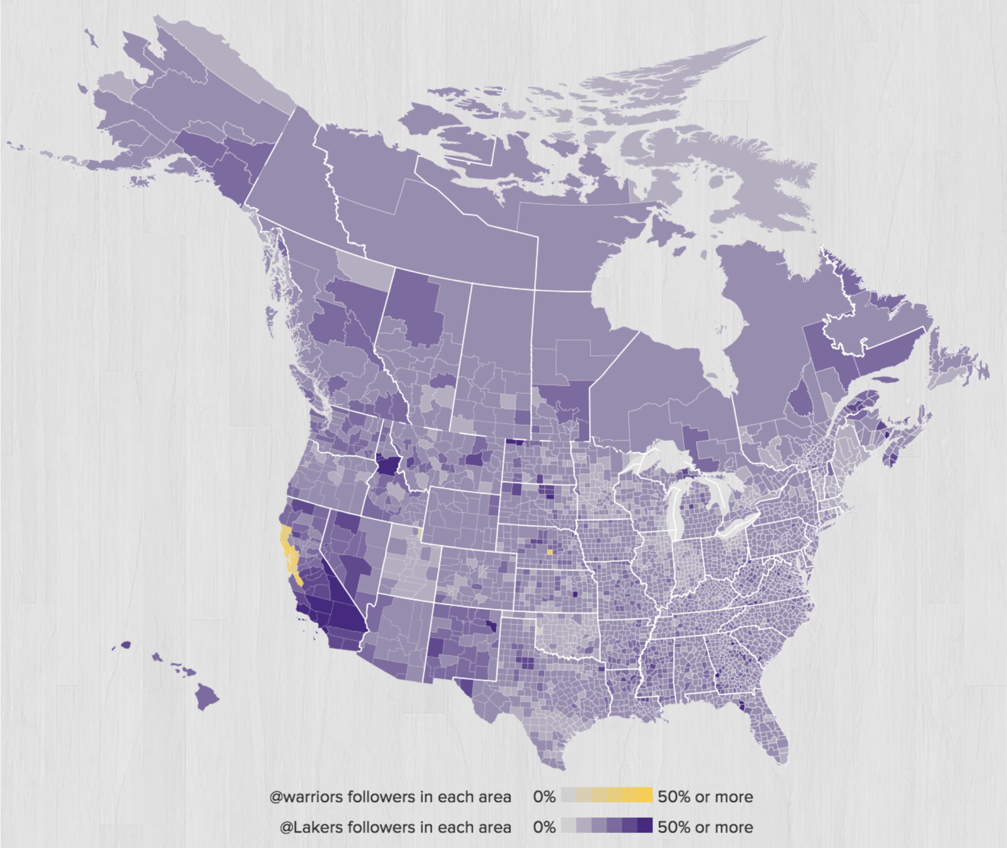
Maps and Twitter data

ANALYZING SOCIAL MEDIA DATA IN PYTHON

Alex Hanna

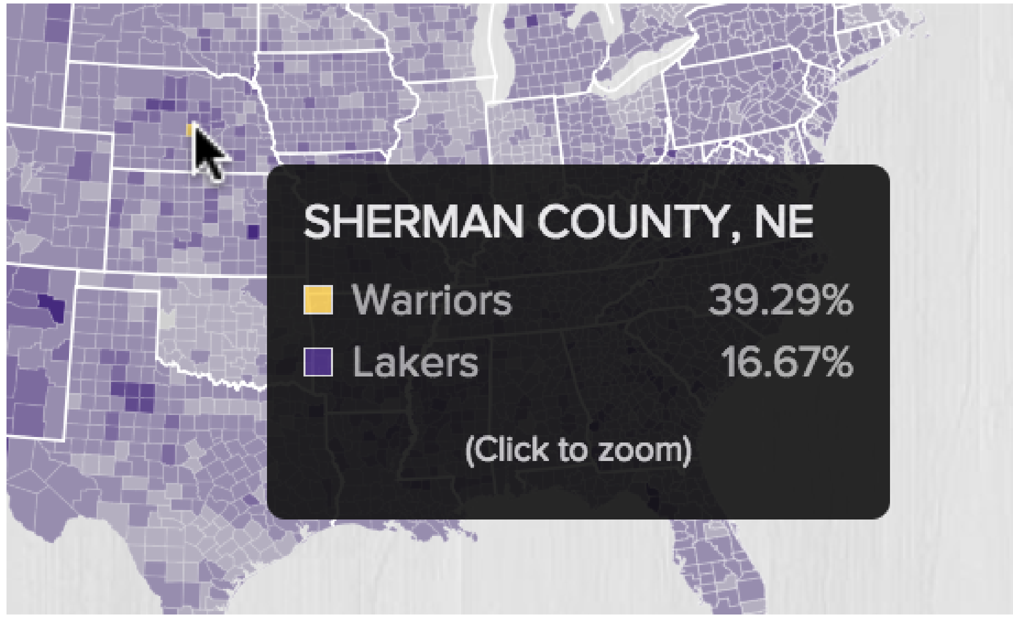
Computational Social Scientist

Why maps?


@warriors followers in each area 0% 50% or more
@Lakers followers in each area 0% 50% or more

- Geographical scope
  - Participants or observers?
- Differentiating tweets
  - For or against?

How Twitter gets location data



- Location is device-dependent
- In practice, aggregate geographical to county, state-level

