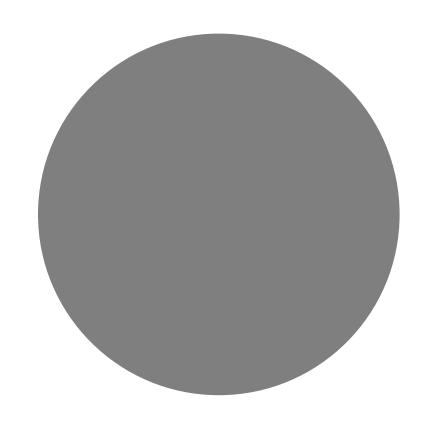
Lesson 9: Data Visualization 1

Introduction to Plotting Systems in R

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R的三大绘图 系统

- · 基本绘图系统 (Base Plotting System)
- Lattice绘图系统 (Lattice Plotting System)
- ggplot2 绘图系统(ggplot2 Plotting System)

基本绘图系统(Base Plotting System)

- 人人都是艺术家:绘图开始于空白,一笔一划添加内容
- 需要事先计划好, 直观地实时反映绘图和分析数据的逻辑
- 用基本R绘图需要走两步
 - 图
 - 修饰/添加=执行一系列函数
- 适于绘制2D图
- quick, easy, dirty

基本绘图系统

- 绘图函数 (graphics包)
 - plot/hist/boxplot/points/lines/text/title/axis
- plot()
 - plot(x,y,...)
 - 重要参数: xlab/ylab/lwd/lty/pach/col
 - ?par
 - 用于设置全局参数(作用于R中的所有plot绘图)
 - bg/mar/las/mfrow/mfcol
 - 这些参数可以在每次plot之前修改

Lattice绘图系统

- 绘图=使用一次函数调用(一次成图)
- 特别适用于观测变量间的交互:在变量z的不同水平,变量y如何随着x变化

Lattice绘图系统

- 绘图函数
 - lattice包
 - xyplot/bwplot/histogram/stripplot/dotplot/splom/levelplot.contourplot
 - 格式xyplot(y~x|f*g,data), f*g是分类变量
 - panel函数,用于控制每个面板内的绘图
 - grid包
 - 实现了独立于base的绘图系统
 - lattice包是基于grd创建的,很少直接从grid包调用函数

Lattice绘图系统

- xyplot(Temp~Ozone|Month, data=airquality, layout=c(5,1))
- Lattice与Base的重要区别
 - base绘图函数直接在图形设备上绘图
 - Lattice绘图函数返回trellis类对象
 - 打印函数真正执行了在设备上绘图
 - 命令执行时,trellis类对象会被自动打印,所以看起来就像是lattice函数直接完成了绘图

ggplot2 绘图系统

- The Grammar of Graphics
 - 图:动词,名词,形容词等
 - 数据映射到几何客体(points/lines/bars)的美学属性(颜色/形状/大小)
 - 基本绘图系统+Lattice绘图系统
 - 自动处理标题/文字说明/空间等,但也允许通过添加注释进行修改
 - complex, flexibility, control details

常用图形

histogram (柱状图)

boxplot (箱图)

scatter (散点图)

line (线图)

柱状图简单命令

- hist(airquality\$Temp)
- ?hist

```
hist(x, ...)
## Default S3 method:
hist(x, breaks = "Sturges",
    freq = NULL, probability = !freq,
    include.lowest = TRUE, right = TRUE,
    density = NULL, angle = 45, col = NULL, border = NULL,
    main = paste("Histogram of" , xname),
    xlim = range(breaks), ylim = NULL,
    xlab = xname, ylab,
    axes = TRUE, plot = TRUE, labels = FALSE,
    nclass = NULL, warn.unused = TRUE, ...)
```

箱图简单命令

boxplot(airquality\$Temp)

Arguments

plotting

formula a formula, such as y ~ grp, where y is a numeric vector of data values to be split into groups according to the grouping variable grp (usually a factor).

data a data.frame (or list) from which the variables in formula should be taken.

subset an optional vector specifying a subset of observations to be used for

散点图简单命令

 plot(airquality\$Wind, airquality\$Temp, type="p")

```
plot(x, y, ...)
```

Arguments

- the coordinates of points in the plot. Alternatively, a single plotting structure, function or any R object with a plot method can be provided.
- y the y coordinates of points in the plot, optional if x is an appropriate structure.
- ... Arguments to be passed to methods, such as <u>graphical parameters</u> (see <u>par</u>).
 Many methods will accept the following arguments:

type

what type of plot should be drawn. Possible types are

- "p" for points,
- "1" for lines,
- "b" for both.
- "c" for the lines part alone of "b",

线图简单命令

- plot(airquality\$Wind, airquality\$Temp, type="l")
- 适用于时间序列分析

绘图实践 RStudio!