Statistical Cartoons

rpanel: simple interactive controls for R functions using the tcltk package

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Elementary example

\[ \text{lambda} = 1.3 \]
library(rpanel)
x11(width=4,height=4)

qq.draw <- function(panel) {
  z <- bc.fn(panel$y, panel$lambda)
  qqnorm(z, main = paste("lambda = ",
              round(panel$lambda, 2)))
  panel
}

panel <- rp.control(y = exp(rnorm(50)), lambda = 1)
rp.slider(panel, lambda, -2, 2, qq.draw, showvalue = TRUE)
Second elementary example

Simple linear regression

\[
\text{Giving} = 61.445 - 4.6517 \times \text{Attend} \quad \text{SS} = 3 \]

\[
\text{Giving} = 70.863 - 7.7528 \times \text{Attend} \quad \text{RSS} = \]

\begin{figure}
\centering
\includegraphics[width=\textwidth]{scatterplot.png}
\caption{Scatter plot showing the relationship between attendance and giving.}
\end{figure}
Second elementary example
Relationship with wider gui packages

- Rgtk2
- gWidgets
- playwith
- rwxwidgets
- JGR
- rtcltk

...
Indication of tools available

What we offer in terms of widgets
- panel/window
- button (with repeat)
- slider/scrollbar
- radiogroup
- textentry (or multiples)
- checkbox (or multiples)
- listbox
- doublebutton
- image
- line
- messagebox
- tkrplot

...
Gulls
Spatial examples: Geosim
Spatial examples: Mururoa
Spatial examples: Rosyth
Current developments

- multi-line text box
- combo box
- pos/grid
- tabbed notebook
- fonts
- slider group

...

- essentially all BWidgets and TkTable

- More Cartoons
Web site

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What

- what i’ll talk about, widgets and their uses
- cartoons explanation
Why

- applications
- rationale (teach dept etc etc)
- xlispsstat etc
Big heading: RGtk2

Sub heading: GTK+

Project page:
http://www.gtk.org

An example of what can be done with GTK+, The GIMP

Illustrated by image
Sub heading: RGtk2

Project page:
http://www.ggobi.org/rgtk2/

Example of what can be done with Rgtk2, demo

Illustrated by image
RGtk is in business

RGtk2 even works on Windows.

Here we're using the GTK theme for Windows, automatically installed with the Windows runtime.
** Third slide: (May not all fit on the one slide, see note about omitting the code below)

Big heading: Gwidgets

Project page:
http://wiener.math.csi.cuny.edu/pmg/gWidgets

Illustrated by images
dotplot(gender–width)
Gwidgets code example (for the slider image)
Adrian - if you see fit, do not include this code. It may be worth including out of fairness as gwidgets is the only easy alternative to using rpanel

library(gWidgets)
options("guiToolkit"="RGtk2")
require(lattice)
dataSet = faithful$eruptions
w = gwindow("Slider example")
g = gpanedgroup(cont=w)
g1 = ggroup(horizontal = FALSE, cont = g) # first is left
gg = ggraphics(cont = g) # second is right

sl <- gsslider(1, length(dataSet), by = 1, cont=g1, handler =
  function(h,...) { print(histogram(dataSet, nint = svalue(h$obj)))
  
svalue(sb) <- svalue(h$obj)
  })

sb <- gspinbutton(1, length(dataSet), by = 1, cont=g1, handler =
  function(h,...) {
  print(histogram(dataSet, nint = svalue(h$obj)))
  })
svalue(sl) <- svalue(h$obj)
}

l = glabel("adjust number of bins", cont=g1)
histogram(dataSet) # start it off
** Slide Four