Beware selection biases!

- *Warning*: only 1-3% of Twitter data have geographical data
- Limits the generalizability of inference

Types of geographical data available in Twitter

- Twitter text (most imprecise)
- User location
- Bounding boxes
- Coordinates and points (most precise)

Let's practice!

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Geographical data in Twitter JSON

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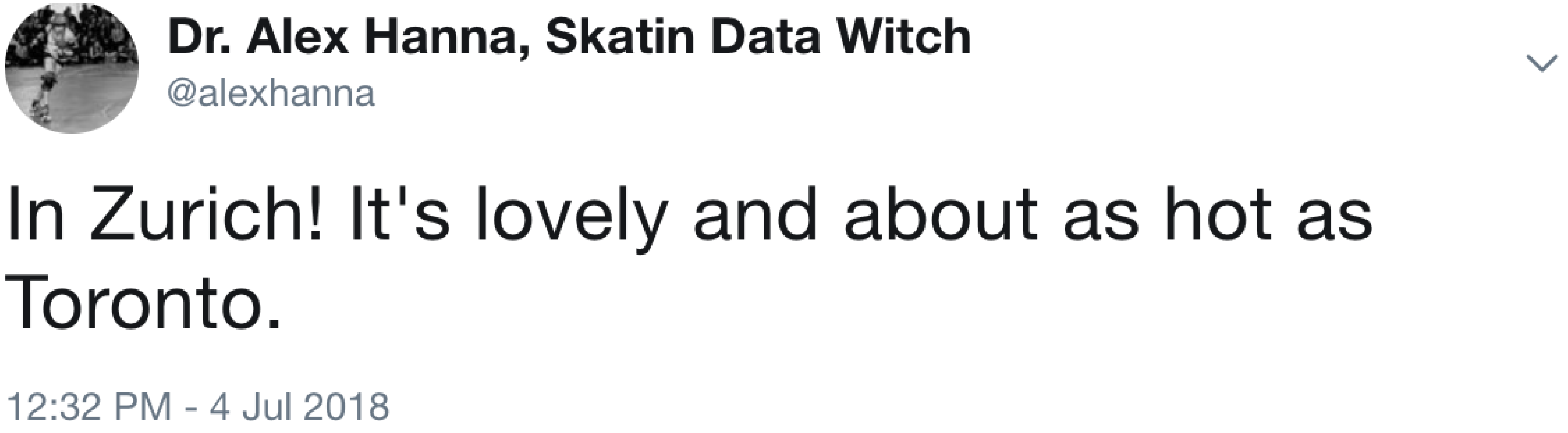
Locations in Twitter text

