R Microplots in Tables with the latex() Function

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Microplots (sparklines) are often used within cells of a tabular array.

We describe several R functions that simplify the use of microplots within LATEX tables constructed in R with Hmisc::latex or a similar function. within HTML tables constructed with the htmlTable package.

We show examples using **base** graphics, **lattice** graphics, and **ggplot2** graphics.

These functions work in LaTeX documents constructed directly in LaTeX, with the R packages Sweave, knitr, or rmarkdown, and with the Emacs package org-mode.

1 Boxplots of iris data with lattice and latticeExtra

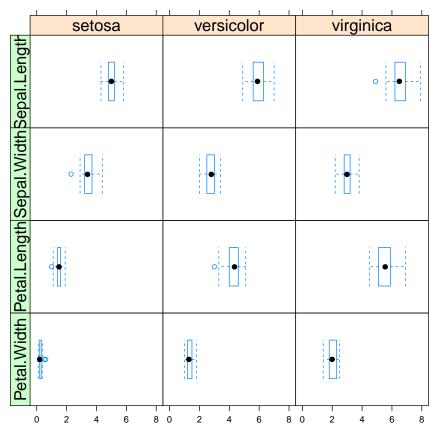


Figure 1: useOuterStrips(
bwplot(~ Sepal.Length + Sepal.Width + Petal.Length + Petal.Width
| Species, data=iris, outer=TRUE, as.table=TRUE))

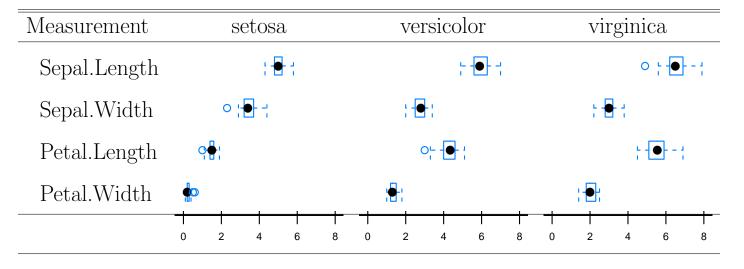
2 Individual boxes placed into a LaTEX tabular environment

Table 1: Measurement by Species

Measurement	setosa	versicolor	virginica	
Sepal.Length	† - †	<u>-</u> -	O	
Sepal.Width	0 1-0-1	- - -	i i	
Petal.Length	O	OL	<u>-</u>	
Petal.Width		 -	- - -	

3 Individual boxes in a table with the x-scale displayed

Table 2: Measurement by Species, with x-scale



4 Transposed LaTeX table

Table 3: Species by Measurement

Species	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width
setosa	¦ - †	0 1-1	़	
versicolor		¦ - - -}	O' +	
virginica	O i - i - i	i - i		i - D i

5 Individual boxes embedded into a more interesting table

Table 4: Five Number Summary and Boxplots for each Species and Measurement

Species		Five Number Summary				nary	
	Measurement	min	Q1	med	Q3	max	Box Plots
setosa							
	Sepal.Length	4.3	4.8	5.00	5.2	5.8	1: -
	Sepal.Width	2.3	3.2	3.40	3.7	4.4	○ ¦ -
	Petal.Length	1.0	1.4	1.50	1.6	1.9	? ∰¦
	Petal.Width	0.1	0.2	0.20	0.3	0.6	
versicolor							
	Sepal.Length	4.9	5.6	5.90	6.3	7.0	
	Sepal.Width	2.0	2.5	2.80	3.0	3.4	{ · • }
	Petal.Length	3.0	4.0	4.35	4.6	5.1	o¦ - ● ¦
	Petal.Width	1.0	1.2	1.30	1.5	1.8	
virginica							
	Sepal.Length	4.9	6.2	6.50	6.9	7.9	O
	Sepal.Width	2.2	2.8	3.00	3.2	3.8	
	Petal.Length	4.5	5.1	5.55	5.9	6.9	; - - ;
	Petal.Width	1.4	1.8	2.00	2.3	2.5	;••;

6 How does it work?

There are two tasks. The **microplot** package provides functions for each task.

1. Isolate the contents of each panel of a multipanel graph into its own pdf file.

ggplot2: function theme_collapse and loop through panels
base: adjust par arguments and xlim and ylim

2. Automate construction of the graphics statements.

ATFX: as.includegraphics function

HTML: as.htmlimg function

org-mode: as.orgtable and as.orgfile functions

suppress <- dev.off()</pre>

lattice

```
## boxplot matrix of iris data
irisBW <-
  bwplot(~ Sepal.Length + Sepal.Width + Petal.Length + Petal.Width |
             Species,
           data=iris, outer=TRUE, as.table=TRUE,
           scales=list(alternating=FALSE),
                                                                            virginica
                                                                   versicolor
           xlab=NULL,
                                                          setosa
                                                     Petal.Width | Petal.Length | Sepal.Width | Sepal.Length
           par.strip.text=list(cex=1.5))
## pdf of boxplot matrix
pdf("irisBW.pdf")
useOuterStrips(irisBW)
```

```
## twelve individual boxplots without axes
irisBW.update <-</pre>
update(irisBW,
       xlab=NULL,
       par.settings=list(
         layout.heights=layoutHeightsCollapse(),
         layout.widths=layoutWidthsCollapse(),
         axis.line=list(col="transparent")),
       layout=c(1,1)
## create 12 pdf files, one per boxplot
pdf("irisBW%03d.pdf", onefile=FALSE, height=.4, width=1.6)
                                                                ## inch
irisBW.update
suppress <- dev.off()</pre>
The first panel in file irisBW001.pdf is shown here.
```

The functions layoutHeightsCollapse (shown here) and layoutWidthsCollapse set the vertical and horizontal space for everything in a plot, except the panel itself, to 0.

```
> layoutHeightsCollapse
function (...)
{
    x.settings <- lattice::trellis.par.get()$layout.heights
    x.settings[] <- 0
    x.settings$panel = 1
    inputs <- list(...)
    if (length(inputs))
        x.settings[names(inputs)] <- inputs
    x.settings
}</pre>
```

The function as.includegraphics wraps the graph file names into the format used by the LATEX graphicx package.

```
> graphnames[1:2]
[1] "irisBW001.pdf" "irisBW002.pdf"
> graphicsnames <- as.includegraphics(graphnames[1:12], wd=".")
> dim(graphicsnames) <- c(4,3)
> graphicsnames[1:2, 1]
[1] "\\includegraphics[height=1em]{./irisBW001.pdf}"
[2] "\\includegraphics[height=1em]{./irisBW002.pdf}"
```

These values are placed into an ordinary matrix or dataframe and sent to the Hmisc::latex function to create a latex file fragment that can be input with the LATEX \input macro.

```
BWMS.latex <- Hmisc::latex(graphicsnames)
BWMS.latex$style <- "graphicx"</pre>
```

8 More Information on Microplots

The **microplot** package shows simple examples with **lattice**, **ggplot2**, and **base** graphics.

The **microplot** package shows simple examples in LAT_EX using the R packages **Sweave**, **knitr**, and **rmarkdown**, and the **Emacs** package **org-mode**.

The **microplot** package shows simple examples in HTML using the R package **rmark-down** and the **Emacs** package **org-mode**.

utils::install.packages("microplot", dependencies="
this includes HH and its dependencies

The **HH** package is designed to accompany Statistical Analysis and Data Display, Second Edition Richard M. Heiberger and Burt Holland Springer 2015

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