




*April 2019*

## *Lesson #13*

# *Data driven maps using Folium*

- 
- Folium
  - Maps styles, markers, color and icon types
  - Marker clusters
  - Heatmap
  - Popups

# Update from repository

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```
git clone https://github.com/ivanovitchm/datascience_one_2019_1
```

Or ....

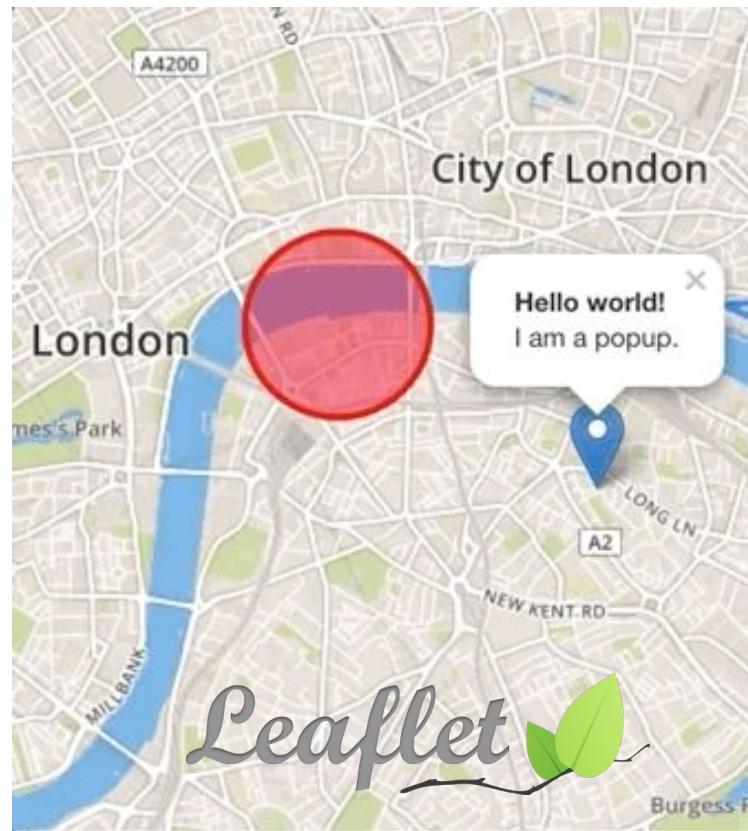
```
git pull
```





# Folium

Manipulate your data in Python, then visualize it in on a Leaflet map via Folium.







