Tools for creating tables for LaTeXand other formats

Marie Vendettuoli
BCB & HCI

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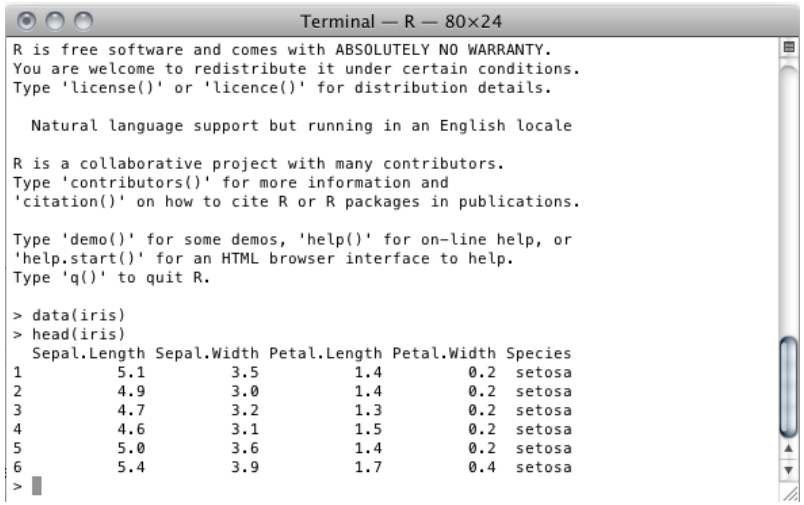
IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

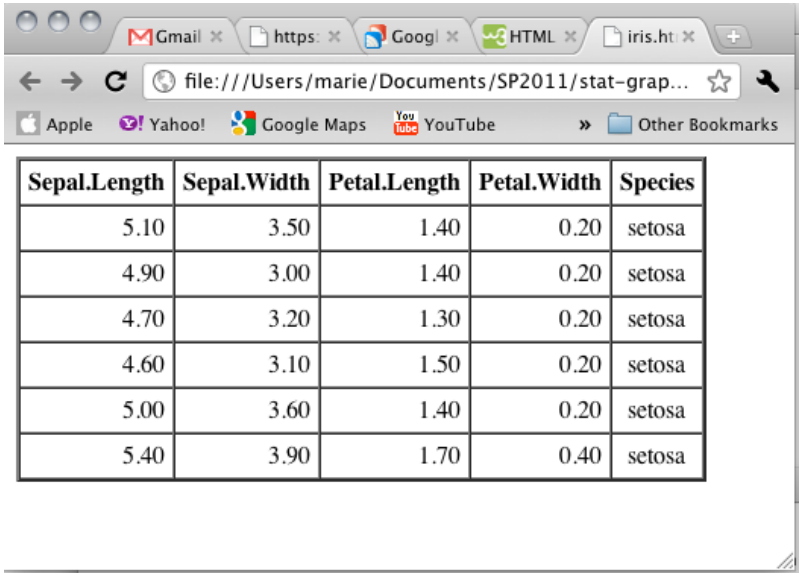
1. Motivation
2. LaTeX
   - xtable
   - Hmisc
   - Extending
   - Sweave
3. HTML
   - xtable
4. R2wd



Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.10	3.50	1.40	0.20	setosa
4.90	3.00	1.40	0.20	setosa
4.70	3.20	1.30	0.20	setosa
4.60	3.10	1.50	0.20	setosa
5.00	3.60	1.40	0.20	setosa
5.40	3.90	1.70	0.40	setosa

Route	Treatment	Litter	ID
IM	pla	4011	m102
			m103
		4013	m105
	vac	4011	m116
			m125
		4013	m133
			m137
SC	pla	4011	m145
		4013	m149
	vac	4011	m117
		4013	m124
			m143

```
\begin{table}
\begin{tabular}{|c|c|c|c|}
\hline
Route&Treatment&Litter&ID\\
\hline
\multirow{7}{*}{IM}&\multirow{3}{*}{pla}&\multirow{2}{*}{4
&&&m103\\
\cline{3-4}
&&4013&m105\\
\cline{2-4}
&\multirow{4}{*}{vac}&\multirow{2}{*}{4011}&m116\\
&&&m125\\
\cline{3-4}
&&\multirow{2}{*}{4013}&m133\\
&&&m137\\
\cline{1-4}
\multirow{5}{*}{SC}&\multirow{2}{*}{pla}&4011&m145\\
\cline{3-4}
&&4013&m149\\
\cline{2-4}
&\multirow{3}{*}{vac}&4011&m117\\
\cline{3-4}
&&\multirow{2}{*}{4013}&m124\\
&&&m143\\
\hline
\end{tabular}
\end{table}
```



Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.10	3.50	1.40	0.20	setosa
4.90	3.00	1.40	0.20	setosa
4.70	3.20	1.30	0.20	setosa
4.60	3.10	1.50	0.20	setosa
5.00	3.60	1.40	0.20	setosa
5.40	3.90	1.70	0.40	setosa

Packages

- `xtable`
- `Hmisc`

xtable

x `anova, aov, aovlist, coxph, data.frame, glm, lm, matrix, prcomp, summary.aov, summary.aovlist, summary.glm, summary.lm, summary.prcomp, table, ts, zoo`

caption Character vector of length 1. Default NULL

label LaTeXlabel. Character vector of length 1. Default NULL

align Vector of length ncol(x)+1. 'l', 'r', 'c', 'p'

digits Vector of length 1 or ncol(x)+1. If < 0, forces scientific format

display Vector of length ncol(x)+1. 'd', 'f', 'e', 'E', 'g', 'G', 'fg', 's'

`print.xtable` - many arguments, later slides

```
>xtable(head(iris), caption = 'head(iris)',
    label = 'tab:headiris', align = c('|','r', '|',
   'c', 'c','c','c', '|','l', '|'),
    digits = c(2,3,4,2,2,2),
    display = c(rep('f',5), 's'))
```

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.100	3.5000	1.40	0.20	setosa
2	4.900	3.0000	1.40	0.20	setosa
3	4.700	3.2000	1.30	0.20	setosa
4	4.600	3.1000	1.50	0.20	setosa
5	5.000	3.6000	1.40	0.20	setosa
6	5.400	3.9000	1.70	0.40	setosa

Table: head(iris)

print.xtable

x	xtable object
file	where file should be saved, file == '' outputs to screen.
append	when saving to file, should code be appended?
floating	use floating environment?
floating.environment	'table' or 'sidewaystable'
table.placement	"h","t","b","p","!","H"
caption.placement	"top" or "bottom"
latex.environments	enclose tabular environment with this. Default is "center"
tabular.environment	"tabular" or "longtable"
size	font size
hline.after	vector of numbers between -1 and `nrow(x)` indicating where `hline` should appear
NA.string	string to represent missing values. default ''
include.rownames	should rownames be printed?
include.colnames	should colnames be printed?
only.contents	no tablular.environment or floating.environment
add.to.row	a list of two components. The first component (which should be called 'pos') is a list contains the position of rows on which extra commands should be added at the end, The second component (which should be called 'command') is a character vector of the same length of the first component which contains the command that should be added at the end of the specified rows.
sanitize.text.function	function to transform all text in table
sanitize.rownames.function	defaults to sanitize.text.function
sanitize.colnames.function	defaults to sanitize.text.function

Visible Effect (1 of 2)

```
> newiris<-iris
> newiris[1,1]<-NA
> print(xtable(head(iris), caption = 'head(newiris)'),
    caption.placement = 'top', size = 'LARGE',
    hline.after = c(-1,0,3), NA.string = '*',
    include.rownames=F, include.colnames = F)
```

Table: head(newiris)

*	3.50	1.40	0.20	setosa
4.90	3.00	1.40	0.20	setosa
4.70	3.20	1.30	0.20	setosa
4.60	3.10	1.50	0.20	setosa

Visible Effect (2 of 2)

```
> sanitize.text.function <- function(x) {
+ sub(x, pattern = 'a', replacement = 'A')
+ }
> print(xtable(head(iris)),
+ add.to.row = list(pos = list(1,2),
+ command = c('\\\\ TEST \\\\', '\\\\ TEST \\\\')),
+ sanitize.text.function = sanitize.text.function,
+ sanitize.rownames.function = NULL,
+ sanitize.colnames.function = sanitize.rownames.function)
```

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.10	3.50	1.40	0.20	setosA
TEST					
2	4.90	3.00	1.40	0.20	setosA
TEST					
3	4.70	3.20	1.30	0.20	setosA
4	4.60	3.10	1.50	0.20	setosA
5	5.00	3.60	1.40	0.20	setosA
6	5.40	3.90	1.70	0.40	setosA

Effect on LaTeXcode (1 of 3)

code

```
> print(xtable(head(iris)),
+ floating.environment = 'sidewaystable',
+ table.placement = 'H',
+ latex.environments = 'flushleft' )
```

```
\begin{sidewaystable}[H]
\begin{flushleft}
\begin{tabular}{rrrrrl}
. . .
\end{tabular}
\end{flushleft}
\end{sidewaystable}
```

