

Capstone Project - The battle of Neighborhoods

1) INTRODUCTION

Uberlândia is a city located in the State of Minas Gerais, Brazil. It is the second largest city after state capital Belo Horizonte, with a population of 700.000 habitants. Uberlândia is an important logistic hub center between São Paulo and Brazil's capital, Brasília. Recently, the city has been classified by the International Congress and Convention Association (ICCA) as one of the brazilian cities that most host international events, staying in 9th position.

With a diverse gastronomy, international tourists seek in Uberlândia good places to eat brazilian food. The goal of this project is the following:

- 1- Locate good restaurants for the tourists to enjoy Uberlândia food.
- 2- Find neighborhoods that lack restaurants.
- 3- Find potential neighborhoods to open a restaurant dedicated to international tourists.



2) DATA DESCRIPTION

Our data consists of a table containing Uberlândia restaurants with their location, likes, ratings, and names. This data was gathered using Foursquare API. Due to the API calls restriction, I've already saved the data in my personal folder. This data will also be available in my github account.

3) METHODOLOGY

For our analysis, we'll load Uberlandia restaurants from a table created with Foursquare API. After that, we'll employ folium library to plot Uberlandia map with restaurant locations. Then, based on visual inspection, we'll select places lacking restaurants as well as potential neighborhoods to open restaurants for tourists. For restaurants recommendation, we'll plot the top ten restaurants based on their rating.

Let's start by loading our python modules:

```
In [14]: import numpy as np
import pandas as pd
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
import json
from geopy.geocoders import Nominatim
import requests
from pandas.io.json import json_normalize
import matplotlib.cm as cm
import matplotlib.colors as colors
from sklearn.cluster import KMeans
import folium # map rendering library
import wikipedia as wp
import pgeocode
import geopandas as gpd
import matplotlib.pyplot as plt
```

Let's import our data to a dataframe called "udi" (shortname for uberlândia)

```
In [8]: udi = pd.read_csv('udi_restaurants.csv')
udi
```

0	Lídice	-18.924568	-48.275133	-18.920301	-48.275595	4cea7d8f948f224b57bdf1
1	Lídice	-18.924568	-48.275133	-18.922842	-48.279211	51b35470498e23845ff06f
2	Lídice	-18.924568	-48.275133	-18.920671	-48.274575	4e0f5b85483bc2b5f48b09
3	Lídice	-18.924568	-48.275133	-18.920484	-48.275485	4dfcde15b0fb84d7ace1a9
4	Lídice	-18.924568	-48.275133	-18.922532	-48.278934	59e80c7b872f7d28f03e6f
5	Lídice	-18.924568	-48.275133	-18.921402	-48.278179	4c2620fbf1272d7f93ec88
6	Lídice	-18.924568	-48.275133	-18.928332	-48.276450	4c8c2faad5049c7465e54d
7	Lídice	-18.924568	-48.275133	-18.921854	-48.278944	502240d4400e22b450d0

Let's visualize Uberlândia restaurant neighborhoods!

```

In [6]: latitude = udi['Neighborhood Latitude'].iloc[0]
longitude= udi['Neighborhood Longitude'].iloc[0]

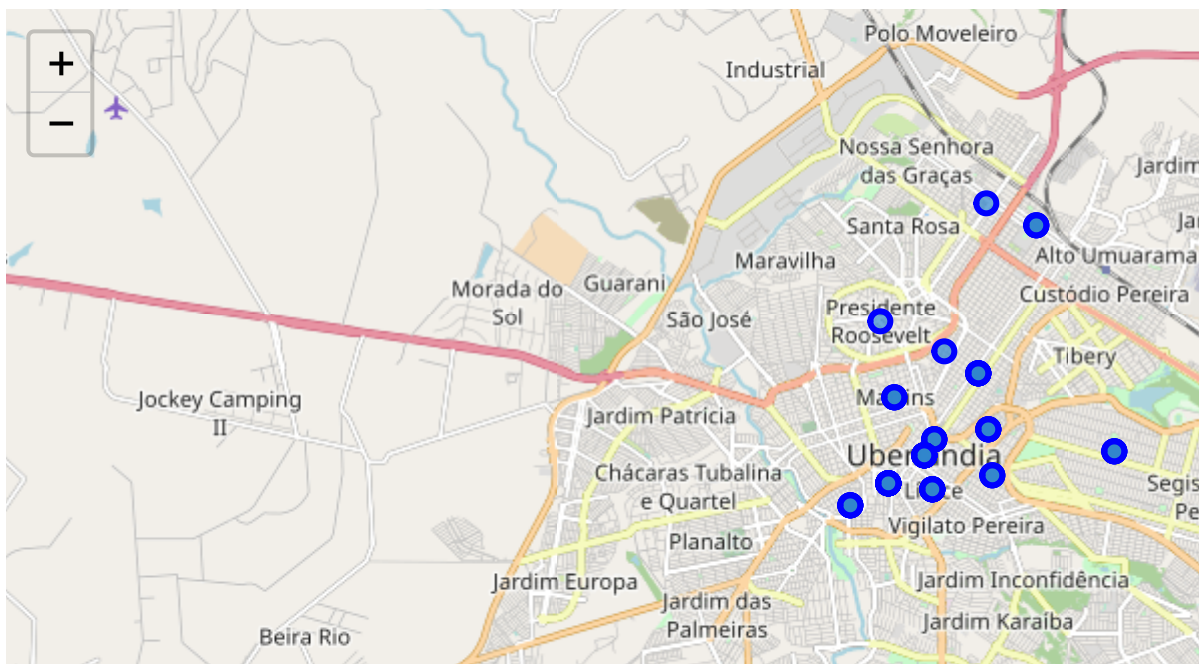
map_udi = folium.Map(location=[latitude, longitude], zoom_start=12)

# add markers to map
for lat, lng, neighborhood in zip(udi['Neighborhood Latitude'], udi['Neighborhood Longitude'], udi['Neighborhood Name']):
    label = '{}'.format(neighborhood)
    popup = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=5,
        popup=popup,
        color='blue',
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7,
        parse_html=False).add_to(map_udi)

map_udi

