Visualizing and mapping Twitter data

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Why visualize?

> *"You should look at your data."*
>
> —*Kieran Healy,* Data Visualization for Social Science

Visualization is a powerful tool for *exploratory data analysis*.

It helps you spot patterns and get a descriptive sense for the data you're working with.

Packages

The key package here is `leaflet`:

```
library(countrycode)
library(forcats)
library(leaflet)
library(stringr)
library(tidyverse)
```

These additional package are needed for static mapping using `ggplot2`:

```
library(ggthemes)
library(maps)
library(mapproj)
```

Data: tweets from Africa

```
tweets_unfiltered <- readRDS("data/tweets_africa.rds")
```

These African tweets were collected using a rectangular "bounding box" around Africa. Because of this, the data include tweets from the Middle East and Mediterranean. (See `collect_tweets.R` for the collection code.)

We want to filter down to tweets from African countries only.

countrycode

We can use the countrycode package to get a list of countries in Africa and their 2-letter country codes

```
cc_africa <-
  countrycode_data %>% filter(continent == "Africa")

tweets_africa <-
  tweets_unfiltered %>%
  filter(country_code %in% cc_africa$iso2c)
```

Data join

We can use some of the information in the countrycode data in our plots and maps, so let's join the two together.

```
tweets_africa <-
  left_join(tweets_africa, cc_africa,
            by = c("country_code" = "iso2c"))
```

Example 1: Non-spatial representation

How many tweets are there from each country?

A good way to represent this is with a simple dotplot.

Summarize the data

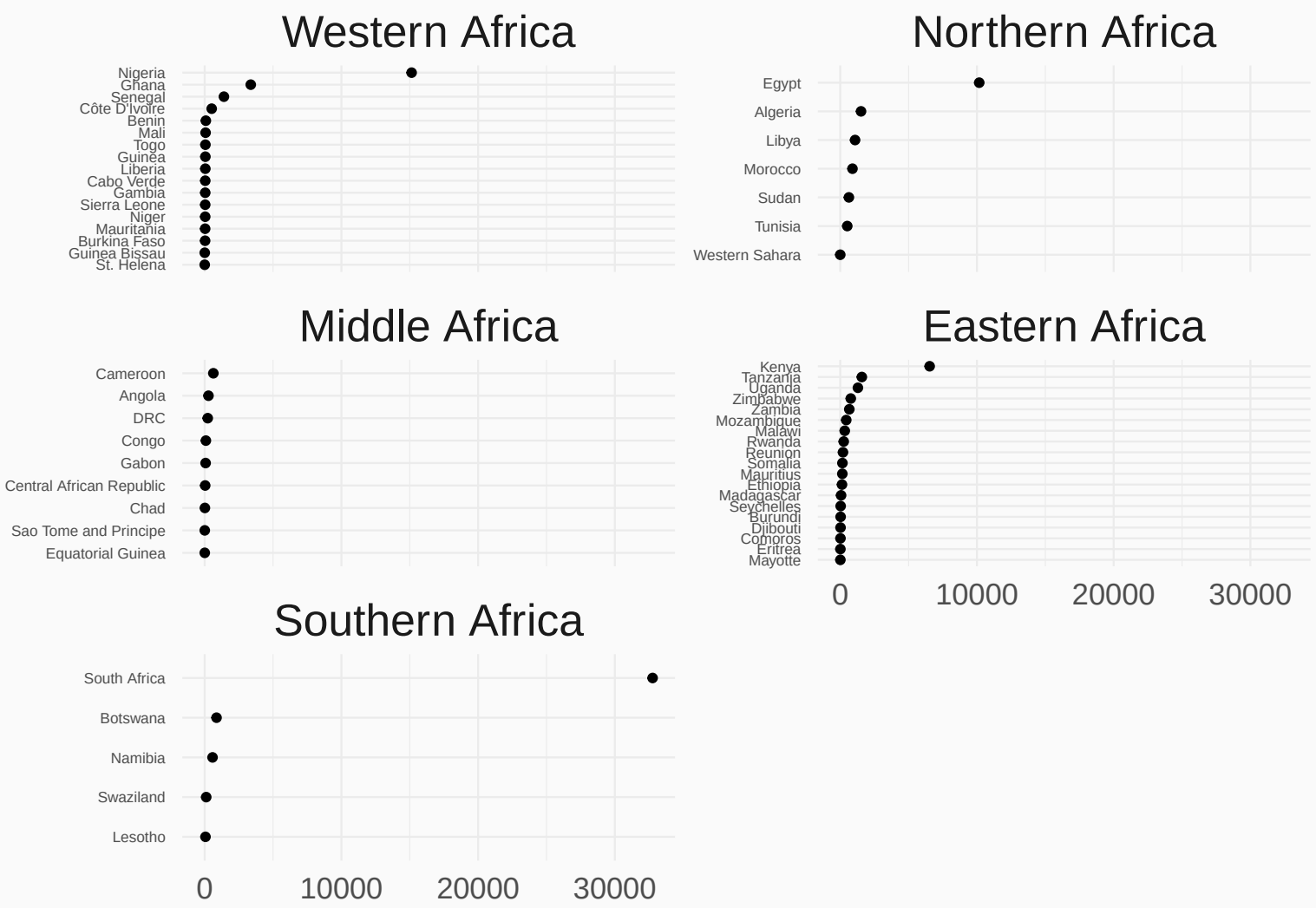
```
tweets_africa_summarized <-
  tweets_africa %>%
  group_by(country_code, country.name.en, region) %>%
  count() %>%
  ungroup()
```