Effect on LaTeXcode (2 of 3)

code

```
> print(xtable(head(iris)), floating = F,
+ tabular.environment = 'longtable')
```

```
\begin{longtable}{rrrrrl}
  . . .
\end{longtable}
```

Effect on LaTeXcode (3 of 3)

code

```
> newiris <- iris
> newiris[1,1] <- -iris[1,1]
> print(xtable(head(newiris)), only.contents = T,
+ math.style.negative = T)
```

```
 & Sepal.Length & Sepal.Width & Petal.Length & Petal.Width
  \hline
1 & $-$5.10 & 3.50 & 1.40 & 0.20 & setosa \\
  2 & 4.90 & 3.00 & 1.40 & 0.20 & setosa \\
  3 & 4.70 & 3.20 & 1.30 & 0.20 & setosa \\
  4 & 4.60 & 3.10 & 1.50 & 0.20 & setosa \\
  5 & 5.00 & 3.60 & 1.40 & 0.20 & setosa \\
  6 & 5.40 & 3.90 & 1.70 & 0.40 & setosa \\
   \hline
```

Default output for different data types

```
> fm1 <- aov(tlimth ~ sex + ethnicty + grade + disadvg, data = tli)
> fm1
Call:
   aov(formula = tlimth ~ sex + ethnicty + grade + disadvg, data = tli)

Terms:
                      sex  ethnicty     grade   disadvg Residuals
Sum of Squares     75.373  2572.149    36.307    59.303 18682.867
Deg. of Freedom         1         3         1         1        93

Residual standard error: 14.17360
Estimated effects may be unbalanced
> print( xtable(fm1))
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
sex	1	75.37	75.37	0.38	0.5417
ethnicty	3	2572.15	857.38	4.27	0.0072
grade	1	36.31	36.31	0.18	0.6717
disadvg	1	59.30	59.30	0.30	0.5882
Residuals	93	18682.87	200.89		

Output for different data types

```
> fm2 <- lm(tlimth ~ sex * ethnicty, data = tli)
> fm2

Call:
lm(formula = tlimth ~ sex * ethnicty, data = tli)

Coefficients:
          (Intercept)                   sexM       ethnictyHISPANIC
               73.636                 -1.636                  -9.761
        ethnictyOTHER          ethnictyWHITE  sexM:ethnictyHISPANIC
               15.864                  4.797                  10.678
   sexM:ethnictyOTHER     sexM:ethnictyWHITE
                   NA                  5.123
> print(xtable(fm2, align = "|r|llrc|"), size = "tiny")
```

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	73.6364	4.2502	17.33	0.0000
sexM	-1.6364	5.8842	-0.28	0.7816
ethnictyHISPANIC	-9.7614	6.5501	-1.49	0.1395
ethnictyOTHER	15.8636	10.8360	1.46	0.1466
ethnictyWHITE	4.7970	4.9687	0.97	0.3368
sexM:ethnictyHISPANIC	10.6780	8.7190	1.22	0.2238
sexM:ethnictyWHITE	5.1230	7.0140	0.73	0.4670

http://biostat.mc.vanderbilt.edu/s/Hmisc/html/Overview.html

high-level graphics

utility operations importing datasets,character string manipulation, conversion of S objects to LaTeX code, recoding variables, and table making

analysis computing sample size and power, imputing missing values, variable clustering

latex

```
> methods(latex)
 [1] latex.bystats                 latex.bystats2
 [3] latex.default                 latex.describe
 [5] latex.describe.single         latex.function
 [7] latex.list                    latex.responseSummary
 [9] latex.summary.formula.cross   latex.summary.formula.response
[11] latex.summary.formula.reverse
```

latex.default

title	filename, minus 'tex' extension
file	filename, with the tex extension. Default is `paste(title, '.tex', sep='')`
append	should output be appended to existing file contents
label	LaTeXlabel
rowlabel	label for the row name columnq
rowlabel.just	justifcation for row name column 'l', 'r' ,'c'
cgroup	major headers names for columns.
n.cgroup	vector of number of columns each cgroup is a heading for.
rgroup	like cgroup, for rows
n.rgroup	like n.cgroup, for rows
cgroupTexCmd	LaTeXcommand to format column group labels
rgroupTexCmd	like rgroupTexCmd for rows
colnamesTexCmd	LaTeXcommand to format column labels
cellTexCmds	matrix of LaTeXcommands for each element
na.blank	whether to use blank instead of NA
insert.bottom	string to bottom of table
first.hline.double	should the top line be doubled?
rowname	`NULL` to omit
cgroup.just	justification for column group labels
colheads	column labels
extracolheads	vector of sub-column labels
extracolsiz	size for extracolheads

`latex.default` (cont'd)

dcolumn	rounding per conventions of `format.df`
numeric.dollar	should math mode be used for negative numbers?
math.row.names	math mode for row names?
math.col.names	math mode for col names?
longtable	use longtable environment?
ctable	use ctable style? (thicker lines)
booktabs	use booktabs style for horizontal rules?
table.env	use table environment?
here	use 'H', depends on 'here.sty'
lines.page	how many lines on table when using package longtable
caption	caption at top of table
caption.lot	short caption for list of tables
caption.loc	'top' or 'bottom'
double.slash	output \as \\?
vbar	separate columns with vertical bars ?
collabel.just	justification for column labels
where	float placement. Default = '!tbp'
size	text size
center	'center' or 'none', as for latex.environment
landscape	for printing in landscape orientation
multicol	use \multicolumn in header?
	FALSE for default LaTeX

Vanilla output

