdown, knitr, htmlTable

SystemRequirements LaTeX

License GPL (>= 2)

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R topics documented:

`microplot-package` *R Graphics as Microplots (Sparklines) in 'LaTeX', 'HTML', 'Excel'*

Description

Prepare lists of R graphics files to be used as microplots (sparklines) in tables in either 'LaTeX', 'HTML', or 'Excel' files. For 'LaTeX', use the 'Hmisc::latex' function or 'xtable::xtable' function with 'Sweave', 'knitr', 'rmarkdown', or 'Emacs' 'org-mode' to construct 'latex' tabular environments which include the graphs. For 'HTML' files, use either 'Emacs' 'org-mode' or the 'htmlTable::htmlTable' function to construct an 'HTML' file containing tables which include the graphs. For 'Excel' use on 'Windows', the file 'examples/irisExcel.xls' includes 'VBA' code which brings the individual panels into individual cells in the spreadsheet. Examples in the 'examples' subdirectory and demos are shown with 'lattice' graphics, 'base' graphics, and 'ggplot2' graphics. Examples for 'LaTeX' include 'Sweave' (both 'LaTeX'-style and 'Noweb'-style), 'knitr', 'emacs' 'org-mode', and 'rmarkdown' input files and their 'pdf' output files. Examples for 'HTML' include 'org-mode' and 'Rmd' input files and their webarchive 'HTML' output files. In addition, the 'as.orgtable' function can display a 'data.frame' in an 'org-mode' document.

Details

The DESCRIPTION file:

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Imports:	Hmisc

Suggests:	HH, lattice, ggplot2, reshape2, grid, latticeExtra, xtable, markdown, rmarkdown, knitr, htmlTable
SystemRequirements:	LaTeX
License:	GPL (>= 2)

Index of help topics:

Microplots are small plots that fit into the cells of a table that otherwise consists of text and numbers. A special case of a microplot is known as a sparkline.

The examples in this package show tables of simple or complex graphs placed into one or more columns of a table. The graphs can be produced by any graphical system in R. We show lattice, base, and ggplot2 graphics. The tables can be targeted for display in either LaTeX or HTML. We show both.

The best way to learn this package is to read the examples and demo files.

This examples (in the `examples` subdirectory) and demo files use operating system `latex` command and the R `pdf()` graphics device. They therefore require that the three options
`options()[c("latexcmd","dviExtension","xdvicmd")]`
all be set to non-`NULL` values. Please see the "System options" in the "Details" section of `?Hmisc::latex` for discussion of the options available.

I normally use the options
`options(latexcmd="pdflatex")`
`options(dviExtension="pdf")`
on Macintosh, on Windows, on Linux.

The "xdvicmd" option is dependent on details of the operating system. The goal is to name the function that opens pdf files. In order to open pdf files, the "xdvicmd" option must be specified. On systems I have used, all these work
options(xdvicmd="open") ## Macintosh, Windows, SMP linux
options(xdvicmd="xdg-open") ## ubuntu linux
For anything else, you might need to experiment.

Should you prefer to use the operating system latex command to write dvi files, then leave the first two options unspecified. You might need to change the "xdvicmd". See ?Hmisc::latex for guidance. Also you will need to modify the examples to specify a different R device function instead of the pdf function used here.

The examples in this DESCRIPTION file are inside dontrun environments because they depend on options and write files. You must set the options for your system before running the example manually.

Most of the examples are shown using the Hmisc::latex function latex (I am coauthor of that function). The **microplot** package also works with the xtable::xtable function xtable. The last example in this help file shows a simple use of xtable

The demos in the demo directory are not inside a dontrun environment. You must set the options for your system before running them. I recommend that you run them manually, not automatically. You will need to read them closely to see what they are doing.

