ggplot2 Introduction

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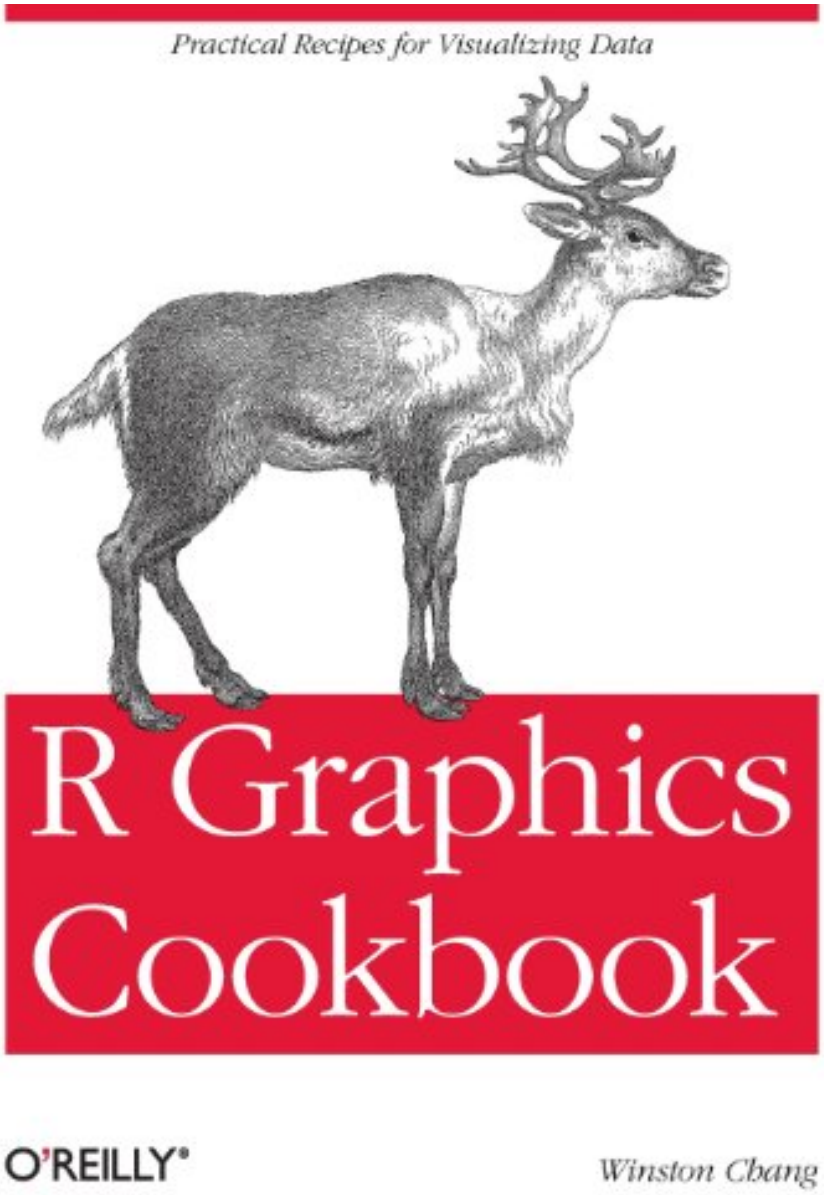
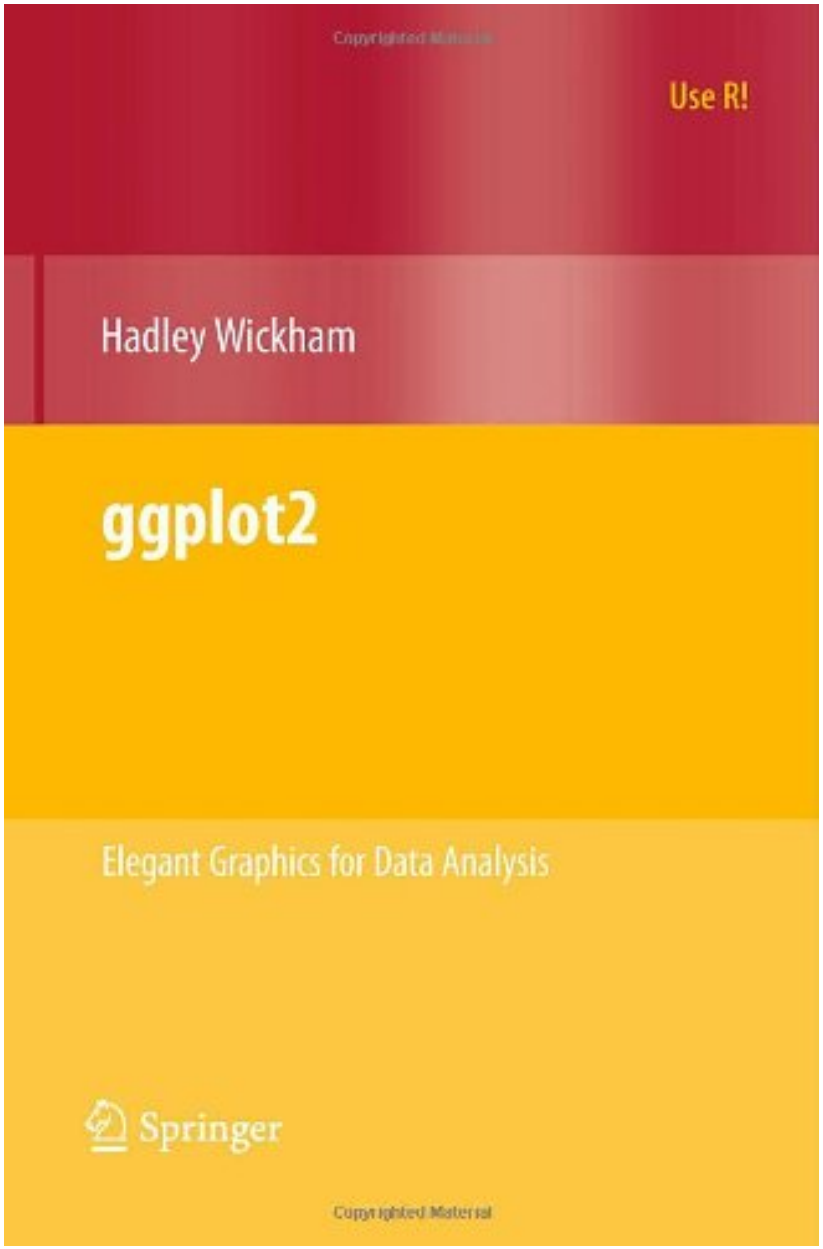
December 8, 2015