```
import folium  
m = folium.Map()  
m.save('index.html')  
m
```

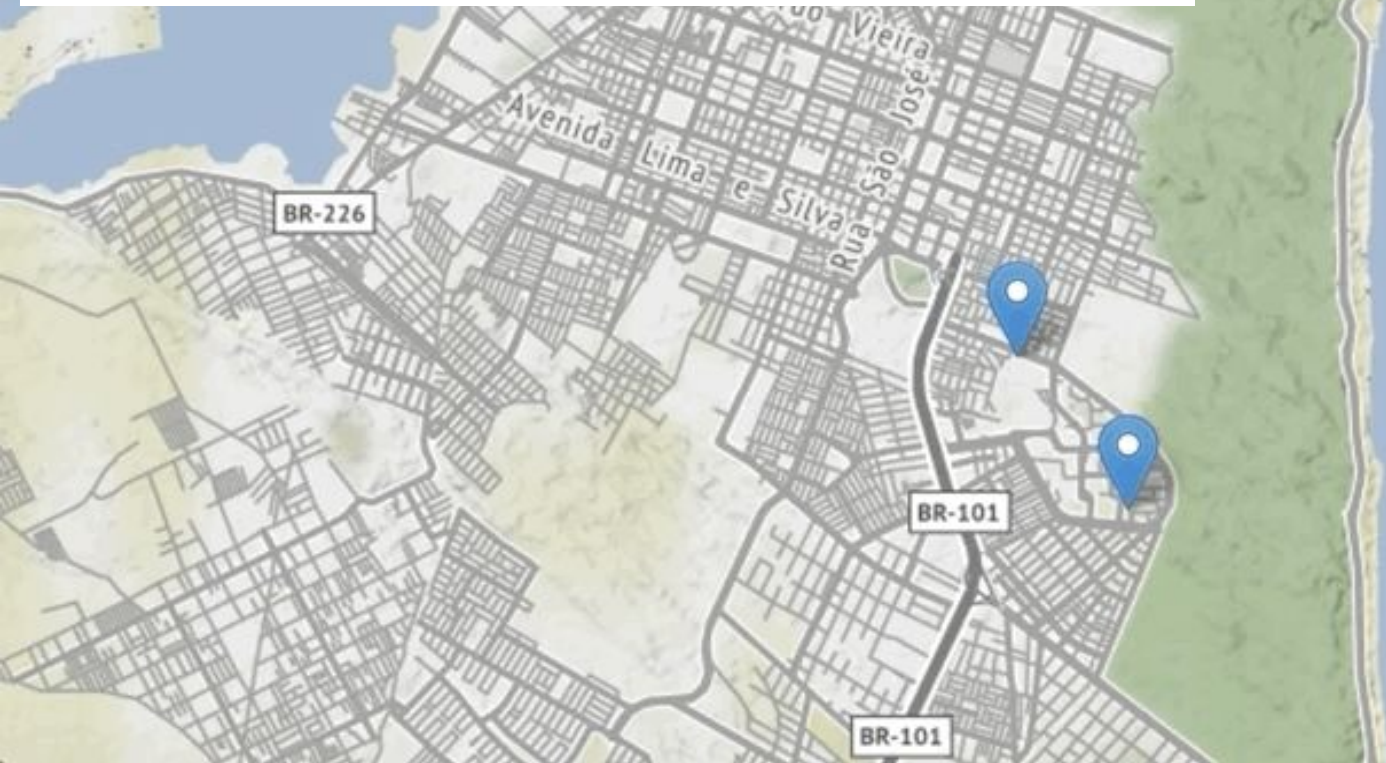


```
m = folium.Map(  
    location=[-15.765379, -47.968776],  
    zoom_start=4  
)
```