To run the demos automatically, use

```
demo("bwplot.lattice",     package="microplot", ask=FALSE)
demo("boxplot.ggplot",     package="microplot", ask=FALSE)
demo("iris",               package="microplot", ask=FALSE)
demo("NTplot",             package="microplot", ask=FALSE)
demo("timeseries",         package="microplot", ask=FALSE)
```

The examples directory paste0(system.file(package="microplot"), "/examples") includes complete working examples of **Sweave** (both LaTeX-style and Noweb-style), **knitr**, emacs **orgmode**, and **rmarkdown** input files and their pdf output files. These files must be copied into a directory in which you have write privilege, and that directory must be made the current working directory with setwd. They will not work from the installed package directory.

Author(s)

Richard M. Heiberger, with contributions from Karen Byron and Nooreen Dabbish.

Maintainer: Richard M. Heiberger <rmh@temple.edu>

See Also

latex

Examples

```
## Not run:
latexCheckOptions()

## These are the LaTeX options I use
```

```
options(latexcmd="pdflatex") ## Macintosh, Windows, linux
options(dviExtension="pdf")  ## Macintosh, Windows, linux

options(xdvicmd="open")      ## Macintosh, Windows, SMP linux
## or
options(xdvicmd="xdg-open")  ## ubuntu linux

## See ?Hmisc::latex for discussion of these options.

## End(Not run)


## This example writes a set of pdf files and then uses the Hmisc::latex
## function to display them in LaTeX.

## The graphs are constructed three times, once each with lattice,
## base graphics, and ggplot2.

## Not run:
  tmp <- matrix(rnorm(20), 2, 5, byrow=TRUE,
                dimnames=list(c("A", "B"), paste0("X", 1:5)))

  tmp.df <- data.frame(y=as.vector(t(tmp)),
                       group=factor(rep(row.names(tmp), each=5)))
  tmp.df

## End(Not run)

  ## All three examples use the pdf device

  ## lattice example
## Not run:

  library(lattice)

  tmp.lattice <- bwplot(group ~ y | group, data=tmp.df, layout=c(1,2))
  tmp.lattice

  pdf("tmpl%03d.pdf", onefile=FALSE, height=.4, width=4) ## inch
  update(tmp.lattice, layout=c(1,1), xlab=NULL, ylab=NULL,
         par.settings=list(layout.heights=layoutHeightsCollapse(),
                           layout.widths=layoutWidthsCollapse(),
                           axis.line=list(col="transparent")),
         scales=list(y=list(relation="free", at=NULL)))
  dev.off()

  tmpl.graphnames <- paste0("tmpl", sprintf("%03i", 1:2), ".pdf")

  tmpl.display <- data.frame(round(tmp, 2),
                             graphs=as.includegraphics(tmpl.graphnames, raise="-.55ex"))
  tmpl.display

  tmpl.latex <- Hmisc::latex(tmpl.display)
```

```
  tmpl.latex$style <- "graphicx"
  tmpl.latex  ## this line requires latex in the PATH, and Hmisc to be loaded
  ## Hmisc::print.latex(tmpl.latex) ## if Hmisc is not loaded


## End(Not run)

## base graphics example
## Not run:

  pdf("tmpb%03d.pdf", onefile=FALSE, height=.5, width=3) ## inch
  par( bty="n", xaxt="n", omd=c(0,1, 0,1), mai=c(0,0,0,0))
 boxplot(tmp["A",], horizontal=TRUE, ylim=range(tmp)) ## ylim is correct for horizontal plot
 boxplot(tmp["B",], horizontal=TRUE, ylim=range(tmp)) ## ylim is correct for horizontal plot
  dev.off()

  tmpb.graphnames <- paste0("tmpb", sprintf("%03i", 1:2), ".pdf")

  tmpb.display <-