Big heading: rwxwidgets

Project page:  
http://www.omegahat.org/RwxWidgets/

Illustrate rwxwidgets image:
Big heading: JGR

Project page:
http://rosuda.org/JGR/

Illustrations:
Creating per-session help links...

```r
> rnorm(100)
[1]  0.24144923 -0.02181413  0.36885005 -1.67760300
[5]  0.99966213  0.30319863 -0.02242267 -0.55070643
[9] -1.06183724  0.25353681 -2.02276751  0.25492471
[13]  0.23048065 -0.25195792 -0.61800243 -2.17082792
[17] -2.24703936 -0.10149626 -0.13531822  1.55351373
[21] -1.01593239  0.95487234 -0.20717973 -1.02378805
[25] -0.71285041  2.66051957 -0.60017942 -0.96743723
[29] -0.06080342 -0.31593280 -0.48799749  1.37877023
[33]  0.04905670  0.95873484 -1.32148874  1.06856673
[37] -0.59939211  1.29463994  1.00941820 -1.53778827
[41]  0.62887268 -1.13487415  1.89409958  0.41494860
[45]  1.19203727  1.18620208 -0.47971630  1.19921458
[49] -0.92141615 -1.1179462  0.07546436 -0.33752317
[53]  0.80050362 -1.41124127 -0.99333993 -0.77411738
[57]  0.86839178  0.14238617 -1.08786371 -2.32190442
[61]  1.89074208  0.44152870 -0.88354668 -1.29104062
[65]  0.38234458  0.92902043  0.34990954 -2.31213898
[69] -0.77387566  1.19241880 -1.19836250  1.95543789
[73]  0.41852685  1.41647403 -0.52765579  0.08739633
[77]  0.82172783 -1.06939009  0.06495697 -0.54738280
[81]  3.20328505 -1.90194456 -0.13125577  0.30097003
[85] -0.57644598 -0.08396210  2.85659297  1.41334059
[89] -0.71402570  0.09971885  1.78880142 -1.02322626
[93]  0.30901740  1.69790378  1.05596703 -0.34397525
[97] -1.68551317 -0.27072100 -1.64798113  0.07342743
```

```
plot()

plot(x, y, ...)
```
# Dateneingabe
dose <- rep(c(1,2,4,8,16,32),2)
dldose <- rep(0:5, 2)
numdead <- c(1, 4, 9, 13, 18, 20, 6, 10, 12, 16)
sex <- factor(rep(c("M", "F"), c(6, 6)))
SF <- cbind(numdead, numalive=20-numdead)

# erste Modelle mit Interaktion
budworm.lg.2 <- glm(SF ~ sex*dose, family = binomial)
summary(budworm.lg.2)

budworm.lg.i <- glm(SF ~ sex*lldose, family=binomial)
summary(budworm.lg.i)

budworm.lg.A <- glm(SF ~ sex*I(lldose-3), family=binomial)
summary(budworm.lg.A)

plot(budworm.lg.i$linear.predictor, budworm.lg.i$residuals)

# Graphiken der vorhergesagten Werte gegen den linearen Präd
ld <- seq(0.5, 0.1)
plot(c(1,32), c(0,1), type="n", xlab = "dose", ylab = "prob
text(2^ldose, numdead/20, as.character(sex))
lines(2^ld, predict(budworm.lg.2, data.frame(dose=2^ld,
sex=factor(rep("M", length(ld)), levels=levels(sex)), type
="response"))
lines(2^ld, predict(budworm.lg.i, data.frame(lldose=ld,
sex=factor(rep("M", length(ld)), levels=levels(sex)), type
="response"),col=2)
lines(2^ld, predict(budworm.lg.A, data.frame(lldose=ld,
sex=factor(rep("M", length(ld)), levels=levels(sex)), type
"response"),col=2)
rtcltk

Pages:
http://bioinf.wehi.edu.au/~wettenhall/RTclTkExamples/

Illustrative image: rtcltk_editbox2.jpg
soa

- ---as per lanc --- - get images -
+ new -> Playwith
- who did what
  - adrian b, simon urbanek, gavin, richard b
- tcl/tk and internals
- list of controls/widgets/facilities (but not exhaustive)
examples

- preview of examples - click to run - check what runs -

[Diagram showing a plot with lambda = 1.3]
examples

- preview of examples - click to run - check what runs -

![](image)

**lambda = -0.03**

Sample Quantiles

Theoretical Quantiles

Frequency

z
- tables(panel)
examples

- normal fitting
examples

- preview of examples - click to run - check what runs -
- regression 1d
examples

- cosine regression
- density est 1d
- gulls
- clyde map

lambda = 1.3
examples

- spatial sim
examples

- mururoa
- rosyth
*** As per Adrian’s build up? ***

panel <- rp.control("Clyde data", do = DO, days = Days)
panel <- rp.slider(panel, day.adj, 0, 364,
                   action = days.plot)
panel <- rp.checkbox(panel, model.showing, model.fn,
                      title = "Show model")
Behind the scenes . . .
panel <- action(panel)
- discuss with AB
- applications
- my comments, pros, cons
- future plans
  - pos, grid, notebook, combo ...
Web site

www.stats.gla.ac.uk/~adrian/rpanel