Making interactive online graphics from Stata, using Stata2leaflet and Stata2D3

Robert Grant, Senior Lecturer in Health & Social Care Statistics
Kingston University & St George's, University of London

Interactive graphics or dataviz

super trendy

D3 (data-driven documents) has taken over from Flash

created by Mike Bostock in 2012

Leaflet is a very simple JavaScript library for maps

things develop and change very fast in dataviz!

Examples

using D3: Upshot jobs report
http://www.nytimes.com/2014/05/02/upshot/
how-not-to-be-misled-by-the-jobs-report.html

using Leaflet: RSA water quality map
http://www.dwa.gov.za/iwqs/microbio/nmmp.aspx

advanced D3: NYT recession in charts
http://www.nytimes.com/interactive/2014/06/05/upshot/
how-the-recession-reshaped-the-economy-in-255-charts.html

Web page anatomy

HTML file: recipe for making the page

your browser (highly optimised) follows the recipe

contains (or links to other files with):

- CSS (formatting, style)
- JavaScript (programming language to manipulate data, calculate and provide interactive / dynamic content)
- SVG (encoding for vector graphics objects)

Stata users miss out on the fun

rCharts makes an HTML file with D3 charts from your data

rMaps likewise for maps

Shiny is a platform for R charts to become interactive

ggvis is an R package that mimics popular graph syntax

Google Docs and Office Online will let you make some interactives (non-D3)

and there's some proprietary software: Tableau & Mapbox

stata2leaflet

specify variables containing latitude, longitude, color and pop-up text

stata2leaflet latvar longvar...

writes an HTML file that opens as a map in your browser

pulls in tiles from OpenStreetMap

much simpler than D3 – start here to understand JS

stata2leaflet

```
stata2leaflet mlat mlong mlab, ///
        mcolorvar(mcol) replace nocomments ///
       title("Here's my new map") ///
       caption("Here's some more details")
```

robertgrantstats.wordpress.com/2014/06/05/stata2leaflet-v0-1-is-released/

stata2d3 goals

preserve the Stata graphics syntax

make it really easy

bundle everything into one output HTML file (easy to upload)

require no HTML/JS/CSS knowledge

mimic the look of Stata (s2color) charts

provide a starting point for data people to learn JS

Commands: d3set

define conditions for show/hide buttons or filtering

provide string variables to display when clicking or hovering over data

local D3 file or online link?

(auto-?) didactic comments or none?

transition time (milliseconds)

filename (stub - can also specify in -d3-)

htmltitle (can also specify in -d3-)

Commands: d3

a prefix for standard Stata graphics code

```
d3 twoway (line price mpg) (scatter price mpg)
```

additionally allows htmltitle, filename as global options

and transparency (0-1) as individual option

and "steelblue" as lcolor or mcolor value

writes an HTML file including CSS & JS

Commands: odds and ends

d3parse: breaks up twoway commands

d3miniparse: breaks up each twoway constituent

colorstyle2rgba: translates Stata colorstyle to CSS values

colorstyle2hex: as above but without transparency
(might come in handy for ancient browsers)

Commands & options included so far

twoway scatter and twoway line

syntax can be twoway ( ) ( ) or || but not a mixture

lcolor, lwidth

mcolor (and transparency)

show/hide individual twoway graphs

display pop-up text when the mouse hovers over an object

d3

```
sysuse auto, clear
sort mpg
replace price=price/1000
gen mytext = make + "<br>USD " + ///
                    string(price,"%9.1f") + "<br>" + ///
                    string(mpg,"%9.0f") + " MPG"
d3set, showhide_twoway("Line" "Scatter") ///
        mouseover(mytext)
d3 twoway (line price mpg) (scatter price mpg), ///
      replace localjs ///
      htmltitle("1978 cars, in D3") ytitle("Price (1978 USD)")
```

Notes on JS as a language

arrays are indexed from 0, unlike Stata from 1

everything is a "variable", even functions

chaining syntax with dot operators is utilised by D3

scope of variable names is a little complex
(see www.digital-web.com/articles/scope_in_javascript/
and www.bessington.com/javascript-closures-simplified/)

suggested reading coming up...

Considerations

you will be effectively publishing your data
...but you're doing that already in scatterplots

you still need to find out how to upload

to customise it or insert it into an existing webpage,
you'll need to learn a little HTML/CSS/JS

but I managed that in spare time over a year; so can you

there's an active and supportive online community

JS is open source on any website so you can adapt it

Suggested reading

w3schools.com

“Data visualization with d3.js cookbook” by Nick Qi Zhu

d3noob.org

bl.ocks.org

d3js.org

“JavaScript: A beginner's guide” by John Pollock

dashingd3js.com

Watch out for new Stata2D3 features

mix up twoway and other graph commands

filter values, maybe using crossfilter

zoom into part of a graph

didactic comments in the HTML file

pull in other graphs from sersets, like lowess

handling time/date format variables

Watch out for new Stata2D3 features

www.robertgrantstats.co.uk/software

www.interactivegraphs.co.uk

Twitter: @robertstats