Making \texttt{ltxsparklines} package in R: A journey of a CTAN contributor into the world of CRAN

Boris Veytsman

George Mason University, Fairfax, VA, USA

TUG@Bacho\TeX\ 2017
What we are talking about

1. What are sparklines?
2. What is R?
3. What is CRAN?
What are sparklines?

Standard plots give a lot of information—but take much place.

Annual flow of the river Nile at Aswan

Generally, the flow of Nile was higher in 19th century than in 20th.
What are sparklines?

Standard plots give a lot of information—but take much place.

Annual flow of the river Nile at Aswan

Generally, the flow of Nile was higher in 19th century than in 20th,
TUG membership over the years shows a growth in the pre-internet years, and slow decline since you no longer need to be a TUG member to get the distribution.
TUG membership over the years shows a growth in the pre-internet years, and slow decline since you no longer need to be a TUG member to get the distribution.

The previous graph shows the end of year data. The monthly data are noisy due to the patterns in renewals.
TUG membership over the years shows a growth in the pre-internet years, and slow decline since you no longer need to be a TUG member to get the distribution.

The previous graph shows the end of year data. The monthly data are noisy due to the patterns in renewals.

Perhaps barchart is better suited for this.
Even more examples: Nile again

<table>
<thead>
<tr>
<th>Decade</th>
<th>Annual flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1871–1880</td>
<td></td>
</tr>
<tr>
<td>1881–1890</td>
<td></td>
</tr>
<tr>
<td>1891–1900</td>
<td></td>
</tr>
<tr>
<td>1901–1910</td>
<td></td>
</tr>
<tr>
<td>1911–1920</td>
<td></td>
</tr>
<tr>
<td>1921–1930</td>
<td></td>
</tr>
<tr>
<td>1931–1940</td>
<td></td>
</tr>
<tr>
<td>1941–1950</td>
<td></td>
</tr>
<tr>
<td>1951–1960</td>
<td></td>
</tr>
<tr>
<td>1961–1970</td>
<td></td>
</tr>
</tbody>
</table>
Sparklines package

\LaTeX{} package by Andreas Loeffler & Dan Luecking.
A typical sparkline:
Sparklines package

\LaTeX package by Andreas Loeffler & Dan Luecking.

A typical sparkline: \[\begin{sparkline}{10}
\sparkrectangle 0.3 0.8
\sparkdot 0.5 0.62 green
\sparkdot 1 0.2 red
\spark 0 0 0.1 0.95 0.2 0.8 0.3 0.3 0.4 0.52 0.5 0.62
\quad 0.6 0.7 0.7 0.5 0.8 0.4 0.9 0.25 1 0.2 /
\end{sparkline}\]
I am grateful to Uwe Ziegenhagen who introduced me to R back in 2010. I used to work 90% in \TeX. Now it is 40% pure \TeX, and 50% $\text{R} \rightarrow \text{\LaTeX}$. 

An R fragment:

```r
r <- rnorm(10000)
hist(r)
```

Run-on text:

We have $\textbf{Sexpr{length(r)}}$ values with the mean $\textbf{Sexpr{mean(r)}}$ and standard deviation $\textbf{Sexpr{sd(r)}}$. 
I am grateful to Uwe Ziegenhagen who introduced me to R back in 2010. I used to work 90% in \TeX. Now it is 40% pure \TeX, and 50% \text{R}$\rightarrow$\TeX.

