長條圖
Single Bar Chart

群組長條圖

不等寬柱狀圖 Variable Width Column

Table or Table with Embedded Charts

雷達圖(Radar chart)
Circular Area Chart

折線圖
Line Chart

柱狀圖
Column Chart

折線圖
Line Chart

Rcode

Rcode

Rcode

Rcode

Rcode

Rcode

Rcode

Rcode

阿好伯製作

你想呈現什麼? by R
What would you like to show? by R
📎 範例檔案

單項目

多項目

雙變量
Two Variable

三或多變量
Three or more Variable

具循環週期性
Cyclical Data

非循環週期性
Non-Cyclical Data

單一或少量項目
Single or Few Items

多項目
Many Items

單變量
One Variable

多時間
Many Periods

少時間
Few Periods

靜止
Static

隨時間變化
Changing Over Time

比較
Comparison

單變量
One Variable

少數據
Few Item

多數據
Many Item

直方圖
Column Histogram

密度圖(Density Plot)
Line Histogram

Rcode

Rcode

散佈圖
Scatter Chart

雙變量
Two Variables

三變量
Three Variables

關聯
Relationship

分佈
Distribution

氣泡圖
Bubble Chart

Rcode

Rcode

雙變量
Two Variables

散佈圖
Scatter Chart

Rcode

三變量
Three Variables

曲面圖
3D Area Char

Rcode

組成
Composition

隨時間變化
Changing Over Time

靜止
Static

包含地理資訊

少週期
Few Periods

多週期
Many Periods

組成中的組成
Components of Components

累積或累減總和
Accumulation or Subtraction to Total

Rcode

只有相對差異
Only Relative Differences Matter

相對與絕對差異
Relative and Absolute Differences Matter

只有相對差異
Only Relative Differences Matter

相對與絕對差異
Relative and Absolute Differences Matter

帶有子類別

總和的簡單分類
Simple Share of Total

百分比堆疊長條圖
Stacked 100% Column Chart

堆疊長條圖
Stacked Column Chart

百分比堆疊圖面積圖
Stacked 100% Stacked Area Chart

堆疊面積圖
Stacked Area Chart

瀑布圖
Waterfall Chart

圓餅圖
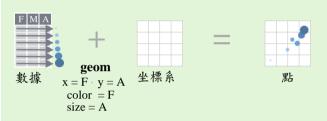Pie Chart

Rcode

Rcode

Rcode

Rcode

Rcode

Rcode

Rcode

ggplot2數據可視化::備忘表

基礎

ggplot2 基於圖形語法，使用相同的元件（數據集、坐標系和表示資料點的幾何物件）來構建圖片。

為了獲取顯示值，資料中的變數映射到圖形的視覺屬性，如大小、顏色以及x和y位置。

完成以下範本來構建圖形

ggplot (data = <DATA>) +
 <geom_function> **(mapping = aes(** **<mappings>),**
 stat = **<stat>** , position = **<position>**) +
 <Coordinate_function> +
 <Facet_function> +
 <Scale_function> +
 <Theme_function>

必要

非必要，有預設值

ggplot(data = mpg, **aes**(x = cty, y = hwy)) 通過添加圖層來完成圖形，每層添加一個**geom**函數。

last_plot() 返回上一個圖片。

ggsave("plot.png", width = 5, height = 5) 將最後一個圖片保存至工作目錄中名為"plot.png"的5'x 5'文件。 檔案類型與文件副檔名相匹配。

參數

通用參數

color and **fill** - string ("red", "#RRGGBB") #框線或填充顏色
linetype - integer or string (0 = "blank", 1 = "solid", 2 = "dashed", 3 = "dotted", 4 = "dotdash", 5 = "longdash", 6 = "twodash") #線條樣式
lineend - string ("round", "butt", or "square") #線端點樣式
linejoin - string ("round", "mitre", or "bevel") #線段點樣式
size - integer (line width in mm)
shape - integer/shape name or a single character ("a") #資料點樣式