We also shorten some country names (code not shown in slides)

Build the plot

```
n_tweets_plot <-
  ggplot(tweets_africa_summarized,
         aes(x = n, y = fct_reorder(country.name.en, n))) +
  geom_point(size = 2) +
  facet_wrap(~region, scales = "free_y", ncol = 2) +
  labs(y = NULL, x = NULL) +
  theme_minimal(base_size = 20) +
  # make the base_size smaller on your laptop!
  # it's big for the projector
  theme(axis.text.y = element_text(size = rel(.5)),
        strip.text = element_text(size = rel(1.2)),
        plot.title = element_text(size = rel(1.5)))
```

Number of tweets by country



Interlude: Static map

```
map_data_africa <-
  map_data("world",
           region = cc_africa$country.name.en.regex)
```

Again, we need to modify some country names (code not shown in slides).

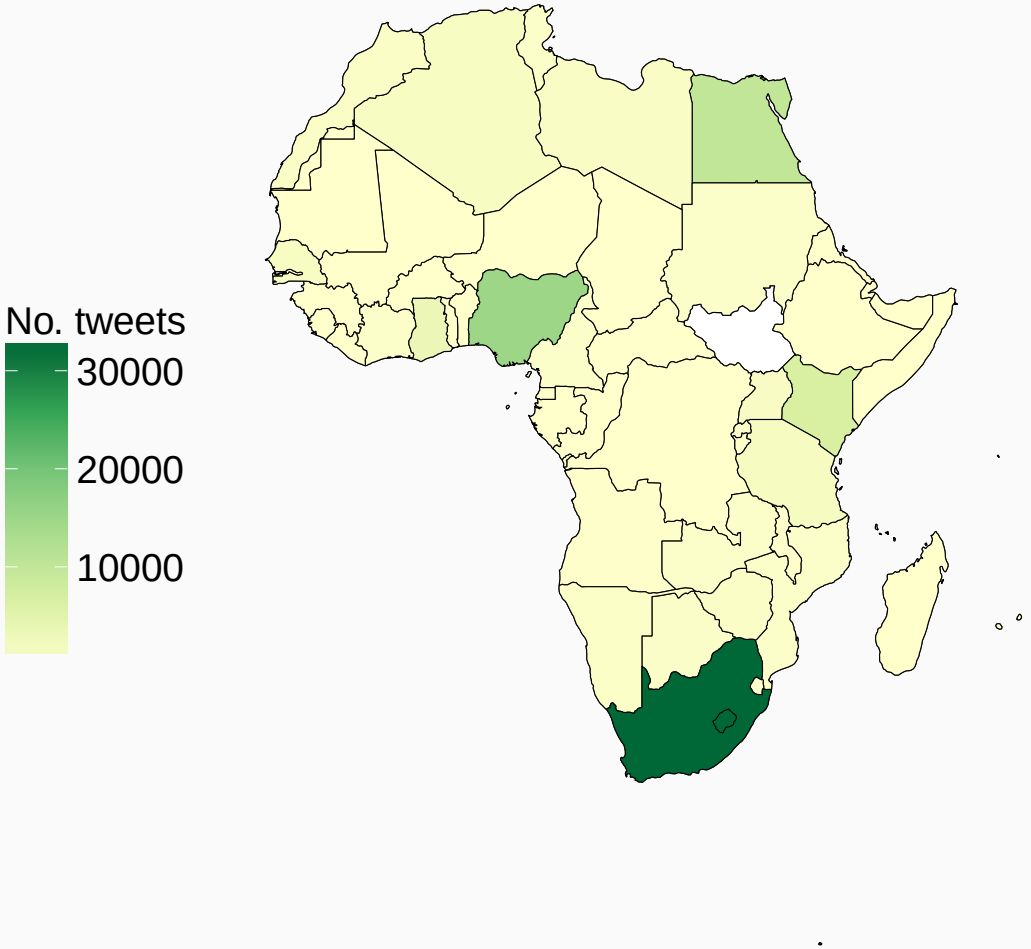
We must also rename the `country.name.en.regex` to `region`.