**An R fragment:**

```r
<<>>=
r <- rnorm(10000)
hist(r)
@```

We have \(\text{Sexpr{length(r)}}\) values with the mean \(\text{Sexpr{mean(r)}}\) and standard deviation \(\text{Sexpr{sd(r)}}\).
I am grateful to Uwe Ziegenhagen who introduced me to R back in 2010. I used to work 90% in \TeX. Now it is 40% pure \TeX, and 50% R→\TeX.

An R fragment:

\begin{verbatim}
<<>>=
  r <- rnorm(10000)
  hist(r)
@
\end{verbatim}

Run-on text:

We have $\text{Sexpr{\text{length}(r)}}$ values with the mean $\text{Sexpr{\text{mean}(r)}}$ and standard deviation $\text{Sexpr{\text{sd}(r)}}$. 
R and knitr II

r <- rnorm(10000)
hist(r)

We have 10000 values with the mean \(-0.0091544\) and standard deviation 0.9931623.
\texttt{\textbackslash Sexpr\{sparkline(Nile, width=30)\}}:

\begin{itemize}
  \item \texttt{Sexpr\{sparkline(xspikes=tug['Date'], yspikes=tug['Members'], ylim=c(0,NA))\}}:
  \item \texttt{Sexpr\{sparkline(tug['Date'], tug['Members'], enddotcolor='red', ylim=c(0,NA))\}}:
\end{itemize}
Ltxsparklines: R interface

\texttt{Sexpr\{sparkline(Nile, width=30)\}}:

\includegraphics[width=0.5\textwidth]{nile_sparkline.png}

\texttt{Sexpr\{sparkline(xspikes=tug[['Date']], yspikes=tug[['Members']], ylim=c(0,NA))\}}:

\includegraphics[width=0.5\textwidth]{tug_sparkline.png}
Ltxsparklines: R interface

\Sexpr{sparkline(Nile, width=30)}:
\[ \begin{array}{c}
\end{array} \]

\Sexpr{sparkline(xspikes=tug[['Date']],
yspikes=tug[['Members']], ylim=c(0,NA))}:
\[ \begin{array}{c}
\end{array} \]

\Sexpr{sparkline(tug[['Date']], tug[['Members']],
enddotcolor='red', ylim=c(0,NA))}:
\[ \begin{array}{c}
\end{array} \]
Ltxsparklines: options

\texttt{sparkline}(x, y, xspikes, yspikes, xdots, ydots, dotcolor, width, rectangle, xlim, ylim, clip, na.rm, bottomline, bottomlinelength, bottomlinex, startdotcolor, enddotcolor, output)
Ltxsparklines: options

\[ \texttt{sparkline}(x, y, \text{xspikes}, \text{yspikes}, \text{xdots}, \text{ydots}, \text{dotcolor}, \text{width}, \text{rectangle}, \text{xlim}, \text{ylim}, \text{clip}, \text{na.rm}, \text{bottomline}, \text{bottomlinelength}, \text{bottomlinex}, \text{startdotcolor}, \text{enddotcolor}, \text{output}) \]

Spikes: \ldots
Ltxsparklines: options

```r
sparkline(x, y, xspikes, yspikes, xdots, ydots, dotcolor, width, rectangle, xlim, ylim, clip, na.rm, bottomline, bottomlinelength, bottomlinex, startdotcolor, enddotcolor, output)
```

Spikes: . . | .
Colored dots:  • • -
Ltxsparklines: options

```
sparkline(x, y, xspikes, yspikes, xdots, ydots, dotcolor, width, rectangle, xlim, ylim, clip, na.rm, bottomline, bottomlinelength, bottomlinex, startdotcolor, enddotcolor, output)
```

Spikes: . . .
Colored dots:  
Rectangles: .
Ltxsparklines: options

\textbf{sparkline}(x, y, xspikes, yspikes, xdots, ydots, dotcolor, width, rectangle, xlim, ylim, clip, na.rm, bottomline, bottomlinelength, bottomlinex, startdotcolor, enddotcolor, output)

Spikes: \ldots | .
Colored dots: \ldots
Rectangles: \ldots
Clipping: compare an unclipped sparkline and a clipped one \ldots
Ltxsparklines: options

\texttt{sparkline}(x, y, xspikes, yspikes, xdots, ydots, dotcolor, width, rectangle, xlim, ylim, clip, na.rm, bottomline, bottomlinelength, bottomlinex, startdotcolor, enddotcolor, output)

Spikes: \ldots\ldots\ldots
Colored dots: \ldots\ldots\ldots
Rectangles: \ldots\ldots\ldots
Clipping: compare an unclipped sparkline and a clipped one
Bottomlines: \ldots\ldots\ldots
Conclusions

1. A simple, but versatile package to create sparklines.
Conclusions

1. A simple, but versatile package to create sparklines.
2. A way to make better documentation and reports about data-intensive topics.
Conclusions

1. A simple, but versatile package to create sparklines.
2. A way to make better documentation and reports about data intensive topics.
3. (for the author) A useful exercise in creation of R packages—a sort of extended “Hello, world”.
1. Coding standards enforcement: some on CTAN, some on CPAN, dictatorship on CRAN.
CRAN, CPAN and CTAN

1. Coding standards enforcement: some on CTAN, some on CPAN, dictatorship on CRAN.
2. Authentication: none on CTAN, passwords on CPAN, e-mail with one-time link on CRAN.
CRAN, CPAN and CTAN

1. Coding standards enforcement: some on CTAN, some on CPAN, dictatorship on CRAN.
2. Authentication: none on CTAN, passwords on CPAN, e-mail with one-time link on CRAN.
3. Automatic testing: voluntary on CTAN, voluntary & automatic on CPAN, very much mandatory on CRAN.