```
m = folium.Map(  
    location=[-15.765379, -47.968776],  
    tiles='Stamen Toner',  
    zoom_start=4  
)
```

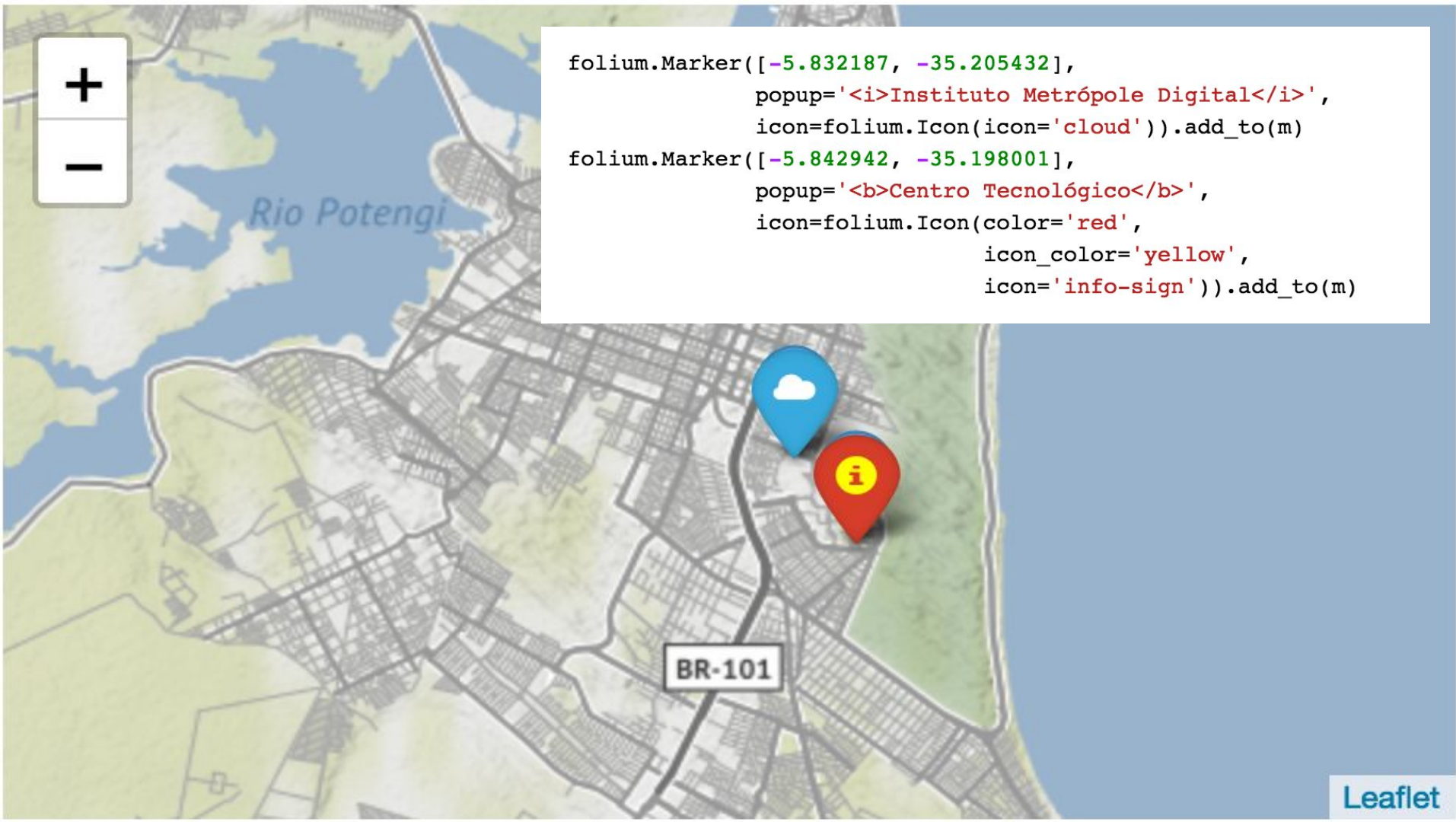
```
folium.Marker([-5.832187, -35.205432],  
              popup='<i>Instituto Metr pole Digital</i>',  
              tooltip="IMD").add_to(m)  
folium.Marker([-5.842942, -35.198001],  
              popup='<b>Centro Tecnol gico</b>',  
              tooltip="CT").add_to(m)
```



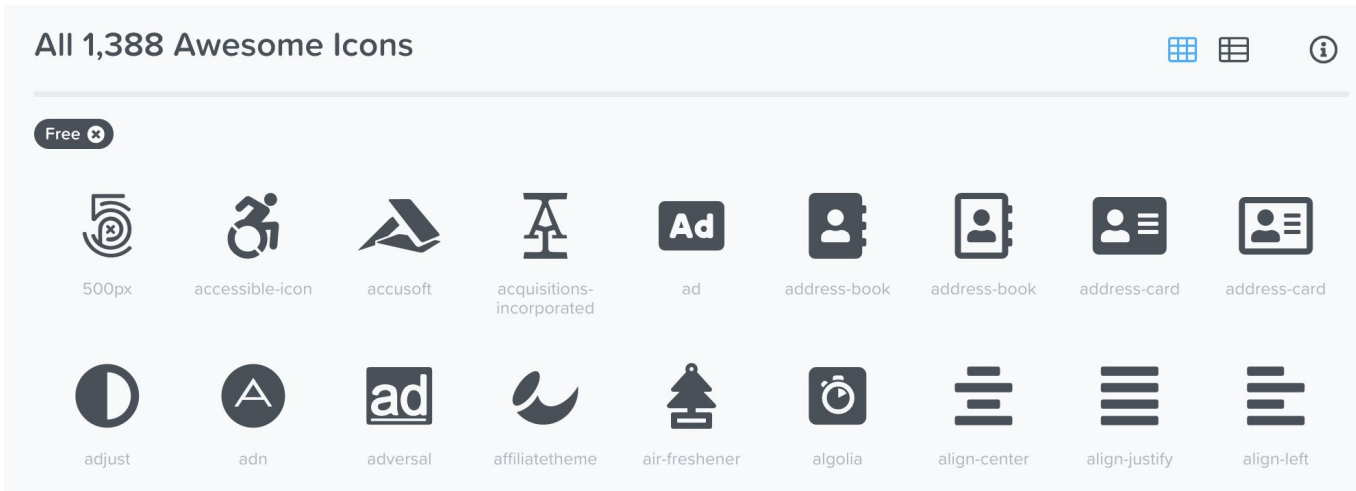