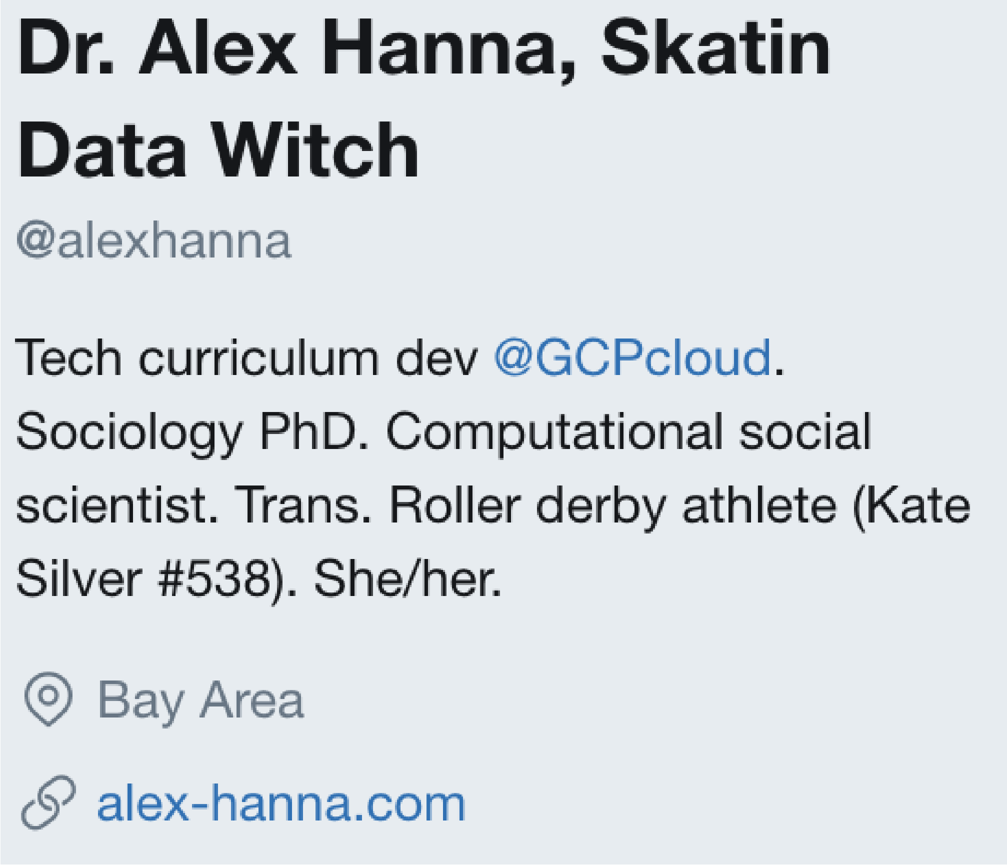


Dr. Alex Hanna, Skatin Data Witch
@alexhanna

In Zurich! It's lovely and about as hot as Toronto.

12:32 PM - 4 Jul 2018

User-defined location



Dr. Alex Hanna, Skatin Data Witch

@alexhanna

Tech curriculum dev @GCPcloud. Sociology PhD. Computational social scientist. Trans. Roller derby athlete (Kate Silver #538). She/her.