Base map

```
base_map_africa <-
  ggplot(map_data_africa, aes(map_id = region)) +
  geom_map(map = map_data_africa,
           fill = "white", color = "black", size = .25) +
  expand_limits(x = map_data_africa$long,
                y = map_data_africa$lat) +
  coord_map() +
  theme_map() +
  theme(legend.background =
          element_rect(fill = alpha("white", 0)))
```

Map with fill gradient

```
static_map_africa <-
  base_map_africa +
  geom_map(map = map_data_africa,
           data = tweets_africa_summarized2,
           aes(fill = n), color = "black", size =.25) +
  scale_fill_distiller(palette = "YlGn", direction = 1) +
  labs(fill = "No. tweets") +
  theme(legend.position = "left",
        legend.justification = c("right", "center"),
        legend.key.size = unit(2, "line"),
        legend.text = element_text(size = rel(2)),
        legend.title = element_text(size = rel(2)))
```


No. tweets
30000
20000
10000

Example 2: Interactive map

For exploratory purposes, being able to click and zoom on a map is useful. The `leaflet` R package provides an interface to the Leaflet JavaScript library, which lets us do just that.

We'll map individual tweets, with two additional innovations:

1. Popup markers containing the text of the tweet
2. Tweets color-coded by language

Interactive mapping with Leaflet

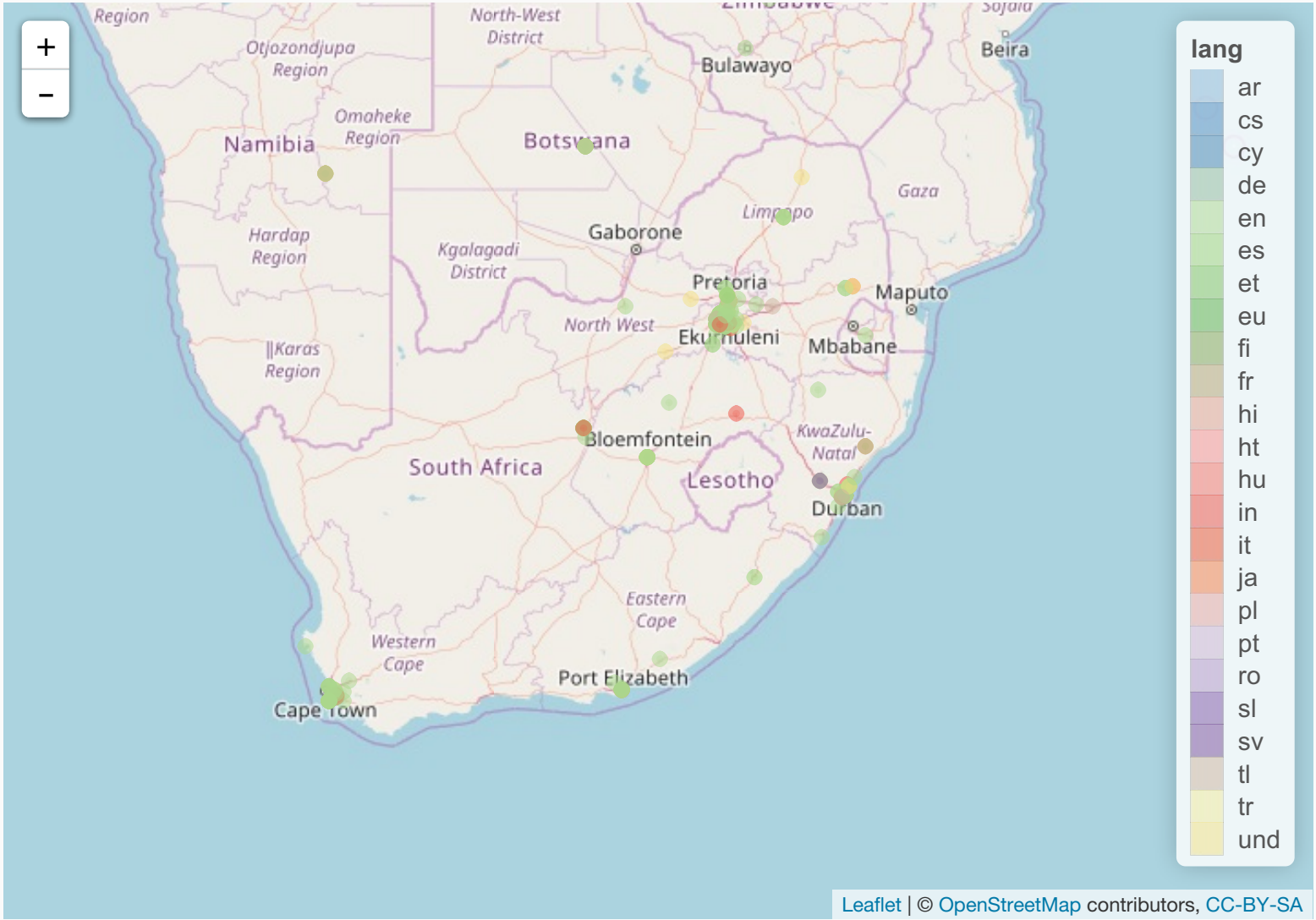