```

Out[6]:



We can see that the majority of the restaurants neighborhoods listed in Foursquare are located downtown. In this case, there is a lack of restaurants outside this region, which could be a potential place for opening new restaurants.

Now, let's visualize Uberlândia restaurants on the map.

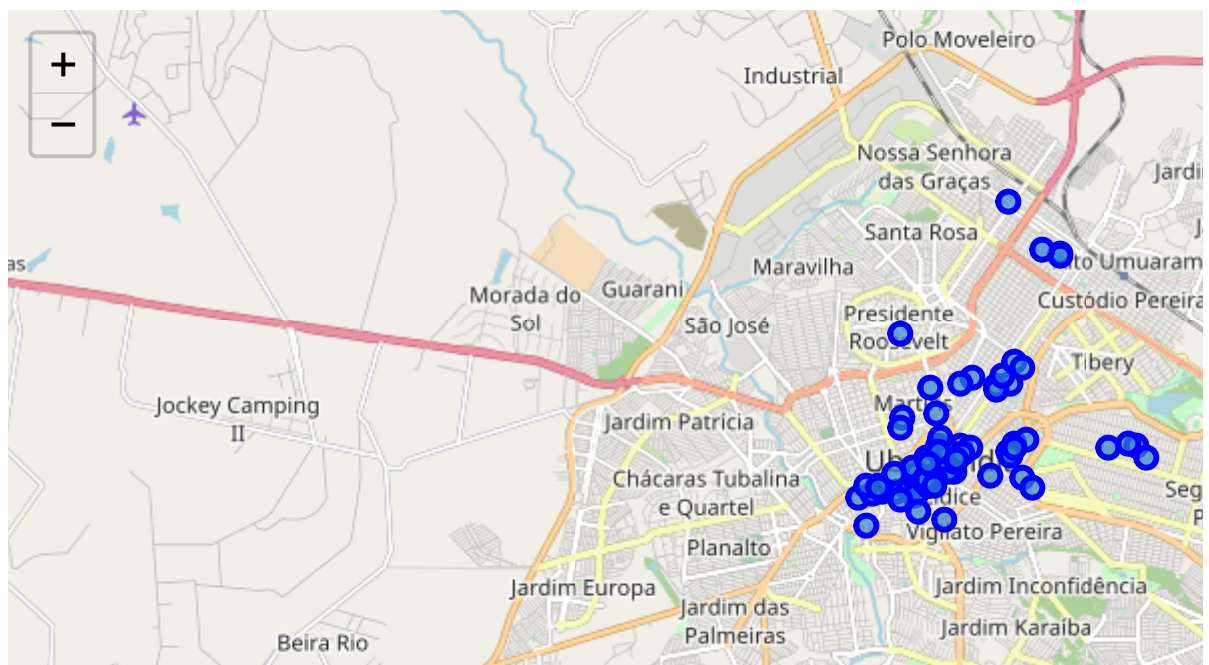
```
In [32]: latitude = udi['Venue Latitude'].iloc[0]
longitude= udi['Venue Longitude'].iloc[0]

map_udi_rest = folium.Map(location=[latitude, longitude], zoom_start=12)

# add markers to map
for lat, lng, neighborhood in zip(udi['Venue Latitude'], udi['Venue Longitude'],
    label = '{}'.format(neighborhood)
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=5,
        popup=label,
        color='blue',
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7,
        parse_html=False).add_to(map_udi_rest)

map_udi_rest
```