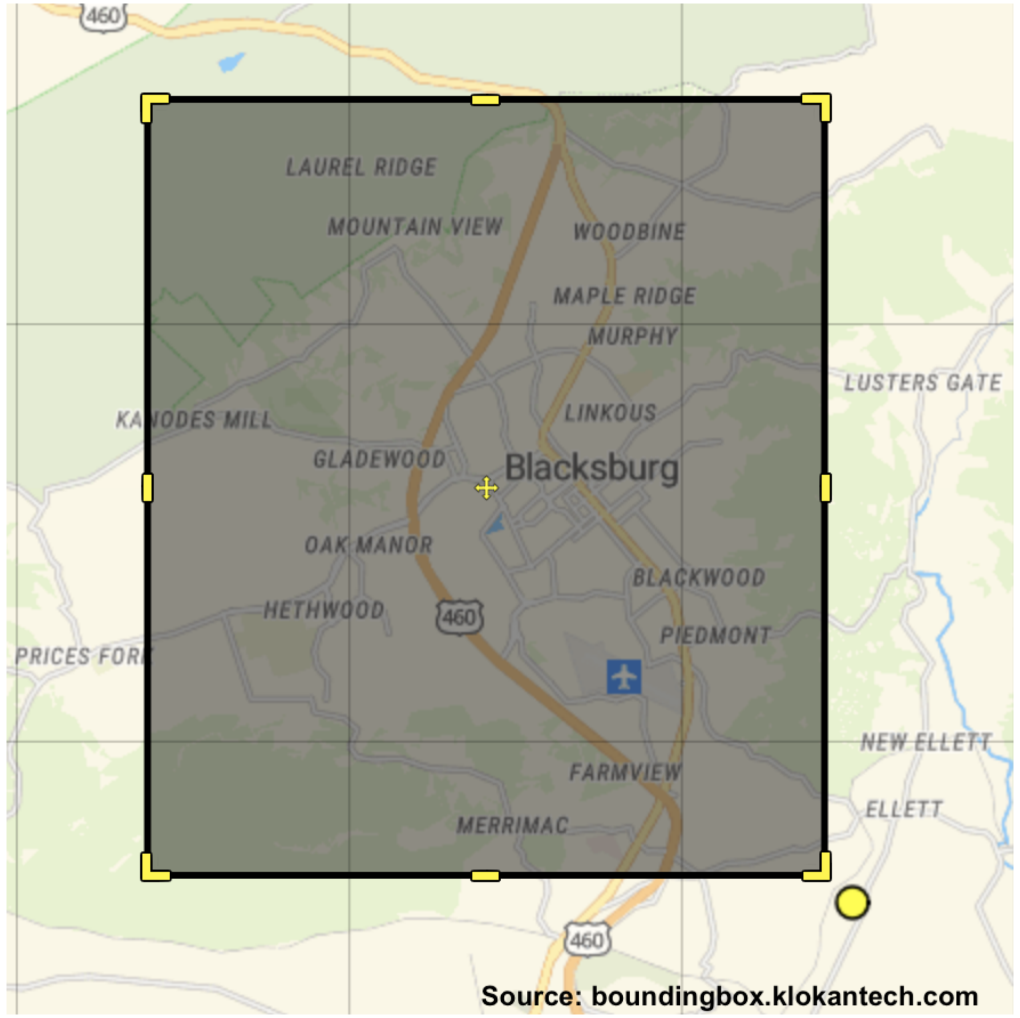
Bay Area

alex-hanna.com

```
print(tweet['user']['location'])
```

```
Bay Area
```

place JSON

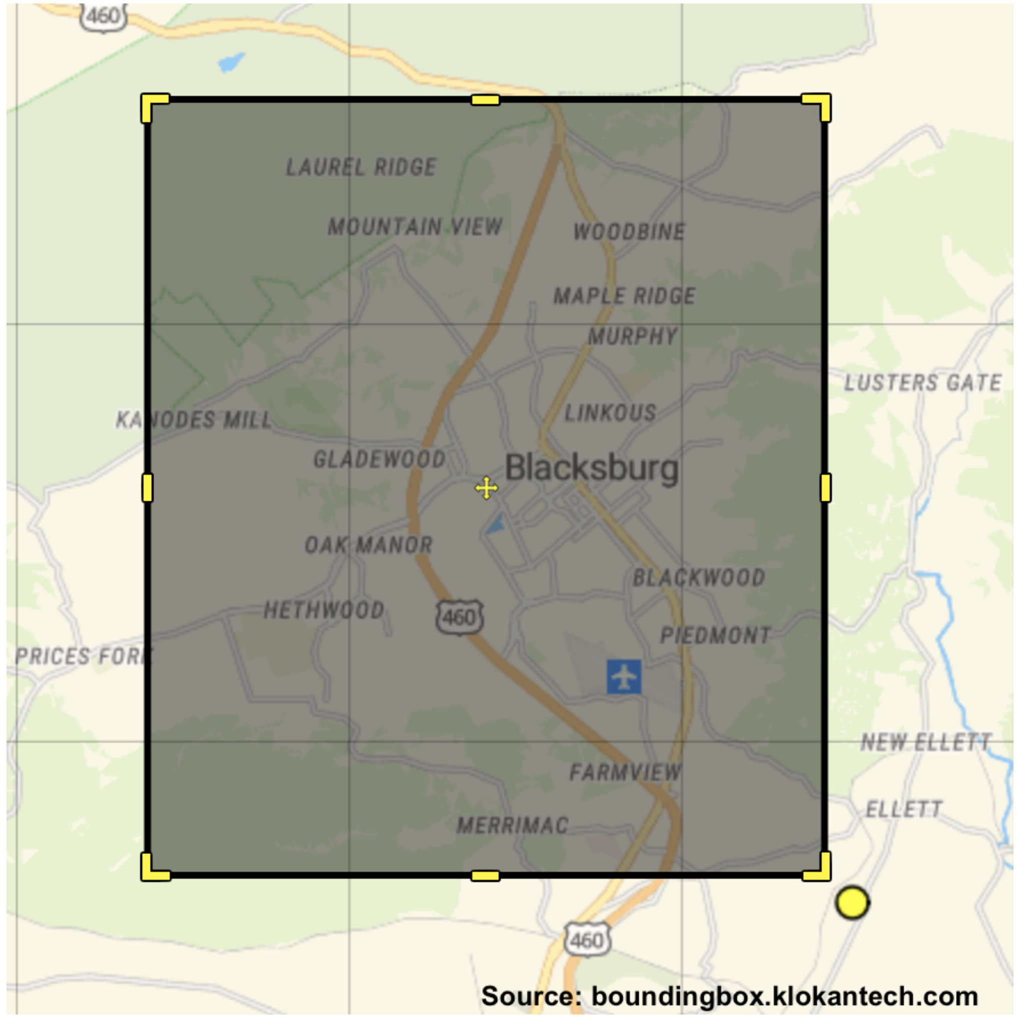


Source: boundingbox.klokantech.com

```python
print(tweet['place'])
```

```
{'attributes': {},
 'bounding_box': {'coordinates':
  [[[-80.47611, 37.185195],
    [-80.47611, 37.273387],
    [-80.381618, 37.273387],
    [-80.381618, 37.185195]]],
  'type': 'Polygon'},
 'country': 'United States',
 'country_code': 'US',
 'full_name': 'Blacksburg, VA',
 'name': 'Blacksburg',
 'place_type': 'city',
 ...}
```

Calculating the centroid



Source: boundingbox.klokantech.com

```
coordinates = [
    [-80.47611, 37.185195],
    [-80.47611, 37.273387],
    [-80.381618, 37.273387],
    [-80.381618, 37.185195]]

longs = np.unique( [x[0] for x
    in coordinates] )
lats  = np.unique( [x[1] for x
    in coordinates] )

central_long = np.sum(longs) / 2
central_lat  = np.sum(lats) / 2
```

coordinates JSON

Whitby
Parrot Cay
Pine Cay
North Caicos
Turks and Caicos Islands
Grace Bay
Ea
Google
Map data ©2018 Google
United States
Terms
Send feedback
10 mi

```
print(tweet['coordinates'])
```

```
{'type': 'Point',
'coordinates': [-72.2833,
                21.7833]}
```

Let's practice!