    data.frame(round(tmp, 2),
               graphs=as.includegraphics(tmpb.graphnames, height="2em", raise="-1.4ex"))
  tmpb.display

  tmpb.latex <- Hmisc::latex(tmpb.display)
  tmpb.latex$style <- "graphicx"
  tmpb.latex  ## this line requires latex in the PATH, and Hmisc to be loaded
  ## Hmisc::print.latex(tmpb.latex) ## if Hmisc is not loaded


## End(Not run)

## ggplot2 example, whole set constructed as a unit, then printed one panel at a time.
## Not run:

  library(ggplot2)
  tmpga <-
    ggplot(tmp.df, aes(group, y)) +
      geom_boxplot(outlier.size = 8) +
        coord_flip() +
          theme_collapse()
  tmpga ## on interactive device

  pdf("tmpga%03d.pdf", onefile=FALSE, height=1, width=4) ## inch
  for (i in 1:length(levels(tmp.df$group))) {
    tmpga$coordinates$limits$x <- c(i, i)  ## I dislike this usage.
                                       ## I want to use "+" with some ggplot2 function,
         ## but have not figured out the right incantation.
    print(tmpga)
  }
  dev.off()

  graphnames <- paste0("tmpga", sprintf("%03i", 1:2), ".pdf")
```

```
  tmpga.display <- data.frame(round(tmp, 2),
                              graphs=as.includegraphics(graphnames, raise="-.7ex"))
  tmpga.display

  tmpga.latex <- Hmisc::latex(tmpga.display)
  tmpga.latex$style <- "graphicx"
  tmpga.latex  ## this line requires latex in the PATH, and Hmisc to be loaded
  ## Hmisc::print.latex(tmpga.latex) ## if Hmisc is not loaded


## End(Not run)

## ggplot2 example, constructed one panel at a time.
## Not run:

  library(ggplot2)

  pdf("tmpgb%03d.pdf", onefile=FALSE, height=1, width=4) ## inch
  ggplot(tmp.df[1:5,], aes(group, y)) +
    geom_boxplot(outlier.size = 8) + ylim(range(tmp.df[,1])) +
      coord_flip() +
        theme_collapse()
  ggplot(tmp.df[6:10,], aes(group, y)) +
    geom_boxplot() + ylim(range(tmp.df[,1])) +
      coord_flip() +
        theme_collapse()
  dev.off()

  graphnames <- paste0("tmpgb", sprintf("%03i", 1:2), ".pdf")

  tmpgb.display <- data.frame(round(tmp, 2),
                              graphs=as.includegraphics(graphnames, raise="-.7ex"))
  tmpgb.display

  tmpgb.latex <- Hmisc::latex(tmpgb.display)
  tmpgb.latex$style <- "graphicx"
  tmpgb.latex  ## this line requires latex in the PATH, and Hmisc to be loaded
  ## Hmisc::print.latex(tmpgb.latex) ## if Hmisc is not loaded


## End(Not run)

## xtable example
## Not run:
  tmpl.display ## from lattice example above
  tmplx.name <- "tmpldisplayxtable.tex"
  print(xtable::xtable(tmpl.display),
        caption.placement = "top",
sanitize.text.function = function(x) x,  ## xtable converts "\abc" to "$\backslash$abc"
        file=tmplx.name)                          ## sanitize restores it back to "\abc".
  tmpx.latex <- list(file=tmplx.name, style="graphicx")
  class(tmpx.latex) <- "latex"
```

```
  tmpx.latex  ## this line requires latex in the PATH, and Hmisc to be loaded
  ## Hmisc::print.latex(tmpx.latex) ## if Hmisc is not loaded

## End(Not run)


## Please see the demos for more interesting examples.
## demo(package="microplot")
```

`as.htmlimg` *Place a filename or filepath in the format used by HTML*

Description

Place a filename or filepath in the format used by HTML, by surrounding it with `"<img src"` and `"/>"` and with possible additional arguments between.

