# Capstone Project

## Finding a Better Place in Marrakech

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# INTRODUCTION/ BUSINESS PROBLEM

**Marrakech** has **928,850** inhabitants according to the **2014** census, spread over an area of **230** km. The population density reaches **350** inhabitants per hectare in the Medina. It is the third largest city in Morocco after Casablanca and Rabat.

**Target :**

The major purpose of this project, is to suggest a better neighborhood in ***marrakech*** city for tourists who are shifting there. Social presence in society in terms of like minded people. Connectivity to the airport, bus stand, city center, markets and other daily needs things nearby.

**Purpose:**

The purpose of this Project is to help tourists to get awareness of the area and neighborhood in this city before traveling to it, also in exploring better facilities around the neighborhood they want to stay at. It will help people making smart and efficient decision on selecting great neighborhood out of numbers of other neighborhoods in Marrakech city.

# DATA DESCRIPTION

**Required information will be extracted and generated as data sources by:**

## "Dataset"

We will use Will use *List of Postal Codes from* ***POSTE MAROC***. Dataset consisting of City, Neighborhood, Postal code.

## "Foursquare API Data"

-After finding the list of neighborhoods, we then connect to the Foursquare API to gather information about venues inside each and every neighborhood. For each neighborhood, we have chosen the radius to be *700* meter.

-The data retrieved from Foursquare contained information of venues within a specified distance of the longitude and latitude of the postcodes.

## "Data Collection Libraries"

Geocoder: To retrieve Location Data.

Beautiful Soup and Requests: To scrap and library to handle ***http*** requests.

# Methodology Section

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**4**

Most Common Venues near Neighborhood - Using Clustering

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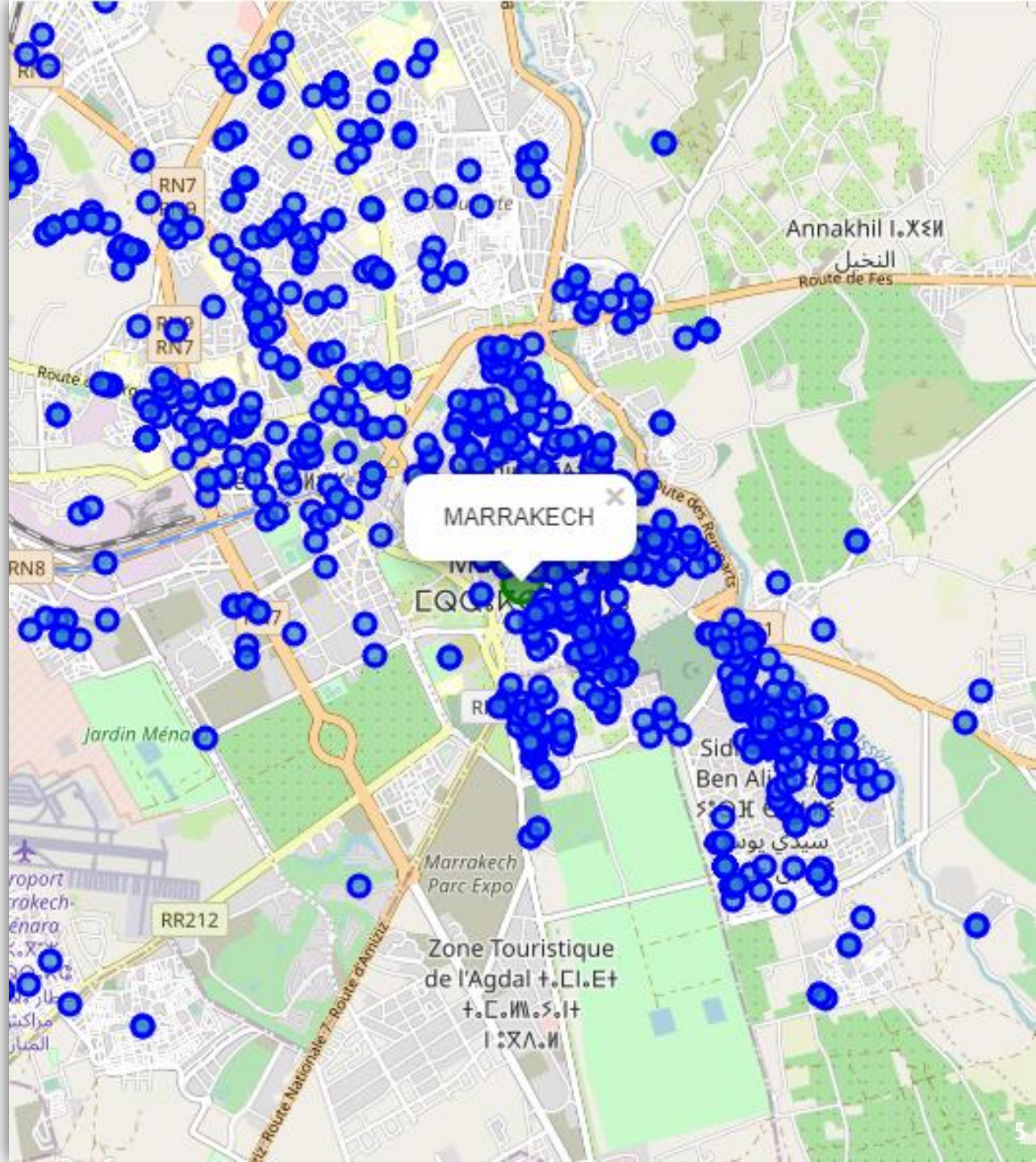
Work Flow