`leaflet()` creates the widget; *tiles* are the map background, and *markers* are the points based on the data.

To make the map faster to manipulate, we plot a sample of **1000 tweets**.

```
set.seed(20171029)
pal <- colorFactor("Paired", tweets_africa$lang)
map_africa <-
  leaflet(data = sample_n(tweets_africa, 1000)) %>%
  addTiles() %>%
  addCircleMarkers(lat = ~place_lat, lng = ~place_lon,
                   popup = ~str_c(screen_name, ": ", text),
                   radius = 2,
                   color = ~pal(lang)) %>%
  addLegend(pal = pal, values = ~lang)
```


lang
ar
cs
cy
de
en
es
et
eu
fi
fr
hi
ht
hu
in
it
ja
pl
pt
ro
sl
sv
tl
tr
und
Leaflet | © OpenStreetMap contributors, CC-BY-SA

Zoom in on South Africa



Exercises

Exercise 1: Click on a few markers and look at the text of the tweets. How accurate does the assigned language generally seem to be?

Exercise 2: Try plotting tweets you've collected using `leaflet`.

Challenge exercise: Some countries have tweets from many locations, while others show all tweets in the same spot. What's the difference? Look at the tweets data to see if you can figure it out. (Hint: we used `place_lat` and `place_lon`, so the difference has to do with places.)

Resources

Leaflet documentation:

`https://rstudio.github.io/leaflet/`

Kieran Healy's online book, *Data Visualization for Social Science*:

`http://socviz.co/`

The examples in this module were inspired by Chapter 7, "Draw Maps"