Introduction

- developped by Hadley Wickham (Rice University, Houston, USA)
- highly recommanded R packages to work with ggplot2: reshape and plyr (also developped by H. Wickham)
- first version called in 2007

Useful books





Online ressources

- R code related to ggplot2 cookbook:
  http://www.cookbook-r.com/Graphs/
- R code related to useR! ggplot2 book:
  http://ggplot2.org/book/
- ggplot2 official documentation:
  http://docs.ggplot2.org/current/
- Google groups to ask questions:
  ggplot2@googlegroups.com
- Github repository:
  https://github.com/yhat/ggplot/

Introduction

- based on new aesthetic principles
- based on *The grammar of graphics* developed by Wilkinson in 2005
- efficient way to produce simple graphics with a length reduction of R code

Forget about R base graphics:

`plot()`, `hist()`, `par()`, `layout()`, `points()`, `lines()`,`legend()`

Principle

ggplot2 is based on a **layer** system which can be used as objects.

Main layers

- data → raw data
- mapping → graphic projection
- geom → geometric objects (points, lines, polygons, ...)
- stat → statistics transformation (histogram, model)
- scale → aesthetics customization (color, shape, size, axes, legend)
- coord → coordinate system (axes, grid)
- facet → subdivision (lattice, trellis)

Base functions

ggplot2 is based on two functions:

1. `qplot()` for **q**uick **plot**
   - easy and fast, but too simple in most cases
   - `qplot(x, y, data=data)`

2. `ggplot()`
   - more complex but more powerful and flexible by adding `layers`
   - `ggplot(data=data, aes(x, y)) + layers`

Getting Started

Data format

Always work with a `data.frame`

Our data frame is based on the surveys XXXX and simulated data.

Getting Started

```
  str(df_data)
```

```
## 'data.frame': 1909 obs. of  18 variables:
##  $ Year             : int  2005 2005 2005 2005 2005 2005 2005 2005 2005 2005 ...
##  $ Month            : int  7 7 7 7 7 7 7 7 7 7 ...
##  $ DURATION_MINUTES: int  21 20 21 21 20 20 20 21 21 20 ...
##  $ AREA             : Factor w/ 2 levels "5AB","5CD": 1 1 1 1 1 1 1 1 1 1 ...
##  $ Avg_net_depth    : num  -0.316 -0.435 -0.442 -0.234 -0.171 ...
##  $ Avg_net_temp     : num  0.3939 0.4339 0.3004 0.1335 -0.0267 ...
##  $ Date             : Date, format: "2005-07-06" "2005-07-06" ...
##  $ Lon              : num  -128 -128 -128 -128 -128 ...
##  $ Lat              : num  51.2 51.1 51.6 51.6 51.7 ...
##  $ X                : num  572025 570307 553665 551917 546338 ...
##  $ Y                : num  5668122 5665874 5717947 5719597 5723992 ...
##  $ X_km             : num  572 570 554 552 546 ...
##  $ Y_km             : num  5668 5666 5718 5720 5724 ...
##  $ Pres             : num  1 1 1 1 1 1 1 0 0 1 ...
##  $ Year_fac         : Factor w/ 5 levels "2005","2007",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ AREA_num         : num  1 1 1 1 1 1 1 1 1 1 ...
##  $ nFish            : int  4 6 3 5 3 2 1 1 4 3 ...
##  $ Biomass          : num  10.2 14.35 7.26 12.58 7.43 ...
```

Scatter plot: Depth and Biomass

```
scatter.plot <- ggplot(data=df_data, aes(x=Avg_net_depth, y=Biomass)) +
                geom_point()
print(scatter.plot)
```