```
folium.Marker([-5.832187, -35.205432],  
              popup='<i>Instituto Metr pole Digital</i>',  
              icon=folium.Icon(icon='cloud')).add_to(m)  
folium.Marker([-5.842942, -35.198001],  
              popup='<b>Centro Tecnol gico</b>',  
              icon=folium.Icon(color='red',  
                               icon_color='yellow',  
                               icon='info-sign')).add_to(m)
```



# Customizing icons



<https://fontawesome.com/icons>

...

```
icon=folium.Icon(color='red',  
                 icon_color='yellow',  
                 icon='bicycle',  
                 prefix='fa')).add_to(m)
```



```
from folium.features import CustomIcon
iconimd = CustomIcon(
    'https://www.imd.ufrn.br/portal/assets/images/IMD_logo_01-01.svg',
    icon_size=(100, 100))
iconct = CustomIcon(
    'http://www.brentengenharia.ct.ufrn.br/images/partners/CT-UFRN_2.png',
    icon_size=(80, 80))
```

```
folium.Marker([-5.832187, -35.205432],
    popup='<i>Instituto Metrópole Digital</i>',
    tooltip="IMD",
    icon=iconimd).add_to(m)
folium.Marker([-5.842942, -35.198001],
    popup='<b>Centro Tecnológico</b>',
    tooltip="CT",
    icon=iconct).add_to(m)
```

```
from folium import plugins
plugins.BoatMarker(
    location=(-5.832187, -35.165432),
    heading=45,
    wind_heading=150,
    speed=0,
    wind_speed=45,
    color='#D9DDB9',
    popup="Banana Boat"
).add_to(m)

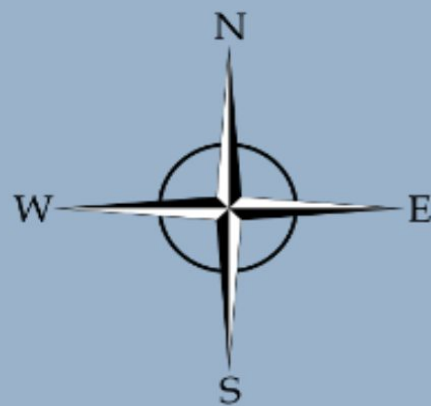
url = ('https://raw.githubusercontent.com/'
      'SECOORA/static_assets/master/maps/img/rose.png')

plugins.FloatImage(url, bottom=50, left=65).add_to(m)
```





```
from folium.plugins import MiniMap
# toggle_display - make the minimap collapsable
# position - change the minimap position
# width,height - minimap size
# tile_layer - change the tile layer
minimap = MiniMap(toggle_display=True,
                  position='bottomright',
                  width=180, height=180,
                  tile_layer='OpenStreetMap')
minimap.add_to(m)
```





# Make a cluster

```
plugins.MarkerCluster(data).add_to(m)
```

+

-

● stamenterrain

☒ Oeste

☒ Central

☒ Agreste

☒ Leste

2 Mossoró

RIO GRANDE  
DO NORTE

2

5

8 Natal

Juazeiro  
do Norte

Pico do Jabre  
1197m

Campina  
Grande

João Pessoa

Vitória  
de Santo  
Antônio

Recife