Out[32]:



What are the top ten restaurants? Let's use the "Rating" column to find out.

```
In [16]: top_ten = udi.sort_values('Rating', ascending=False).head(10)
top_ten
```

Out[16]:

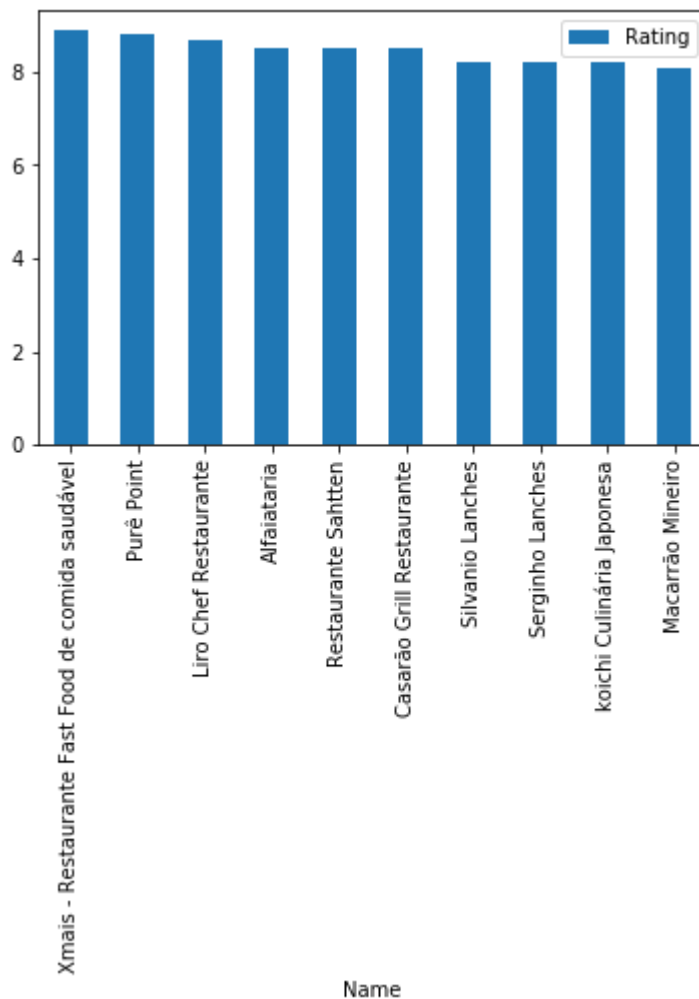
	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue Latitude	Venue Longitude	Venue Id
26	Fundinho	-18.923440	-48.282926	-18.919766	-48.281662	4bf2f45398ac0f47b15562a8
9	Cazeca	-18.914683	-48.265700	-18.915416	-48.262315	50f0bcb4e4b0e0c9cecd4e61
34	Tabajaras	-18.926933	-48.289255	-18.924915	-48.290987	4bb3afdd2397b713bc7a38b3
19	Fundinho	-18.923440	-48.282926	-18.924519	-48.281310	541cb7b0498e537b4054187e
24	Fundinho	-18.923440	-48.282926	-18.920847	-48.281236	4bb3ad0b2397b713d07638b3
18	Fundinho	-18.923440	-48.282926	-18.923738	-48.284706	4d594d5656f2b60ca99d772f
39	Martins	-18.909576	-48.281718	-18.906836	-48.278679	4cc0b395668db60c032b0fb4
35	Tabajaras	-18.926933	-48.289255	-18.924099	-48.288580	4bd4bc686798ef3b454c628d
20	Fundinho	-18.923440	-48.282926	-18.923634	-48.282185	54ab1318498eeb0561e0ea02
63	Santa Mônica	-18.918288	-48.243888	-18.916429	-48.243413	50c51c35e4b09f38ade2bf31

From top ten restaurants, two don't serve brazilian food (even though the last restaurant is categorized as Italian Restaurant, it serves Brazilian pasta) . However we'll leave them anyway for analysis (maybe some tourists would enjoy eating their home country food). Moreover, from top ten data we can visualize the preference of uberlandenses (people from Uberlândia) for brazilian fast food.

