Catalyst Interaction Plot with S

Here is a way to get nice interaction plots with S. The `catalyst` example from *Statistical Models in S* by Chambers and Hastie (1992) is used to illustrate concepts. The file that created this document is called `catalyst.tex` .

1. Turn on a graphics driver. On an X-window (e.g. NCD terminal), use the graphics device `x11()` (for S) or `motif()` (for Splus), or on a dumb keyboard terminal use `printer()`. Mac and PC platforms having a "tektronics" emulator might try the graphics device `tek4014()`. Note that only one graphics device can be on at a time; calling a second one turns off the first.

2. Play around interactively with plots in S. Do this until you find what you want. Try my `lsd.plot` as an alternative to `interaction.plot` (but you must first call `library(pda)`).

3. Construct a file of plot commands. This helps keeps track of plots that work well. Build ideas interactively in S, using a separate editing window or invoking an editor from within S (e.g. `!emacs catplot.s`) to update your file. Here is my file `catplot.s`:

```
motif()
par(mfcol=c(1,2))
plot(catalyst)
attach(catalyst)
interaction.plot(Conc, Cat, Yield)
detach("catalyst")
```

4. Turn on the `postscript()` device driver. This saves the plot in a postscript file. Use the `postscript` command defaults if you want to have a full page plot, or change the `height`, `width` and `pointsize` for smaller plots for reports. Source your plot commands. Then turn off the graphics device with `graphics.off()` (or reinvoke your favorite) to close the postscript file, called `catplot.ps` here.

```
postscript("catplot.ps",height=4,width=6,pointsize=10,horizontal=F)
source("catplot.s")
dev.off()
```

5. Examine the plots. The figure on the next page was plotted with the following commands:

```
\begin{figure}[htb]
   \centerline{\psfig{figure=catplot.ps}}
   \caption{Catalyst Main Effects and Interactions}
\end{figure}
```

6. View the PostScript plot. There is a `ghostview()` command (as well `lpr()`, `lpq()` and `enscript()`) in the `library(pda)` to make viewing and printing easier:

```
> library(pda)
> ghostview("catplot.ps")
# if it looks OK and you can print it from within ghostview
# or send it to laserprinter with lpr
> lpr("catplot.ps")
# check the printer queue
> lpq()
```

Note: `ghostview` takes a moment to display your graphics. The `ghostview()` command in S stays active by default. You can update your postscript file and reopen it.

7. Examine the LaTeX source for this document. You may want to learn how to embed plots in your reports. See this file (`catalyst.tex`) for an example. Once you have made created `catplot.ps`, and have the file `catalyst.tex`, do the following (from UNIX, not S!):

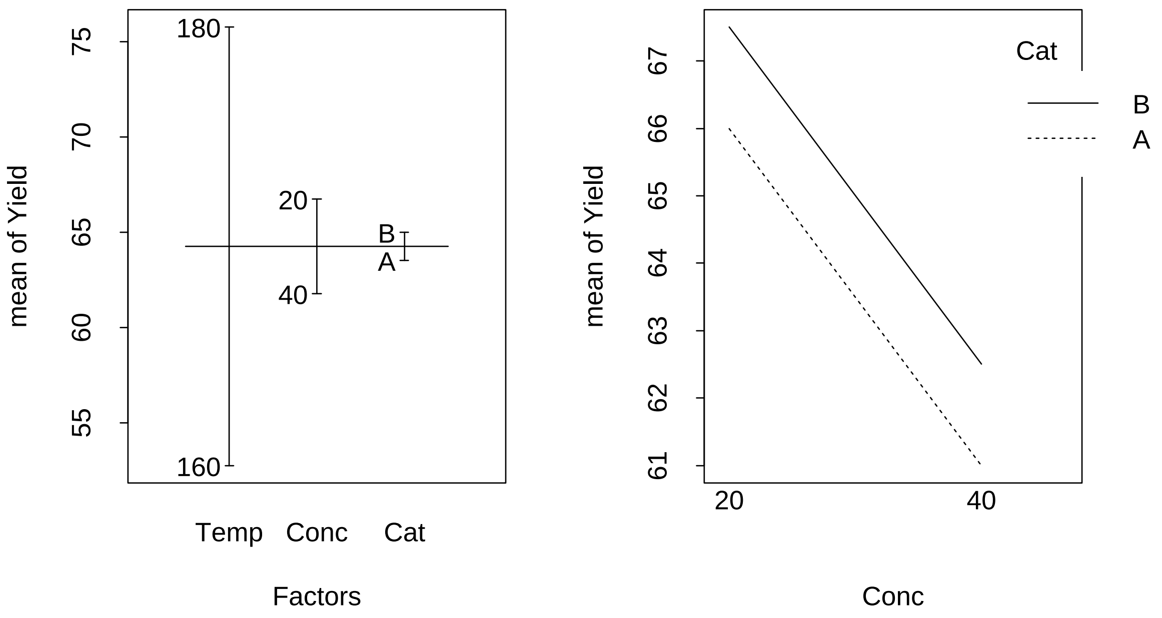

Figure 1: Catalyst Main Effects and Interactions

```
% latex catalyst
% dvips catalyst
% ghostview catalyst.ps
```

The command `dvips` converts `catalyst.dvi` to a PostScript file `catalyst.ps`. (You must specify the `.ps` ending for `ghostview`.) The document viewer `xdvi` can examine `catalyst.dvi` directly:

```
% xdvi catalyst
```

8. Print the PostScript document. When you are satisfied with your plot and document, you can send it to the printer if you have not done this from within `ghostview`. The UNIX command is either

```
% dvipr catalyst
```

or, if you used `dvips` to create a PostScript file,

```
% lpr catalyst.ps
```

WARNING: Postscript files take space. Delete them if not needed.

9. Translate PostScript to GIF or JPEG. The `xv` command can be used on an X terminal to translate `catplot.ps` into `catplot.gif` or `catplot.jpeg` which can be embedded in Word documents on Macs or Windows systems. Type

```
% xv catplot.ps
```

Once the image is up, click the right mouse button for the menu.