Introduction to Graphics

Steve Pittard wsp@emory.edu

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Introduction to Graphics

- R has a poweful environment for visualization of scientific data
- It offers publication quality graphics which can be programmed
- Easily reproducibe across platforms (OSX, Windows, Linux)
- Full LaTeX and Sweave support
- Many add-on packages and functions with built-in graphics support
- Can easily save to PDF, JPEG, PNG, and SVG

Some sources for Information

- R graph gallery `http://gallery.r-enthusiasts.com/`
- R Graphical Manual `http://bit.ly/1ULffYH`
- Lattice Graphics `http://bit.ly/10d8f0Q`
- ggplot2 `http://ggplot2.org/`

History

R graphics can be confusing because there are four different systems that get mentioned in textbooks and online manuals for R.

I will list them here and talk about briefly about each.

- Low Level Capability
  - Base Graphics (Has Low and High Level functions)
  - Grid Graphics (We don't get into this package)
- High Level Capability
  - Lattice Graphics
  - ggplot2

Base Graphics

- Oldest and most commonly used (although that might be changing)
- Uses a "pen on paper" model
  - You can only draw on top of what has already been drawn/plotted
  - Cannot erase, modify, or move existing plot objects
  - Easy to start over if you make mistakes
- Has both high and low level plotting routines
- Very fast
- Can build complex plots in steps
- Can easily write functions to do plotting
- Lots of documentation and "Google" support

Grid Graphics

- Developed in 2000 by Paul Murrell
- Provides a rich set of graphics primitive
- Uses a system of objects and view ports to make plotting complex objects easier
- You almost never use this directly unless you want to do low level programming (mostly true)
- Both the **lattice** and **ggplot2** packages use Grid
- We will not be learning about this package in this class beyond this slide
- Manual is at `https://stat.ethz.ch/R-manual/R-devel/library/grid/doc/grid.pdf`

Lattice Graphics

- Developed by Deepayan Sarkar
- Insipred by Trellis graphics and the book "Visualizing Data" by William Cleveland
- Easy to create conditioned plots and panelled plots (aka Trellis plots)
- Easy to do grouping of data within a single panel
- Legends, annotations, and axes are automatically created
- Is a separate package but it comes with any installation of R
- See `http://lmdvr.r-forge.r-project.org/figures/figures.html`

```
library(lattice)
xyplot(mpg ~ wt | factor(am, labels=c("Auto","Manual")),data = mtcars)
```

Lattice Graphics

xyplot.png