```
oeste_potiguar = ["Mossoró", "Areia Branca", "Pau dos Ferros", "Patu"]
central_potiguar = ["Currais Novos", "Acari", "Caico", "Cruzeta", "Equador"]
agreste_potiguar = ["Serra de São Bento", "Tangará", "Santa Cruz", "Sítio Novo"]
leste_potiguar = ["Natal", "Parnamirim", "Ceará-Mirim", "Baía Formosa"]

mesoregions = [oeste_potiguar,central_potiguar,agreste_potiguar,leste_potiguar]
```

```
# create a cluster
```

```
cluster = plugins.MarkerCluster(control=False).add_to(m)
```

```
# create intra-clusters
```

```
oeste = folium.plugins.FeatureGroupSubGroup(cluster, 'Oeste')
central = folium.plugins.FeatureGroupSubGroup(cluster, 'Central')
agreste = folium.plugins.FeatureGroupSubGroup(cluster, 'Agreste')
leste = folium.plugins.FeatureGroupSubGroup(cluster, 'Leste')
```

```
intra_clusters = [oeste,central,agreste,leste]
```

```
# add intra-cluster to map
```

```
m.add_child(oeste)
m.add_child(central)
m.add_child(agreste)
m.add_child(leste)
```





☒ stamenterrain

☒ Oeste

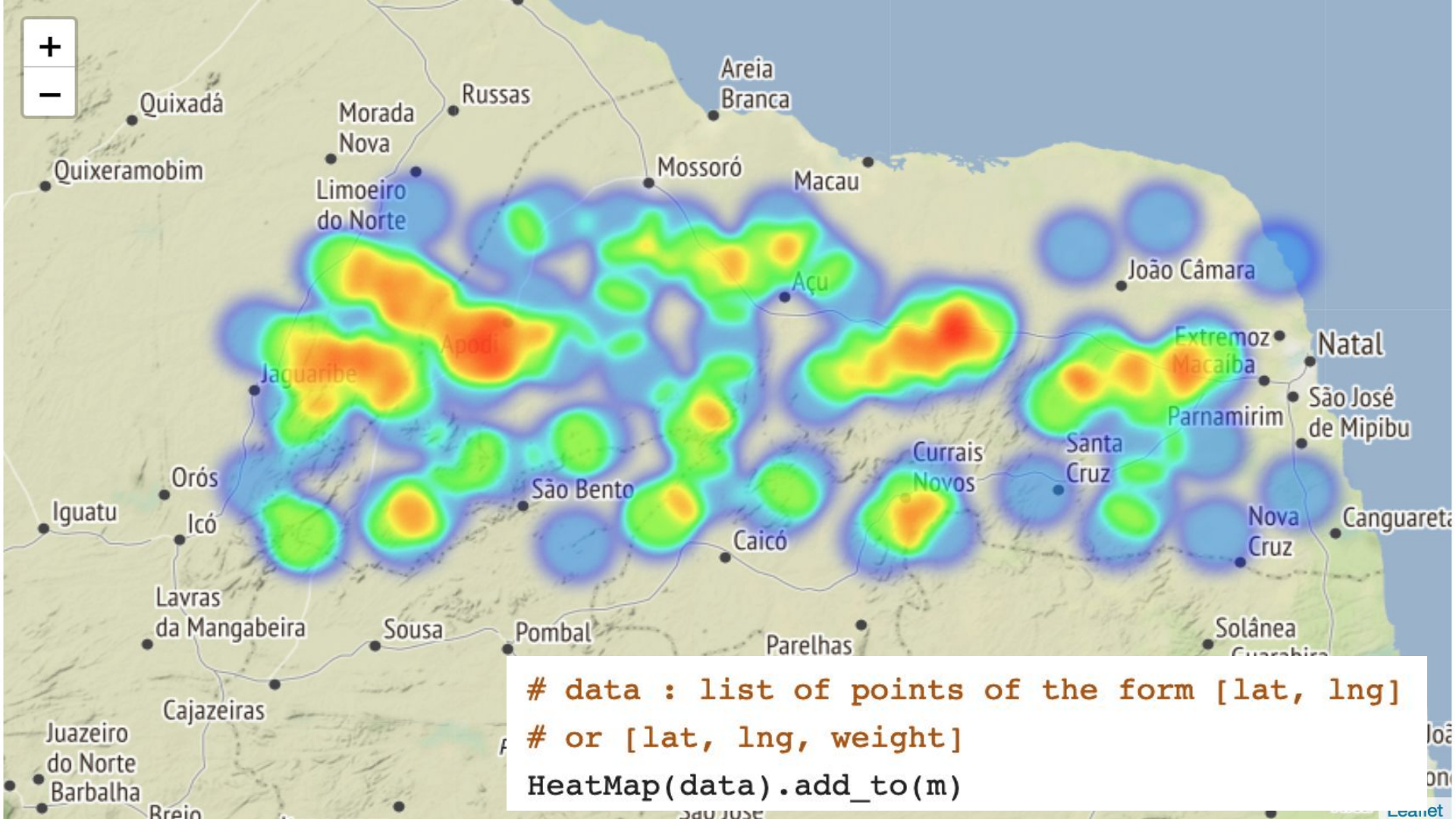
☒ Central

☒ Agreste

☒ Leste

```
index = 0
for mesoregion in mesoregions:
    for city in mesoregion:
        # discovery the latitude and longiture for city
        g = geocoder.arcgis(city + " RN")
        folium.Marker(g.latlng,popup=city,tooltip=city).add_to(intra_clusters[index])
        index += 1

folium.LayerControl(collapsed=False).add_to(m)
```





```
HeatMap(list(zip(lat,lng))).add_to(m)
```



Prefeitura Municipal do Natal

A nossa cidade

Rio Potengi

BR-226

BR-226

BR-226

BR-101

BR-101

RN-063



+

-

Rio Potengi

Natal

BR-101

Create popups

```
m.add_child(folium.LatLngPopup())
```



+

-

Extremoz

BR-406

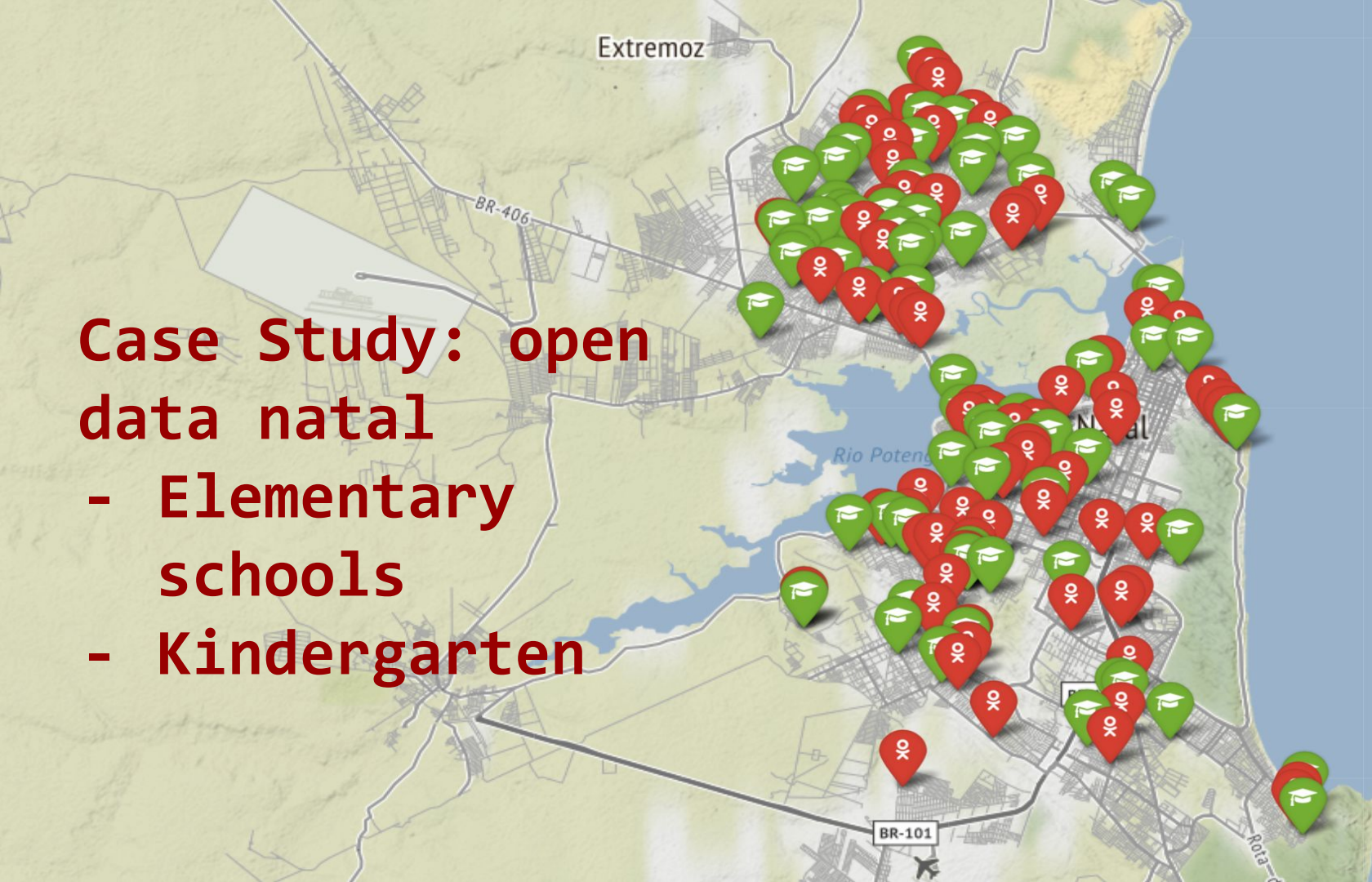
Rio Potengi