Usage

```
as.htmlimg(object, height = "80", width = NULL, wd = getwd(), align = "middle")
```

Arguments

`object`	Vector of character strings containing filenames.
`height, width`	Number of pixels as a character string.
`wd`	The directory in which the files reside. The default is the current working directory that R is using.
`align`	Specifies the alignment of an image according to surrounding elements (Not supported in HTML5). One of the strings: "top", "bottom", "middle", "left", "right"

Value

A character vector containing the input strings surrounded by `"<img src"` and `"/>"` and with possible additional arguments between.

Author(s)

Nooreen Dabbish <nerd@temple.edu> and Richard M. Heiberger <rmh@temple.edu>

See Also

`microplot`

Examples

```
as.htmlimg("abcd.png")
as.htmlimg("abcd.png", wd=".")
as.htmlimg(c("abcd.png", "efgh.png"))
cat( as.htmlimg("abcd.png")               , "\n")
cat( as.htmlimg("abcd.png", wd=".")       , "\n")
cat( paste(as.htmlimg(c("abcd.png", "efgh.png")), "\n"))

## For an example in context, please see the package example:
##    system.file(package="microplot", "examples/irisRMarkdownHtml.Rmd")
## Copy file irisRMarkdownHtml.Rmd to a directory in which you have write privileges.
## Run the statement
##   rmarkdown::render("irisRMarkdownHtml.Rmd", output_file="irisRMarkdownHtml.html")
## at the R Console.
```

`as.includegraphics` *Convert a filename into a complete LaTeX* `includegraphics` *command. This is useful for* `pdf`*,* `png`*, and* `jpeg` *files that are recognized by the LaTeX* `includegraphics` *macro in the* **graphicx** *package when used with the* `pdflatex` *command. This is useful for* `bmp` *and* `tiff` *files that are recognized by the LaTeX* `includegraphics` *macro in the* **graphicx** *package when used with the* `latex` *command.*

Description

Convert a filename into a complete LaTeX includegraphics command. The directory name is included in the command. The `includegraphics` macro is generated with the height and optional width. An optional raise value is available for vertical alignment. An optional `trim` argument is available to remove excess margins from the image. See the Details section for use of the `trim` argument to take panels out of an externally produced graphics file.

Usage

```
as.includegraphics(object,
                   height="1em",
                   width=NULL,
                   wd=getwd(),
                   raise=NULL,
                   viewport=NULL, ## if specified, then left bottom right top.
                                  ## used for pdf png jpeg
                   bb=NULL, ## if specified, then left bottom right top.
                            ## used for bmp tiff
                   trim="0 0 0 0", ## left bottom right top
                   clip="true"
                   )
```

Arguments

object	A character vector of filenames for files that contain graphics.
height	Character vector containing a LaTeX distance (by default "1em").
width	Character vector containing a LaTeX distance (by default NULL). Keeping the default keeps the original aspect ratio. Specifying a value will stretch the figure unless the height is set to NULL.
wd	The directory in which the files reside. The default is the full path to the current working directory that R is using. The full path is necessary when using the Hmisc::print.latex and related functions because they run the operating system's latex or pdflatex command in a temporary directory. The relative path to the current directory (wd="."") is sufficient if the file will be brought into a larger tex file with the LaTeX input macro.
raise	Character vector containing a LaTeX distance (by default NULL). This value may be negative. Use it if the default vertical alignment of the graphs in the table is not satisfactory.
viewport	Size in pixels of the image file. This is the MediaBox in a pdf file. It is the number reported by the operating system for a png or jpeg file. The viewport is optional. When specified it must be a character string containing four numbers in order: left, bottom, right, top.
bb	Bounding Box: Size in pixels of the image file. It is the number reported by the operating system for a bmp or jpeg file. When specified it must be a character string containing four numbers in order: left, bottom, right, top.
trim	Size in pixels to be trimmed. It must be a character string containing four numbers in order: left, bottom, right, top. See the manual for the LaTeX package **graphicx** for details. See the Details section for additional use of the trim argument.
clip	Character value "true" or "false".

Details

We recommend that the aspect ratio be controlled by the R functions that generated the figure.