```
> latex(head(iris), file = '')
```

head	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3.0	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5.0	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa

code

```
> latex(head(iris), file = '',
+ extracolheads = c('cm', 'cm', 'cm','cm', ''),
+ caption = 'head(iris)', label = 'tab:iris',
+ size = 'tiny', cgroup=c('Observations', ''),
+ n.cgroup = c(4,1), rgroup = c('A', 'B'),
+ caption.loc = 'bottom', rowlabel='')
```

	Observations				
	Sepal.Length cm	Sepal.Width cm	Petal.Length cm	Petal.Width cm	Species
A					
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3.0	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
B					
4	4.6	3.1	1.5	0.2	setosa
5	5.0	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa

Table: head(iris)

code

```
> cellTex <- matrix(rep("", nrow(head(iris))* ncol(head(iris))),
+ nrow =nrow(head(iris)))
> cellTex[2,2] <-"cellcolor{red}"
> cellTex[5,1] <-"rowcolor{yellow}"
> cellTex
     [,1]                [,2]                [,3] [,4] [,5]
[1,] ""                  ""                  ""   ""   ""
[2,] ""                  "cellcolor{red}" ""   ""   ""
[3,] ""                  ""                  ""   ""   ""
[4,] ""                  ""                  ""   ""   ""
[5,] "rowcolor{yellow}" ""                  ""   ""   ""
[6,] ""                  ""                  ""   ""   ""
> latex(head(iris), file = "", cellTexCmds = cellTex, rowname=NULL)
```

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7	0.4	setosa

Both `latex` and `xtable` can be extended to new classes.

`xtable.yourclass`

Required Arguments: x, caption, label, align, digits, display

`latex.yourclass`

No required arguments

```
\documentclass[article]
\usepackage{array, color,colortbl}
\begin{document}
<<results=tex, echo=F>>=
  latex(head(iris), file = "",
cellTexCmds = cellTex,
rowname=NULL)
@
\end{document}
```

```
\documentclass[article]
\usepackage{array, color,colortbl}
\begin{document}
\begin{table}[!tbp]
 \begin{center}
 \begin{tabular}{rrrrl}\hline\hline
\multicolumn{1}{c}{Sepal.Length}&\multicolumn{1}{c}{Sepal.W
\hline
   $5.1$ &    $3.5$ &    $1.4$ &    $0.2$ &    setosa\tabul
   $4.9$ & \cellcolor{red}   $3.0$ &    $1.4$ &    $0.2$ &
   $4.7$ &    $3.2$ &    $1.3$ &    $0.2$ &    setosa\tabul
   $4.6$ &    $3.1$ &    $1.5$ &    $0.2$ &    setosa\tabul
\rowcolor{yellow}   $5.0$ &    $3.6$ &    $1.4$ &    $0.2$
   $5.4$ &    $3.9$ &    $1.7$ &    $0.4$ &    setosa\tabul
\hline
\end{tabular}

\end{center}

\end{table}
\end{document}
```

HTML

`xtable`

x

caption

label html anchor

align

digits

display

print.xtable

x	
type	"html"
append	
~~floating~~	
~~floating.environment~~	
~~table.placement~~	
caption.placement	
~~latex.environments~~	
~~tabular.environment~~	
~~size~~	
~~hline.after~~	
NA.string	
include.rownames, include.colnames	
~~only.contents~~	
add.to.row	
sanitize.text.function	
sanitize.rownames.function	
sanitize.colnames.function	
~~math.style.negative~~	
html.table.attributes	passed to <TABLE> tag.

R2wd

Only in Windows environment

Depends on rcon

A Demo!

```
library(R2wd)
data(iris)
wdGet()
wdTable(head(iris))
wdQuit()
```