Loess Smoothing Parameter Animation

Luke Tierney

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This note shows how to create an animation of a `loess` surface fit as the smoothing parameter `span` is varied, and how to embed that animation in a PDF file.

The data to be used are normally distributed, with the mean of z a linear function of x and y:

```
> npoints <- 4000
> x <- rnorm(npoints)
> y <- rnorm(npoints)
> z <- .5 * rnorm(npoints) + dnorm(x+y)
```

The fit will be computed on an equally spaced grid defined by

```
> grsize <- 50
> xseq <-  seq(-3, 3, len = grsize)
> yseq <- seq(-3, 3, len = grsize)
> grid <- expand.grid(x = xseq, y = yseq)
```

The function `showframe` computes the fit for a particular value of `span` and plots the result using `persp`:

```
> showframe <- function(s) {
+     lf <- loess(z ~ x + y, span = s)
+     v <- matrix(predict(lf, grid), grsize)
+     persp(x = xseq, y = yseq, v,
+           xlab = "x", ylab = "y", zlab = "z", zlim = c(-1,1),
+           col = "lightblue", phi=30, theta=-30,
+           main = sprintf("Loess Fit, span = %.2f", s))
+ }
```

The `png` device generates its plots in files named, by default, `Rplot001.png`, `Rplot002.png`, ... The frames for an animaiton with `span` ranginf from 0.01 to 0.30 in steps of 0.01 can therefore be generated by

```
> png()
> for (s in seq(0.01, 0.3, by = 0.01)) showframe(s)
> dev.off()

null device
          1
```

The LaTeX `animate` packages can then be used to embed the result in a PDF file. Figure 1 shows the result and should work as a movie when viewed with the Adobe PDF reader.

To produce the PDF file from the `loessanim.Rnw` run the commands

```
R CMD Sweave loessanim.Rnw
pdflatex loessanim.tex
```

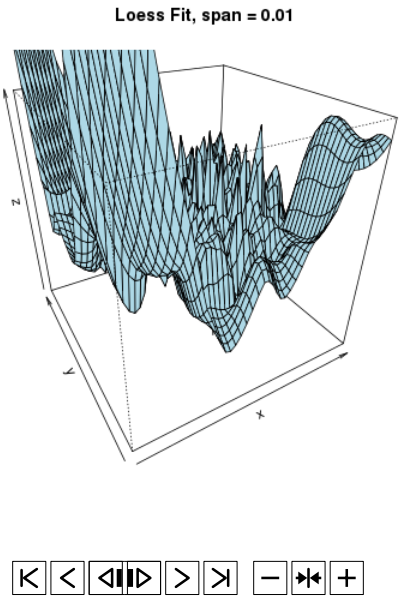

Figure 1: Animation of a `loess` fit. Click on the image or use the controls to run the animation.

The result can then be viewed with the Adobe PDF reader. You will need to have the LaTeX style files `animate.sty` and `animfp.sty` in your LaTeX path or in the same directory as `loessanim.tex`. The manual for the LaTeX `animate` packages is available at

`http://mirror.ctan.org/macros/latex/contrib/animate/animate.pdf`

The R package `animation` can also be used to create several kinds of anumations. For example, on our Linux systems the expressions

```
> library(animation)
> saveMovie(for (s in seq(0.01, 0.3, by = 0.01)) showframe(s),
+           interval = 0.1, outdir = "loessanim")
```

will create an animated GIF file that can be viewed by most web browsers. (You will need to create the `loessanimation` directory before running this code.)