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Creating Twitter maps

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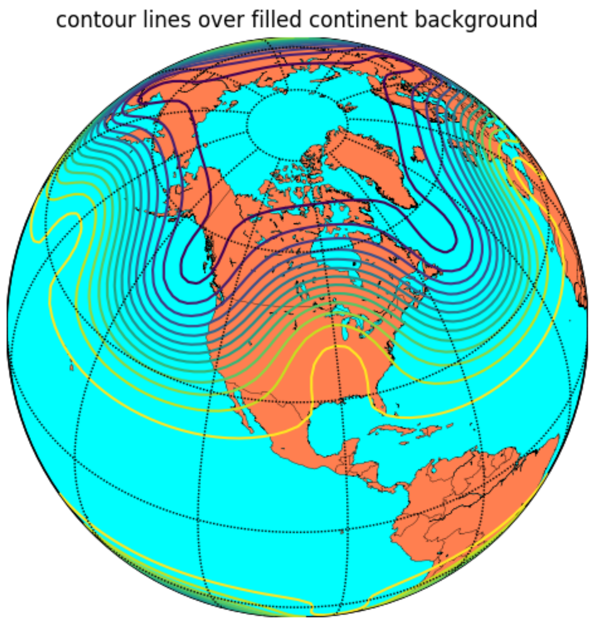
Introducing Basemap

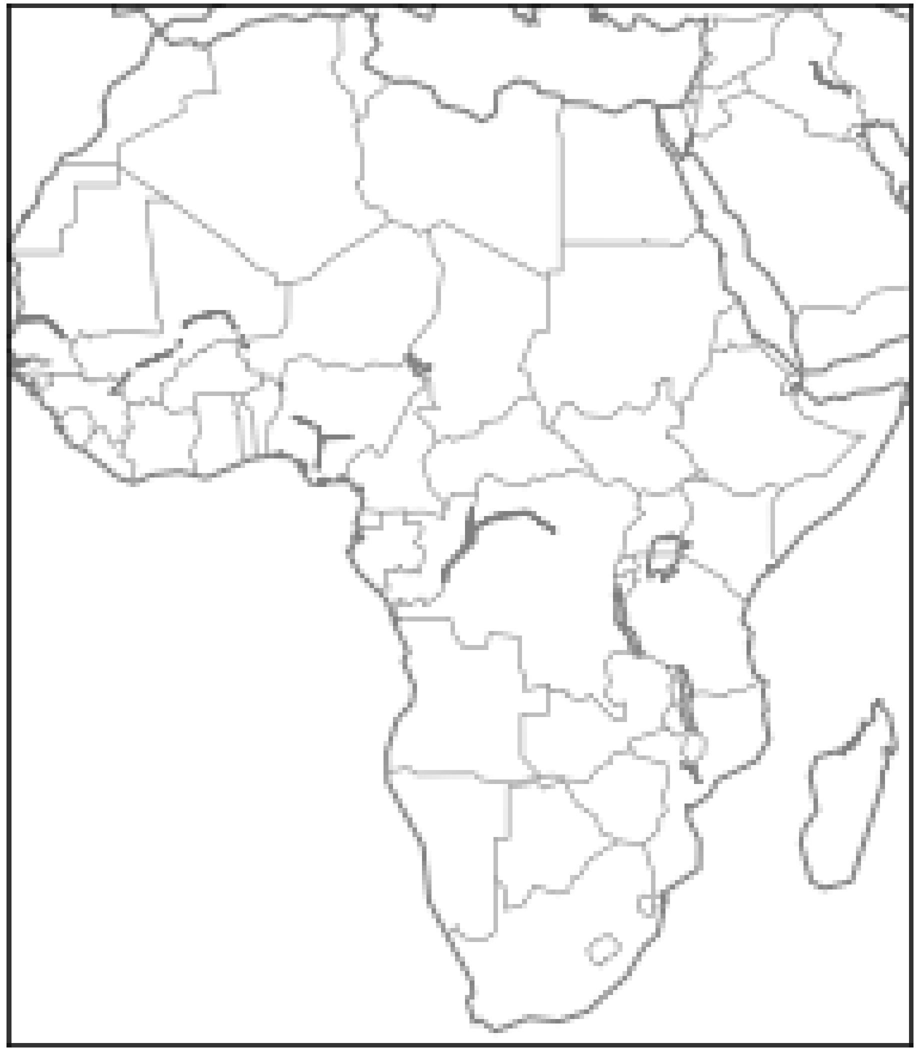


Source: https://matplotlib.org/basemap/users/examples.html

- Library for plotting two-dimensional maps
- Built on top of matplotlib
- Converts coordinates into map projections

