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In [2]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import json
from math import radians, cos, sin, atan2, sqrt, log, pi
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In [3]: #read data
locs = pd.read_json("geoloclondon.txt",lines=True)
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In [4]: #initialize grid, radius, bottom left corner of london
grid = np.zeros((48,58))
radius = 6371
bottom_left_london = [-0.563, 51.281318]
lon_start = bottom_left_london[0]
lat_start = bottom_left_london[1]
#extract coordianates of each tweet
coordinates = []
for i,r in locs.iterrows():
    coordinates.append(list(r['coordinates'].values())[1])
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In [5]: locations = []
def distance(loc1, loc2):
    #convert longtitudes and latitudes to radians
    loc1[0],loc1[1],loc2[0], loc2[1] = map(radians, [loc1[0],loc1[1],loc2[0],loc2[1]])

    #calculate differences in longtitude and latitude between the given points
    dlat = loc2[1]-loc1[1]
    dlon = loc2[0]-loc1[0]

    #haversine distance formula
    a = sin(dlat / 2)**2 + cos(loc1[1])*cos(loc2[1])*sin(dlon / 2 )**2
    c = 2 * atan2(sqrt(a) , sqrt(1-a))
    return c*radius
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In [6]: #calculate tweets at each corresponding grid point
for c in coordinates:
    y_off = distance([lon_start,lat_start],[c[0],lat_start])
    x_off = distance([lon_start,lat_start],[lon_start,c[1]])
    grid[int(x_off)-1][int(y_off)-1] += 1

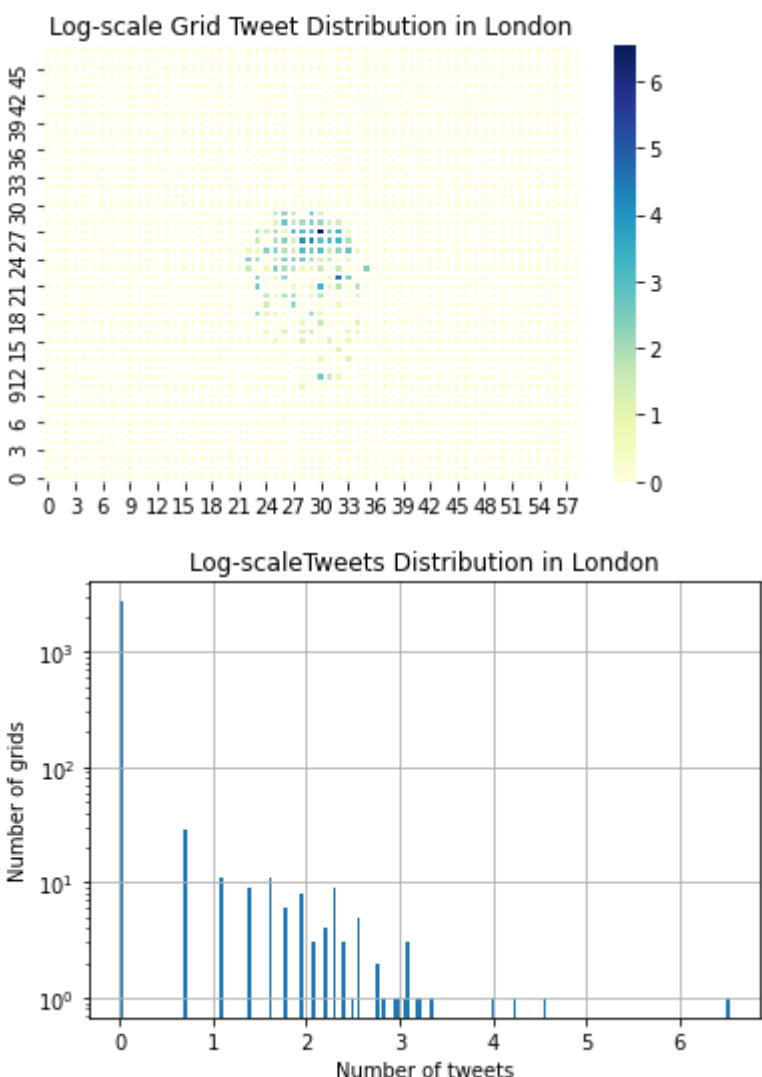
#normalize grid
x=[]
for i in range(48):
    for j in range(58):
        if grid[i][j] != 0:
            grid[i][j] = log(grid[i][j])
            x.append(grid[i][j])
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In [ ]:
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In [7]: import seaborn as sns

#heatmap
sns.heatmap(grid,cmap='YlGnBu', linewidth=0.05).invert_yaxis()
plt.title("Log-scale Grid Tweet Distribution in London", fontsize=12)
plt.show()

#histogram
plt.hist(x=grid.flatten().T, bins=200, log=True)
plt.title("Log-scaleTweets Distribution in London", fontsize=12)
plt.xlabel("Number of tweets")
plt.ylabel("Number of grids")
plt.grid()
plt.show()
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In [ ]: #!pip install folium
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In [8]: import numpy as np
from math import sin, cos, sqrt, atan2, radians, log
import matplotlib.pyplot as plt
import seaborn as sns
import json
import folium
from folium.plugins import HeatMap

m = folium.Map([51.281318,-0.563], tiles="OpenStreetMap", zoom_start=10)
HeatMap([[i[1],i[0]] for i in coordinates]).add_to(m)

#Grid
for lat in np.arange(-90, 91, 0.1):
    folium.PolyLine([[lat, -180], [lat, 180]], opacity=0.5).add_to(m)

for lon in np.arange(-180, 181, 0.1):
    folium.PolyLine([[lon, -90], [lon, 90]], opacity=0.5).add_to(m)
m.save("london_map.html")
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In [ ]:
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