0 1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19 20 21 22 23 24 25

幾何對象

使用geom函數表達資料，使用geom的美學屬性表示變量。 每個函數繪製一個圖層。

基本圖像

a <- ggplot(economics, aes(date, unemploy))
b <- ggplot(seals, aes(x = long, y = lat))

a + geom_blank() and **a + expand_limits()**

b + geom_curve(aes(yend = lat + 1, xend = long + 1), curvature = 1) - x, xend, y, yend, alpha, angle, color, curvature, linetype, size

a + geom_path(lineend = "butt", linejoin = "round", linemitre = 1)
x, y, alpha, color, group, linetype, size

a + geom_polygon(aes(alpha = 50)) - x, y, alpha, color, fill, group, subgroup, linetype, size

b + geom_rect(aes(xmin = long, ymin = lat, xmax = long + 1, ymax = lat + 1)) - xmax, xmin, ymax, ymin, alpha, color, fill, linetype, size

a + geom_ribbon(aes(ymin = unemploy - 900, ymax = unemploy + 900)) - x, ymax, ymin, alpha, color, fill, group, linetype, size

線段

常用參數: x, y, alpha, color, linetype, size

b + geom_abline(aes(intercept = 0, slope = 1))
b + geom_hline(aes(yintercept = lat))
b + geom_vline(aes(xintercept = long))

b + geom_segment(aes(yend = lat + 1, xend = long + 1))
b + geom_spoke(aes(angle = 1:1155, radius = 1))

單變數 連續

c <- ggplot(mpg, aes(hwy)); c2 <- ggplot(mpg)

c + geom_area(stat = "bin")
x, y, alpha, color, fill, linetype, size

c + geom_density(kernel = "gaussian")
x, y, alpha, color, fill, group, linetype, size, weight

c + geom_dotplot()
x, y, alpha, color, fill

c + geom_freqpoly()
x, y, alpha, color, group, linetype, size

c + geom_histogram(binwidth = 5)
x, y, alpha, color, fill, linetype, size, weight

c2 + geom_qq(aes(sample = hwy))
x, y, alpha, color, fill, linetype, size, weight

離散變數

d<- ggplot(mpg, aes(fl))

d + geom_bar()
x, alpha, color, fill, linetype, size, weight

雙變數

兩個都連續

e <- ggplot(mpg, aes(cty, hwy))

e + geom_label(aes(label = cty), nudge_x = 1, nudge_y = 1) - x, y, label, alpha, angle, color, family, fontface, hjust, lineheight, size, vjust

e + geom_point()
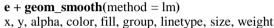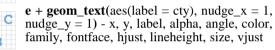x, y, alpha, color, fill, shape, size, stroke

e + geom_quantile()
x, y, alpha, color, group, linetype, size, weight

e + geom_rug(sides = "bl")
x, y, alpha, color, linetype, size

e + geom_smooth(method = lm)
x, y, alpha, color, fill, group, linetype, size, weight

e + geom_text(aes(label = cty), nudge_x = 1, nudge_y = 1) - x, y, label, alpha, angle, color, family, fontface, hjust, lineheight, size, vjust

一個離散，一個連續

f <- ggplot(mpg, aes(class, hwy))

f + geom_col()
x, y, alpha, color, fill, group, linetype, size

f + geom_boxplot()
x, y, lower, middle, upper, ymax, ymin, alpha, color, fill, group, linetype, shape, size, weight

f + geom_dotplot(binaxis = "y", stackdir = "center") x, y, alpha, color, fill, group

f + geom_violin(scale = "area")
x, y, alpha, color, fill, group, linetype, size, weight

兩個都是離散變數

g <- ggplot(diamonds, aes(cut, color))

g + geom_count()
x, y, alpha, color, fill, shape, size, stroke

e + geom_jitter(height = 2, width = 2)
x, y, alpha, color, fill, shape, size

連續二元分佈

h <- ggplot(diamonds, aes(carat, price))

h + geom_bin2d(binwidth = c(0.25, 500))
x, y, alpha, color, fill, linetype, size, weight

h + geom_density_2d()
x, y, alpha, color, group, linetype, size

h + geom_hex()
x, y, alpha, color, fill, size

連續函數

i <- ggplot(economics, aes(date, unemploy))