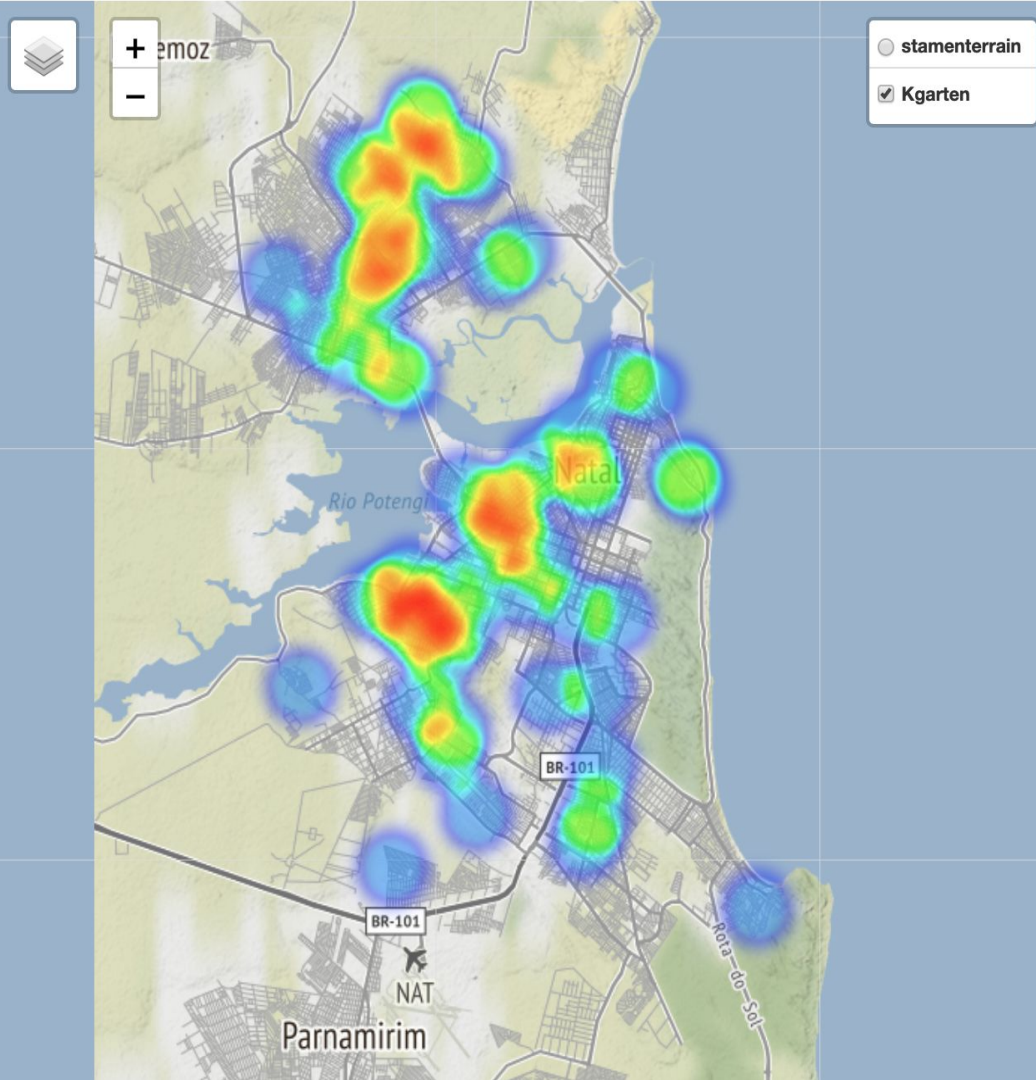
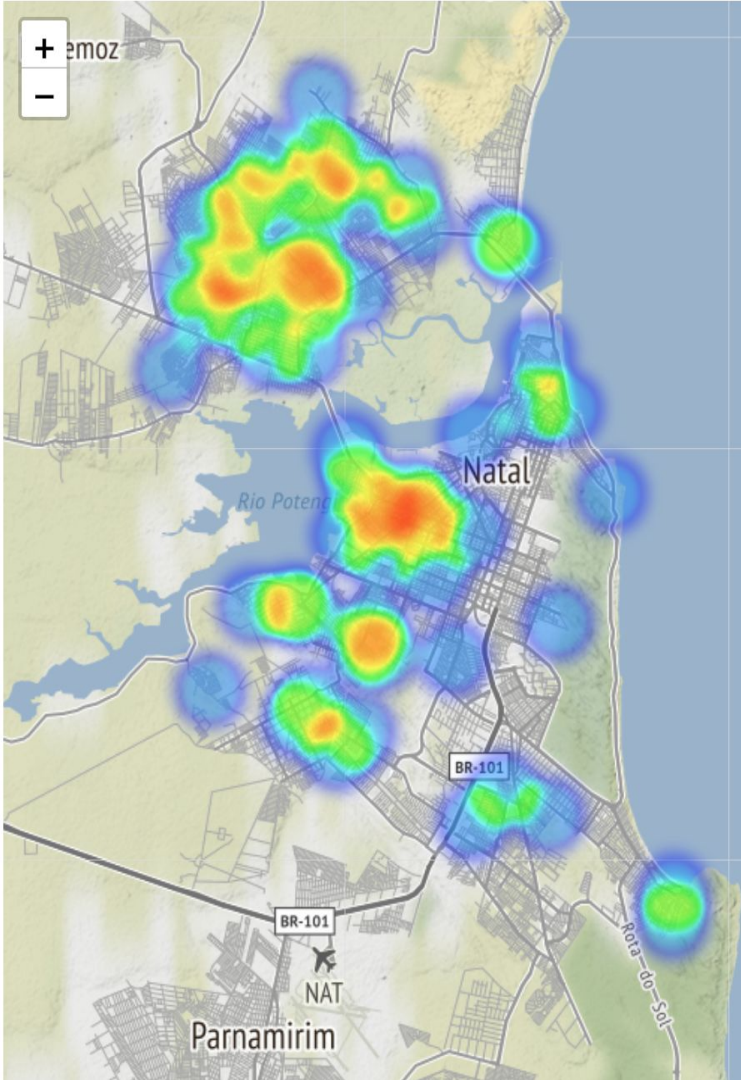
Natal

```
popup = folium.Popup(max_width=650)
folium.Vega(scatter_chart,
            height=350,
            width=650).add_to(popup)
```

# Case Study: open data natal

- Elementary schools
- Kindergarten







# Lesson #13 - Folium.ipynb