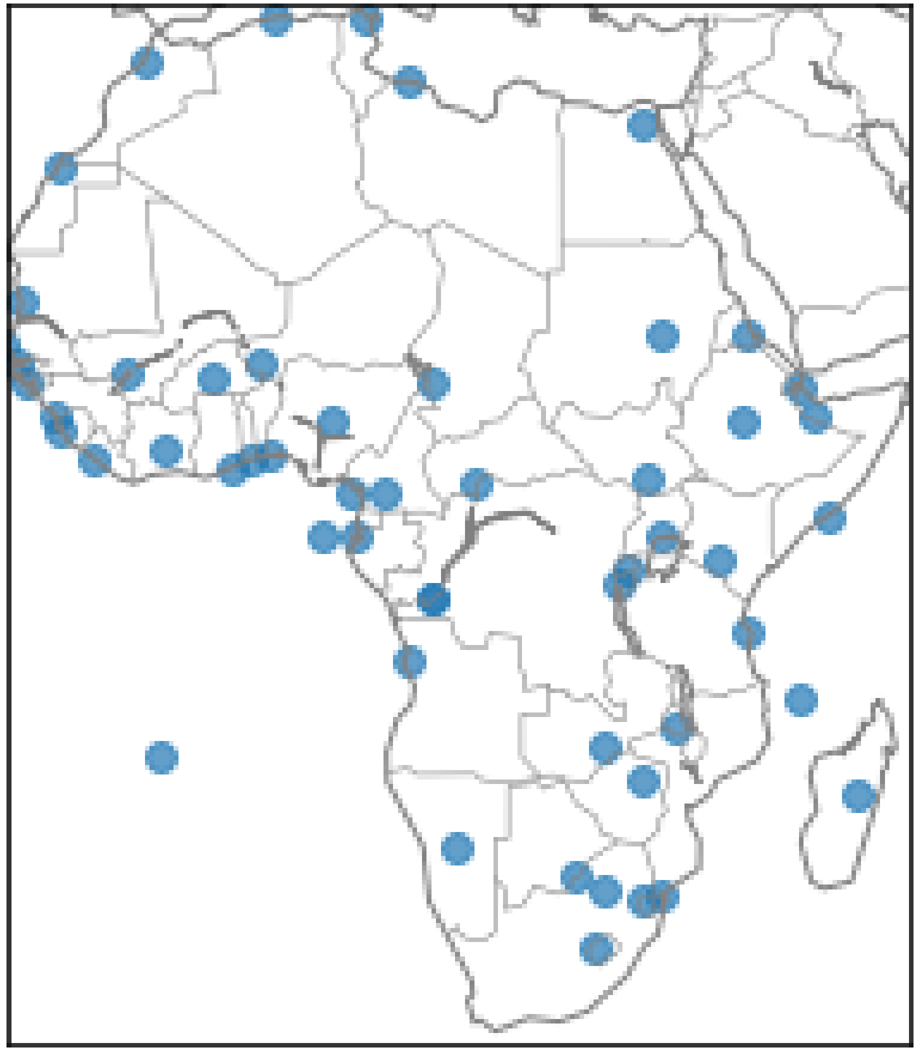
Beginning with Basemap

```
from mpl_toolkits.basemap
    import Basemap
m = Basemap(projection='merc',
            llcrnrlat = -35.62,
            llcrnrlon = -17.29,
            urcrnrlat = 37.73,
            urcrnrlon = 51.39)
m.fillcontinents(color='white')
m.drawcoastlines(color='gray')
m.drawcountries(color='gray')
```



Plotting points

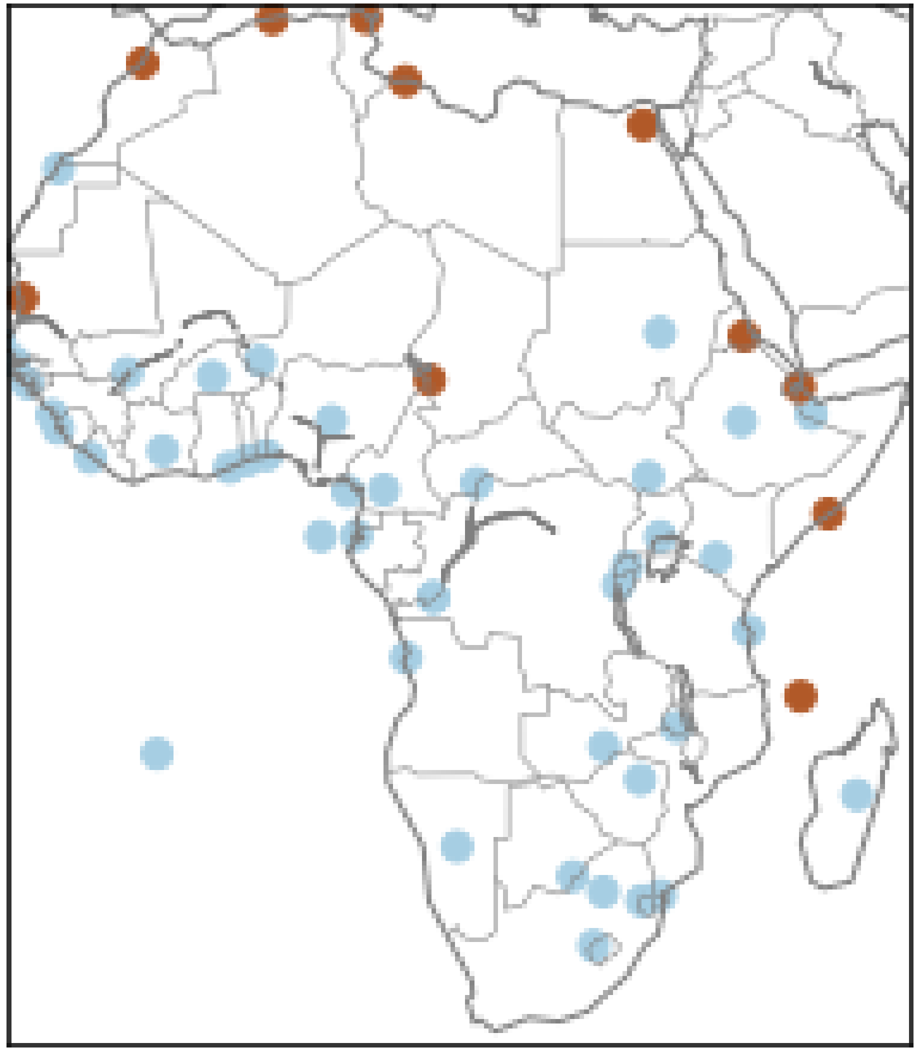
```
africa = pd.read_csv('africa.csv')
longs  = africa['CapitalLongtiude']
lats   = africa['CapitalLatitude']
m = Basemap(...)
m.fillcontinents(color='white',
    zorder = 0)
m.drawcoastlines(color='gray')
m.drawcountries(color='gray')
m.scatter(longs.values,
          lats.values,
          latlon = True,
          alpha = 0.7)
```



Using color

```
africa = pd.read_csv('africa.csv')
longs  = africa['CapitalLongtiude']
lats   = africa['CapitalLatitude']
arabic = africa['Arabic']

m = Basemap(...)
m.fillcontinents(color='white',
    zorder = 0)
m.drawcoastlines(color='gray')
m.drawcountries(color='gray')
m.scatter(longs.values,
          lats.values,
          latlon = True,
          c = arabic.values,
          cmap = 'Paired',
          alpha = 1)
```



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Congratulations!

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Next steps

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