i + geom_area()
x, y, alpha, color, fill, linetype, size

i + geom_line()
x, y, alpha, color, group, linetype, size

i + geom_step(direction = "hv")
x, y, alpha, color, group, linetype, size

視覺化誤差

df <- data.frame(grp = c("A", "B"), fit = 4:5, se = 1:2)
j <- ggplot(df, aes(grp, fit, ymin = fit - se, ymax = fit + se))

j + geom_crossbar(fatten = 2) - x, y, ymax, ymin, alpha, color, fill, group, linetype, size

j + geom_errorbar() - x, ymax, ymin, alpha, color, group, linetype, size, width
Also **geom_errorbarh()**.

j + geom_linerange()
x, ymin, ymax, alpha, color, group, linetype, size

j + geom_pointrange() - x, y, ymin, ymax, alpha, color, fill, group, linetype, shape, size

地圖

data <- data.frame(murder = USArrests$Murder, state = tolower(rownames(USArrests)))
map <- map_data("state")
k <- ggplot(data, aes(fill = murder))

k + geom_map(aes(map_id = state), map = map) **+ expand_limits**(x = map$long, y = map$lat)
map_id, alpha, color, fill, linetype, size

三變數

seals$z <- with(seals, sqrt(delta_long^2 + delta_lat^2)); l <- ggplot(seals, aes(long, lat))

l + geom_contour(aes(z = z))
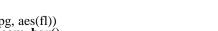x, y, z, alpha, color, group, linetype, size, weight

l + geom_contour_filled(aes(fill = z))
x, y, alpha, color, fill, group, linetype, size, subgroup

l + geom_raster(aes(fill = z), hjust = 0.5, vjust = 0.5, interpolate = FALSE)
x, y, alpha, fill

l + geom_tile(aes(fill = z))
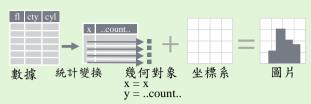x, y, alpha, color, fill, linetype, size, width

統計變換 另一種構建圖層的方法

統計變換構建新變數來繪圖（例如，count，prop）。

數據　統計變換　幾何對象　坐標系　圖片
　　　　　　　　x = x
　　　　　　　　y = ..count..

通過更改geom函數的默認統計信息，**geom_bar(stat="count")** 或者使用統計變化功能來繪圖**stat_count(geom="bar")**，其調用默認圖片來創建一個圖層（相當於geom函數）。

使用 **..name..** 語法將統計變化映射到坐標。

i + stat_density_2d(aes(fill = ..level..),
geom = "polygon")

由統計變換創建的變數

c + stat_bin(binwidth = 1, boundary = 10)
x, y | ..count.., ..ncount.., ..density.., ..ndensity..

c + stat_count(width = 1) **x, y** | ..count.., ..prop..

c + stat_density(adjust = 1, kernel = "gaussian")
x, y | ..count.., ..density.., ..scaled..

e + stat_bin_2d(bins = 30, drop = T)

x, y, fill | ..count.., ..density..

e + stat_bin_hex(bins = 30) **x, y, fill** | ..count.., ..density..

e + stat_density_2d(contour = TRUE, n = 100)
x, y, color, size | ..level..

e + stat_ellipse(level = 0.95, segments = 51, type = "t")

l + stat_contour(aes(z =　　z)) **x, y, z, order** | ..level..

l + stat_summary_hex(aes(z = z), bins = 30, fun = max) **x, y, z, fill** | ..value..

l + stat_summary_2d(aes(z = z), bins = 30, fun = mean)
x, y, z, fill | ..value..

f + stat_boxplot(coef = 1.5)
x, y | ..lower.., ..middle.., ..upper.., ..width.. , ..ymin.., ..ymax..

f + stat_ydensity(kernel = "gaussian", scale = "area") **x, y** |
..density.., ..scaled.., ..count.., ..n.., ..violinwidth.., ..width..

e + stat_ecdf(n = 40) **x, y** | ..x.., ..y..

e + stat_quantile(quantiles = c(0.1, 0.9),
formula = y ~ log(x), method = "rq") **x, y** | ..quantile..

e + stat_smooth(method = "lm", formula = y ~ x, se = T,
level = 0.95) **x, y** | ..se.., ..x.., ..y.., ..ymin.., ..ymax..

ggplot() + xlim(-5, 5) + **stat_function**(fun = dnorm,
n = 20, geom = "point") **x** | ..x.., ..y..

ggplot() + stat_qq(aes(sample = 1:100))
x, y, sample | ..sample.., ..theoretical..

e + stat_sum() x, y, size | ..n.., ..prop..

e + stat_summary(fun.data = "mean_cl_boot")

h + stat_summary_bin(fun = "mean", geom = "bar")

e + stat_identity()

e + stat_unique()

尺規 使用**scales**包覆蓋預設值

將映射資料縮放到較為美觀的比例。
添加新的尺規來改變映射。

n <- d + geom_bar(aes(fill = fl))

scale_
開頭　調整參數　預設參數　尺規特定屬性的參數

n + scale_fill_manual(
values = c("skyblue", "royalblue", "blue", "navy"), **limits**
= c("d", "e", "p", "r"), breaks =c("d", "e", "p", "r"), **name**
= "fuel", labels = c("D", "E", "P", "R"))

映射中包含值的範圍　圖例/軸中使用的標題　圖例/軸中使用的標籤　圖例/軸的分隔

尺規的一般用法

使用大多數參數
scale_*_continuous() - 將資料的連續取值映射為圖形屬性的取值
scale_*_discrete() - 將資料的離散取值映射為圖形屬性的取值
scale_*_binned() - 將資料的連續取值映射為離散的統計項
scale_*_identity() - 使用資料的值作為圖形屬性的取值
scale_*_manual(values = c()) - 將資料的離散取值作為手工指定的圖形屬性的取值
scale_*_date(date_labels = "%m/%d"),
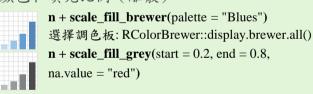date_breaks = "2 weeks") - 將資料值視為日期
scale_*_datetime() - 將數據x視為時間

參數和scale_x_date()一樣。有關標籤格式請參閱?striptime。

調整**X**和**Y**的比例

調整 x 和 y 的 標尺（使用 x 為例
) **scale_x_log10()** - 以log10比例繪製
x **scale_x_reverse()** - 反轉x軸方向
scale_x_sqrt() - 以平方根繪製x

顏色和填充比例（離散）

n + scale_fill_brewer(palette = "Blues")
選擇調色板: RColorBrewer::display.brewer.all()

n + scale_fill_grey(start = 0.2, end = 0.8,
na.value = "red")

顏色和填充比例（連續）

o <- c + geom_dotplot(aes(fill = ..x..))
o + scale_fill_distiller(palette = "Blues")

o + scale_fill_gradient(low="red", high="yellow")

o + scale_fill_gradient2(low = "red", high =
"blue", mid = "white", midpoint = 25)

o + scale_fill_gradientn(colors = topo.colors(6))
也見: rainbow(), heat.colors(), terrain.colors(),
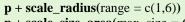cm.colors(), RColorBrewer::brewer.pal()

形狀和尺寸比例

p <- e + geom_point(aes(shape = fl, size = cyl))
p + scale_shape() + scale_size()
p + scale_shape_manual(values = c(3:7))

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
□△+×◇▽☒✳⊕⊠✡⊞⊟△◇○○□□△▽

p + scale_radius(range = c(1,6))
p + scale_size_area(max_size = 6)

坐標系

r <- d + geom_bar()

r + coord_cartesian(xlim = c(0, 5)) - xlim, ylim
默認笛卡爾坐標系

r + coord_fixed(ratio = 1/2)
ratio, xlim, ylim - x和y單位之間固定長寬比的笛卡爾坐標

ggplot(mpg, aes(y = fl)) + **geom_bar()**
通過切換x和y參數映射翻轉笛卡爾座標

r + coord_polar(theta = "x", direction=1)
theta, start, direction – 極座標

r + coord_trans(y = "sqrt") - x, y, xlim, ylim
轉換後的笛卡爾座標。將xtrans和ytrans設置為視窗函數的名稱。

π + **coord_quickmap()**
π + **coord_map**(projection = "ortho",
orientation = c(41, -74, 0)) - projection, xlim, ylim
從mapproj包中映射投影(mercator (default),
azequalarea, lagrange, etc.)

位置調整

位置調整決定了如何安排原本會占據相同空間的圖例

s <- ggplot(mpg, aes(fl, fill = drv))

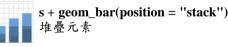**s + geom_bar(position = "dodge")**
並排排列元素

s + geom_bar(position = "fill")
堆疊元素並標準化高度

e + geom_point(position = "jitter")
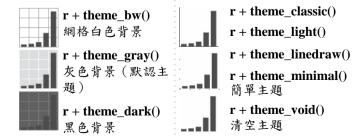將隨機抖動添加到每個元素的X和Y位置以避免重疊

e + geom_label(position = "nudge")
標籤稍微遠離資料點

s + geom_bar(position = "stack")
堆疊元素

每個位置調整都可以重新編寫為具有手動寬度和高度參數的函數:
s + geom_bar(position = position_dodge(width = 1))

主題

r + theme_bw()
網格白色背景

r + theme_gray()
灰色背景（默認主題）

r + theme_dark()
黑色背景

r + theme_classic()

r + theme_light()

r + theme_linedraw()

r + theme_minimal()
簡單主題

r + theme_void()
清空主題

r + theme() 自訂主題的各個方面，例如軸、圖例、面板和構圖屬性。
r + ggtitle("Title") + theme(plot.title.postion = "plot")
r + theme(panel.background = element_rect(fill = "blue"))

分面

根據一個或多個離散
變數劃分子圖。

t <- ggplot(mpg, aes(cty, hwy)) + geom_point()
t + facet_grid(cols = vars(fl))
基於fl的列分面
t + facet_grid(rows = vars(year))
基於year的行分面
t + facet_grid(rows = vars(year), cols = vars(fl))
列和行的分面圖
t + facet_wrap(vars(fl))
包裹成矩形佈局的分面圖

設置scales限制分面坐標軸
t + facet_grid(rows = vars(drv), cols = vars(fl),
　　　　scales = "free")
　　　x和y軸適應各自的分面
　　　"free_x" - 限制調整x軸
　　　"free_y" - 限制調整y
軸設置labeller屬性調整分面的標籤
t + facet_grid(cols = vars(fl), labeller = label_both)
t + facet_grid(rows = vars(fl),

fl: c	fl: d	fl: e	fl: p	fl: r

labeller = label_bquote(alpha ^ .(fl)))

α^c	α^d	α^e	α^p	α^r

標籤與圖例

使用**labs()**標記圖中的元素。
t + labs(x = "New x axis label", **y** = "New y axis label",
　title ="Add a title above the plot",
　subtitle = "Add a subtitle below title",
　caption = "Add a caption below plot",
　alt = "Add alt text to the plot",

　<AES> = "New **<AES>** legend title")

t + annotate(geom = "text", x = 8, y = 9, label = "A")
Places a geom with manually selected aesthetics.使用手動選擇的參數調整幾何物件的放置位置。
p + guides(x = guide_axis(n.dodge = 2)) 使用
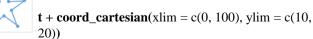guide_axis(n.dodge 或 angle)避免擁擠或重疊的標籤。
n + guides(fill = "none")設置圖例類型**: colorbar, legend, or none (no legend)**
n + theme(legend.position = "bottom")
放置圖例: "bottom", "top", "left", or "right"
n + scale_fill_discrete(name = "Title",
labels = c("A", "B", "C", "D",
"E"))
使用scale函數設置圖例標籤

縮放

沒有裁剪（推薦）
t + coord_cartesian(xlim = c(0, 100), ylim = c(10, 20))

裁剪（刪除看不見的資料點）
t + xlim(0, 100) + **ylim**(10, 20)

t + scale_x_continuous(limits = c(0, 100)) +
scale_y_continuous(limits = c(0, 100))