We recommend that only one of the arguments height and weight be used in as.includegraphics. Using both will change the aspect ratio and consequently stretch the figure. The trim argument is used to remove excess margins from the figure.

Either the viewport or bb should be specified, not both.

The trim argument can be used to take apart an externally produced graphics file and use its components in a LaTeX table. See the files examples/irisSweaveTakeApart.Rtex and examples/irisSweaveTakeApart-Distributed.pdf for an example.

Value

A vector of LaTeX statements with the LaTeX macro includegraphics for the input filenames.

Author(s)

Richard M. Heiberger <rmh@temple.edu>

See Also

latex, microplot

Examples

```
as.includegraphics("abc.pdf")
## [1] "\includegraphics[height=1em]{/Users/rmh/abc.pdf}"
## This form, with the full pathname, is required when the Hmisc::print.latex
## and related functions are used to display the current .tex file on screen.

as.includegraphics("abc.pdf", wd=".")
## [1] "\includegraphics[height=1em]{./abc.pdf}"
## This form, with the relative path, is optional when the .tex file will be
## embedded into a larger file, and will not be displayed on screen.

as.includegraphics(c("abc.pdf", "def.pdf"), raise="-1em")
## [1] "\raisebox{-1em}{\includegraphics[height=1em]{/Users/rmh/abc.pdf}}"
## [2] "\raisebox{-1em}{\includegraphics[height=1em]{/Users/rmh/def.pdf}}"



## Please see the package documentation ?microplot for a simple example in context.

## Please see the demos for more interesting examples.
## demo(package="microplot")
```

---

as.orgfile *Place a filename or filepath in the format used by org-mode*

Description

Place a filename or filepath in the format used by org-mode, by surrounding it with "[[" and "]]".

Usage

```
as.orgfile(object, wd = getwd(), ...)
```

Arguments

object	Vector of character strings containing filenames.
wd	The directory in which the files reside. The default is the current working directory that R is using.
...	Ignored.

Value

A character vector containing the input strings surrounded by "[[" and "]]".

Author(s)

Nooreen Dabbish <nerd@temple.edu> and Richard M. Heiberger <rmh@temple.edu>

See Also

microplot

Examples

```
as.orgfile("abcd.png")
as.orgfile("abcd.png", wd=".")
as.orgfile(c("abcd.png", "efgh.png"))

## For an example in context, please see the package example:
##    system.file(package="microplot", "examples/irisOrgHtml.org")
## Copy file irisOrgHtml.org to a directory in which you have write privileges,
## open it in emacs, and enter
## C-c C-e b           on Macintosh
## C-c C-e ho          on Windows
## C-c C-e <something> on linux
```

---

as.orgtable *Prepare a matrix or data.frame to be used as an org-mode table*

Description

Prepare a matrix or data.frame to be used as an org-mode table. Column names are required. Row names are optional (and default to FALSE

Usage

```
as.orgtable(x, rownames = FALSE)
```

Arguments

x	Matrix or data.frame.
rownames	Logical. When FALSE (the default), the row.names are not displayed in the value. When TRUE, the row.names are displayed in the value. See the last example for details on this behavior.

Value

Vector of character strings, one item for each row of the argument x. The strings contain the markup that will make them appear as tables in an org-mode document.

Author(s)

Nooreen Dabbish <nerd@temple.edu> and Richard M. Heiberger <rmh@temple.edu>

See Also

microplot

Examples

```
tmp <- matrix(1:12, 3, 4, dimnames=list(letters[1:3], LETTERS[4:7]))
tmp
as.orgtable(tmp)
as.orgtable(tmp, rownames=TRUE)

tmpdf <- data.frame(tmp)
tmpdf
cat(as.orgtable(tmpdf), sep="\n")
cat(as.orgtable(tmpdf, rownames=TRUE), sep="\n")

## This example shows why row names default to FALSE.

tmp2 <- rbind(tmp, tmp)
tmp2
tmp2df <- data.frame(tmp2)
tmp2df

tmp2df <- cbind(" "=row.names(tmp2), group=rep(c("A","B"), each=3), tmp2df)
tmp2df

cat(as.orgtable(tmp2df), sep="\n")  ## this is what we want

## this has the unwanted initial column of 1:6
cat(as.orgtable(tmp2df, rownames=TRUE), sep="\n")
```

---

latexCheckOptions *Check whether the options for latex functions have been specified.*

Description

Check whether the options for latex functions have been specified. If any of `options()[c("latexcmd","dviExtension","xdvicmd")]` are `NULL`, an error message is displayed.

Usage

```
latexCheckOptions(...)
```

Arguments

`...`	Any arguments are ignored.

Value

If any `NULL` options are detected, the invisible text of the error message. If all three options have non-`NULL` values, NULL.

Author(s)

Richard M. Heiberger <rmh@temple.edu>

See Also

latex, microplot

`layoutCollapse` *Set the lattice* `par.settings` *to remove all marginal space.*

Description

Set the lattice `par.settings` to remove all marginal space. By default everything in `layout.heights` or `layout.widths` is set to 0 except for `panel`. The user can specify values for all the standard items in either of those items.

Usage

```
layoutHeightsCollapse(...)
layoutWidthsCollapse(...)
```

Arguments

`...`	Any item name in `layout.heights` for `layoutHeightsCollapse` or in `layout.widths` for `layoutWidthsCollapse`.

Details

When very small plots are placed inside a LaTeX tabular environment, it is often helpful to suppress margins, axes, labels, titles.

Value

A list which may be used as input to the `par.settings` argument in a lattice call.

Author(s)

Richard M. Heiberger <rmh@temple.edu>

Examples

```
lattice::trellis.par.get("layout.heights")
lattice::trellis.par.get("layout.widths")
layoutHeightsCollapse()
layoutWidthsCollapse()
layoutWidthsCollapse(axis.left=1)

## Please see the package documentation for a simple example in context.
```

```
## Please see the demos for more interesting examples.
## demo(package="microplot")
```

`theme_collapse` *Set the ggplot2 theme to remove all marginal space.*

Description

Set the ggplot2 theme to remove all marginal space. By default the grid, ticks, tick labels, and axis labels are set to blank. Margins are set to 0.

Usage

```
theme_collapse(      ## the commented values are from theme_grey
panel.grid.major=eb, ## element_line(colour = "white")
panel.grid.minor=eb, ## element_line(colour = "white", size = 0.25)
axis.ticks=eb,       ## element_line(colour = "grey20")
axis.text=eb,        ## element_text(size = rel(0.8), colour = "grey30")
axis.title=eb,       ## axis.title.x = element_text(
                     ##    margin = margin(t = 0.8 * half_line,
                     ##                    b = 0.8 * half_line/2))
                     ## axis.title.y = element_text(angle = 90,
                     ##    margin = margin(r = 0.8 * half_line,
                     ##                    l = 0.8 * half_line/2))
plot.margin= grid::unit(c(0, 0, 0, 0), "in"),
...,
eb=ggplot2::element_blank())
```

Arguments

`panel.grid.major, panel.grid.minor, axis.ticks, axis.text, axis.title, plot.margin`	**ggplot2** theme elements. See `theme` for information.
`...`	Other valid arguments to `ggplot2::theme`.
`eb`	Conventience for `ggplot2::element_blank()`.

Details

When very small plots are placed inside a LaTeX tabular environment, it is often helpful to suppress margins, axes, labels, titles.

Value

A ggplot2 theme object.

Note

The first draft of theme_collapse was written by Karen Byron.

Author(s)

Richard M. Heiberger <rmh@temple.edu>

Examples

```
theme_collapse()
## Please see the package documentation for a simple example in context.

## Please see the demos for more interesting examples.
## demo(package="microplot")
```

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