Let's make a bar plot showing the top ten rating:

In [20]:

```
ax = top_ten.plot.bar(x='Name', y='Rating', rot=90)
```



We can observe that these restaurants are all above rating 8, **so we can recommend them to the tourists!**

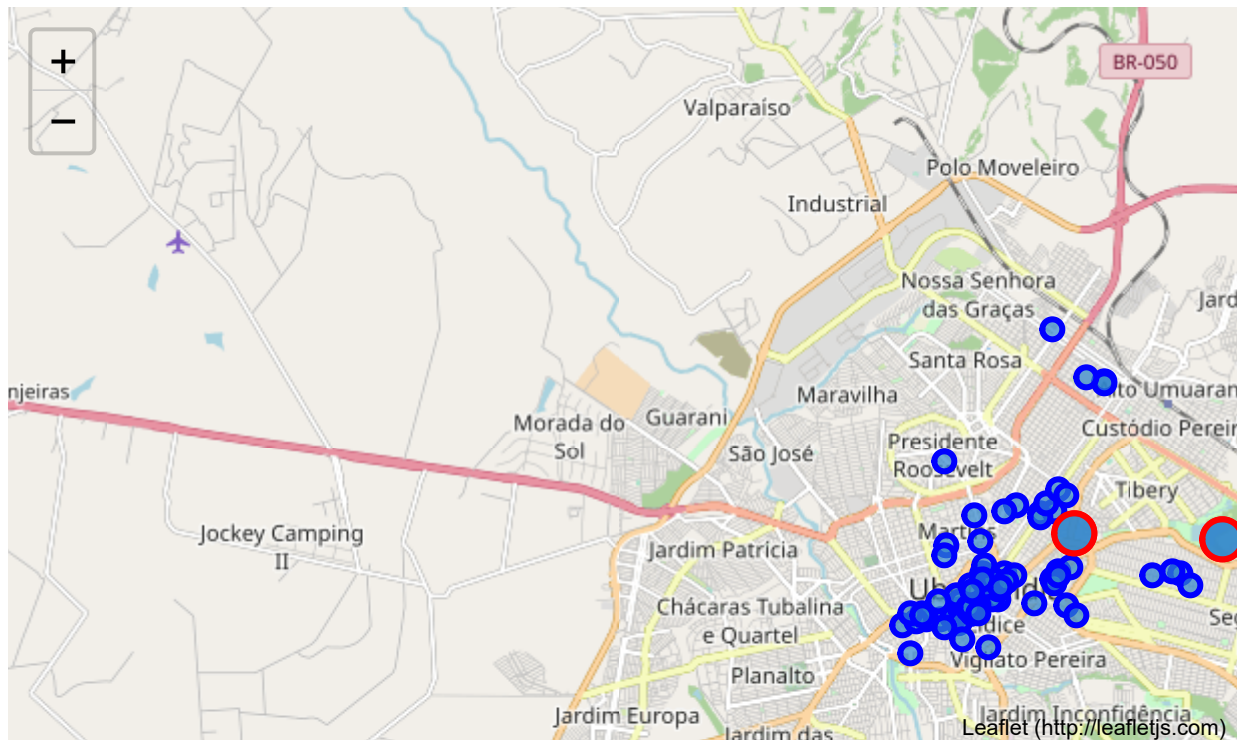
In Uberlândia, most of the international events happen at two locations: Center Convention and Parque do Sabia. Let's plot their location (**red circles**) along with the restaurants to find out what are the nearby restaurants at each event location.

```
In [35]: center_sabia_lat = [-18.909760, -18.910911]
center_sabia_lon = [-48.261436, -48.236139]
names = ['Convention', 'Sabia']
locs = zip(center_sabia_lat, center_sabia_lon, names)

for lat, lng, neighborhood in locs :
    label = '{}'.format(neighborhood)
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=10,
        popup=label,
        color='red',
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7,
        parse_html=False).add_to(map_udi_rest)

map_udi_rest
```

Out[35]:



Looking the map we can definitely see that only four restaurants are **nearby Parque do Sabia**. In this case, the neighborhoods around this place represents a **good option** for opening new restaurants for international tourists. As for the Center Convention, there are already tons of restaurants that might serve our tourists.

4) Conclusions

Our analysis in this notebook leads to the following conclusions:

1. Good restaurants for tourists: We've selected the top ten restaurants for the tourists to enjoy some of Uberlândia food based on rating. The top ten have a rating above 8, which makes them well evaluated.

2. Find neighborhood that lack restaurants: From the data plotted on the maps, we conclude that the majority of restaurants are found in downtown, hence other neighborhoods might benefit from opening a new restaurant.

3. Find neighborhoods to open new restaurants for international tourists: We plotted on the map the main location of international events. It was found that we don't have too many restaurants nearby Parque do Sabia, making this region suitable to open a restaurant for tourists.

I hope you guys have enjoyed this analysis. Thanks!

In []: