

Some Extensions to Traditional Graphics

Bill Venables

2021-01-26

Contents

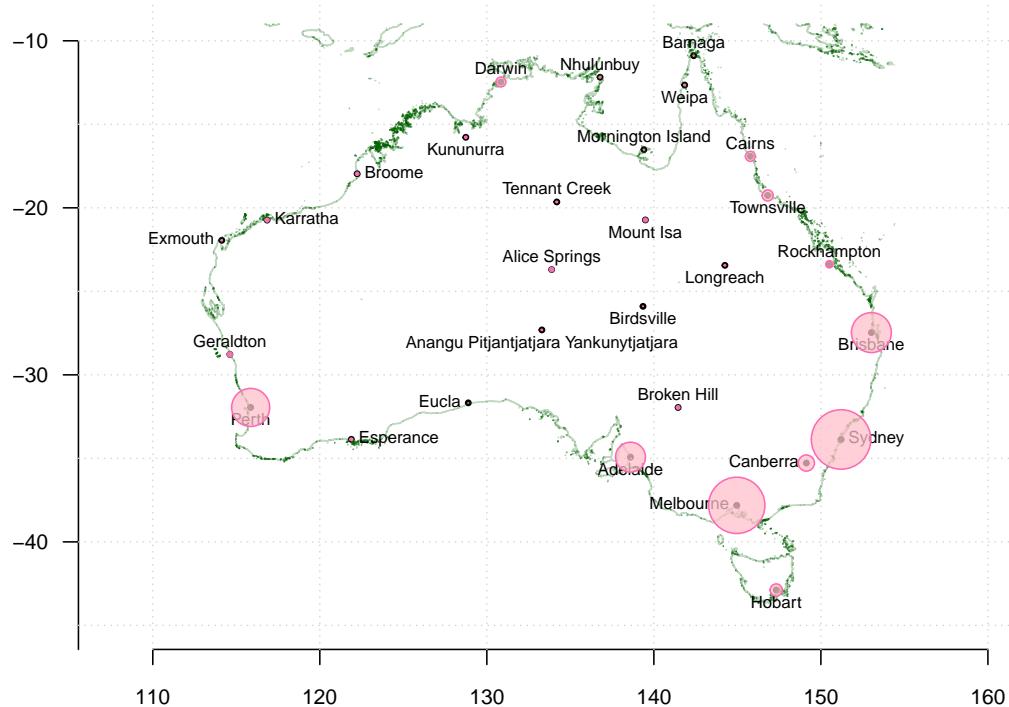
Introduction	1
---------------------	----------

Introduction

Traditional graphics in R are definitely on the way out. Most new graphical methods in R should be drafted in a more modern idiom, not necessarily ggplot2, but certainly based on Paul Murrell's grid package. Nevertheless Traditional, or 'Base' graphics are likely to remain in R for some time to come. They remain an obvious choice, for example, for lightweight plot methods for their convenience and for the simple fact that they rely only on R core packages.

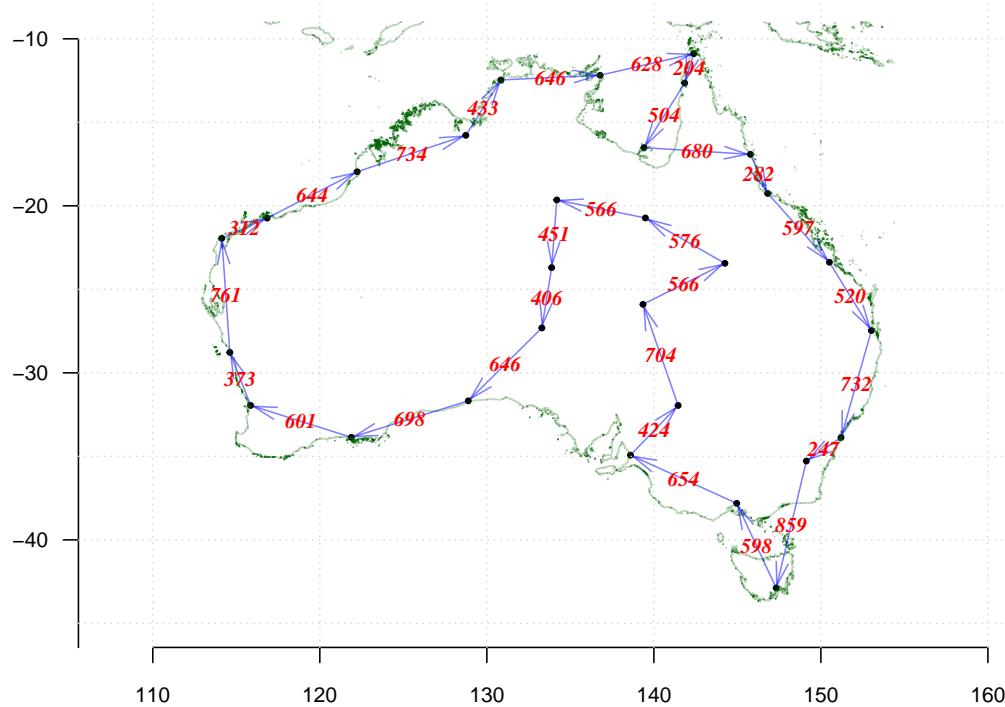
```
par(mar = c(3,3,3,1), bg = "white")
greenish <- alpha("dark green", 0.25)
blueish <- alpha("blue", 0.5)
pinkish <- alpha("pink", 0.75)
#####
##### First view, Population
#####
z <- with(roundTrip, setNames(complex(real = Longitude,
                                         imaginary = Latitude),
                               Locality))
plot(z, asp = 1, cex = 0.7, ann = FALSE, axes = FALSE, bty = "n",
      ylim = c(-45,-9))
axis(1, at = 10*(11:16))
axis(2, at = -10*(5:1))
grid()
lines(0z, col = greenish)
text(z, labels = names(z), pos = avoid(z), cex = 0.7, offset = 0.25)
circles(Latitude ~ Longitude, roundTrip, radii = sqrt(Population),
        maxradius = 0.5, fill = pinkish, colour = "hot pink")
title(main = "Population")
```

Population



```
#####
##### Second view
#####
plot(z, asp = 1, cex = 0.7, ann = FALSE, axes = FALSE, bty = "n",
      ylim = c(-45,-9))
axis(1, at = 10*(11:16))
axis(2, at = -10*(5:1))
grid()
lines(0z, col = greenish)
arrows(z, cyc(z), gap = 0.5, col = blueish)
km <- gcd_km(z, cyc(z)) %>% round
text((z + cyc(z))/2, labels = km, col = "red", family = "serif",
      font = 4, cex = 0.8)
title(main = "Great Circle Distances")
```

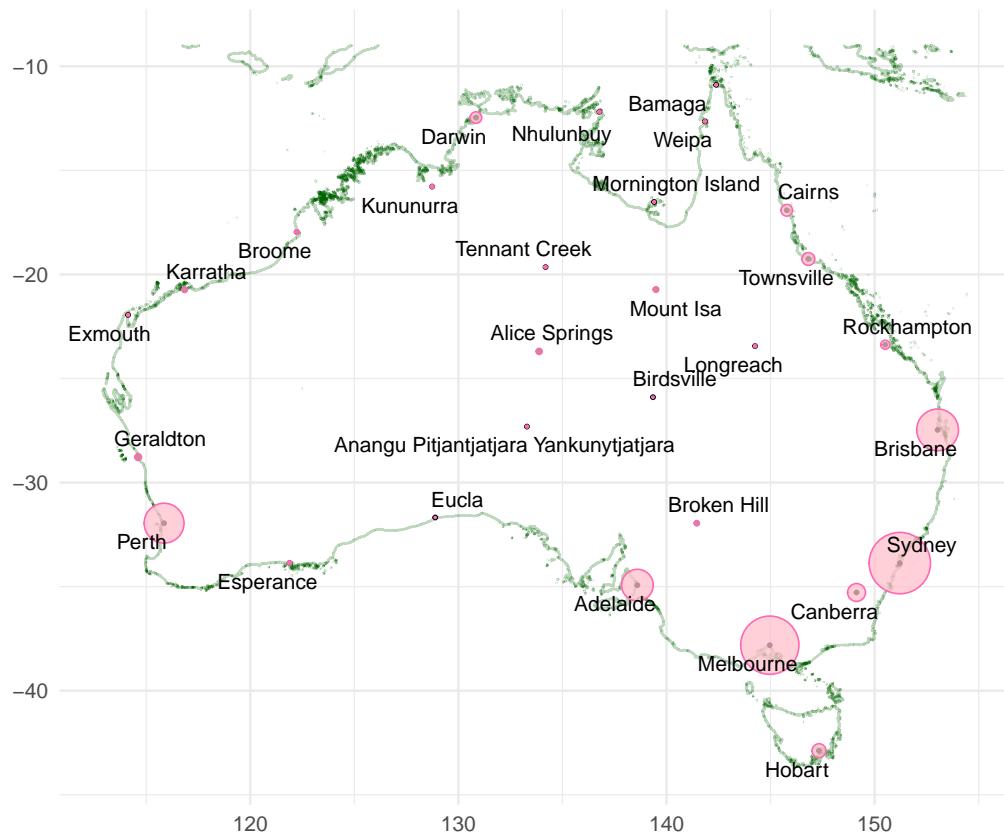
Great Circle Distances



```

library(ggplot2)
library(ggrepel)
zfill <- function(x) gsub(" ", "0", format(x, justify = "right"))
gg0z <- data.frame(0z) %>% within({
  strip <- paste0("S", zfill(cumsum(is.na(x))))
}) %>% na.omit()
legs <- data.frame(start = z, end = cyc(z), mid = (z + cyc(z))/2,
  km = round(gcd_km(z, cyc(z))))
head <- arrow(length = unit(0.0625, "inches"), angle = 15, type = "closed")
#####
g0 <- ggplot(gg0z, aes(x, y)) +
  geom_path(aes(group = strip), colour = greenish) + xlab("") + ylab("") +
  geom_point(aes(x = Longitude, y = Latitude), size = 0.5,
    data = roundTrip) + coord_equal() + theme_minimal() +
  theme(plot.title = element_text(hjust = 0.5), legend.position = "none")
#####
g0 + geom_point(data = roundTrip, aes(x = Longitude, y = Latitude,
  size = Population),
  fill = pinkish, colour = "hot pink", shape = 21) +
  scale_size_area(max_size = 12) +
  geom_text_repel(aes(x = Longitude, y = Latitude, label = Locality),
    size = 3, data = roundTrip) + ggtitle("Population")
  
```

Population



```
#####
g0 + geom_segment(data = legs, aes(x = Re(start), y = Im(start),
                                    xend = Re(end), yend = Im(end)),
                   arrow = head, colour = "steel blue", size = 0.25) +
  geom_text(data = legs, aes(x = Re(mid), y = Im(mid),
                             label = as.character(km)), colour = "red",
            size = 3.5, family = "serif", fontface = "bold.italic") +
  ggtitle("Great Circle Distances")
```

Great Circle Distances