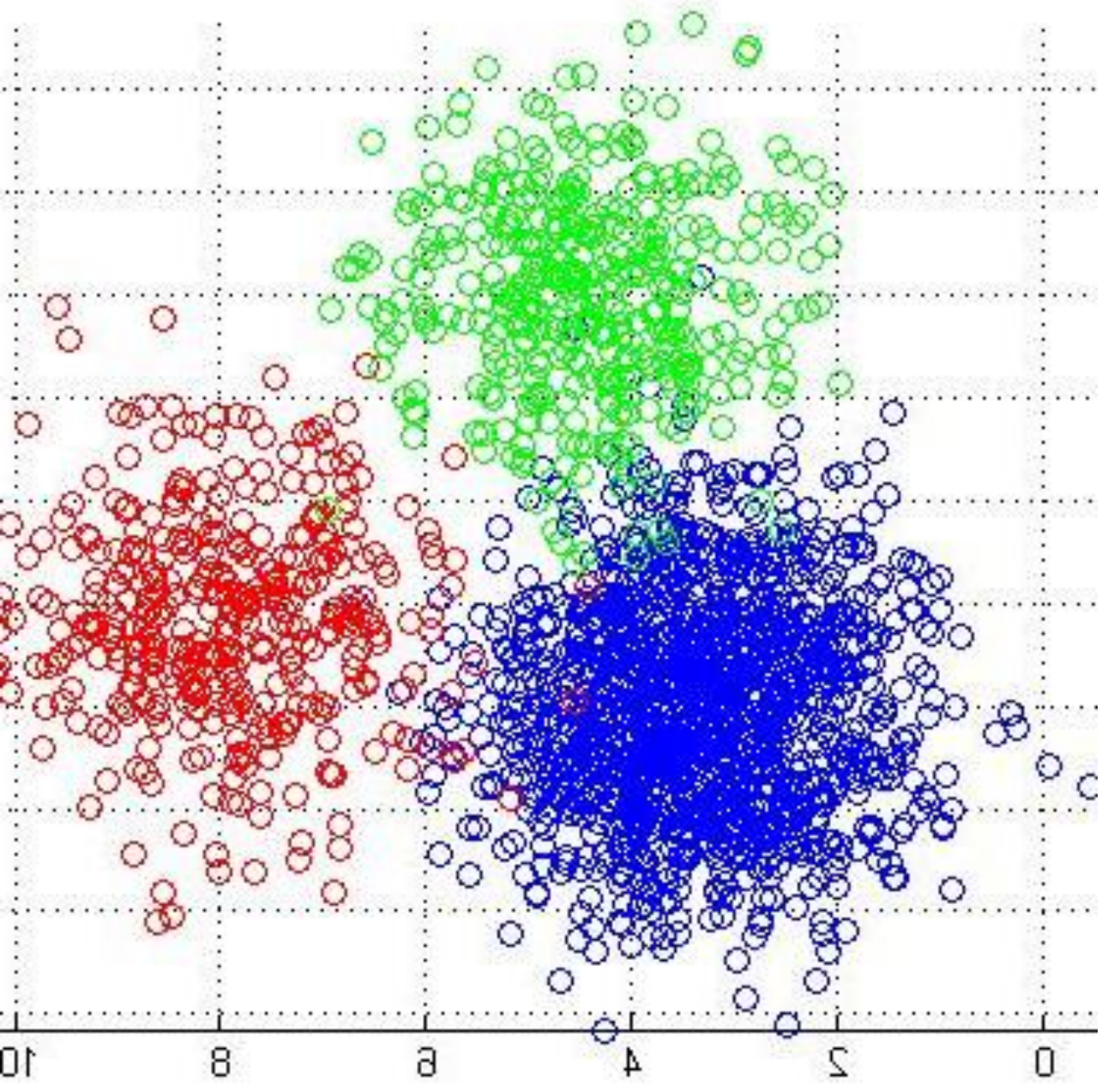
# 1

## Initial Map

## Map of Marrakech

With different Latitude and Longitude






# 2

## Clustering Approach

## Finding similar neighborhoods in a big city like Marrakech

We explore neighborhoods, segment them, and group them into clusters to find similar neighborhoods in a big city like Marrakech. To be able to do that, we need to cluster data which is a form of unsupervised machine learning: k-means clustering algorithm.

# 3

# Using K-Means Clustering Approach - *Most Common Venue*

Entrée [87]:
```
locations_venues_sorted.insert(0, 'Cluster_Labels', kmeans.labels_)

Marrakech_merged =marrakech.iloc[:16,:]

# merge Marrakech_grouped with Marrakech_data to add latitude/longitude for each location
Marrakech_merged = Marrakech_merged.join(locations_venues_sorted.set_index('Neighborhood'), on='Neighborhood')
```

Entrée [88]:
```
Marrakech_merged.head()# check the last columns!
```

Out[88]:

| Latitude | Longitude | Neighborhood | Cluster_Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4the Most Common Venue | 5the Most Common Venue | 6the Most Common Venue | 7the Most Common Venue | 8the Most Common Venue | 9the Most Common Venue | 10the Most Common Venue |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31.514265 | -9.769298 | COMPLEXE YOUSSEF BEN TACHFINE, RESIDENCE YOUSS... | 1.0 | Hotel | Restaurant | Café | Bed & Breakfast | Moroccan Restaurant | Coffee Shop | Beach | Breakfast Spot | Roof Deck | Diner |
| 31.595138 | -7.963173 | QUARTIER TARIQ IBNOU ZIAD | NaN | NaN | NaN | NaN | NaN | NaN | NaN | NaN | NaN | NaN | NaN |
| 31.596659 | -8.047614 | LOTISSEMENT ERRACHIDIA | 2.0 | Café | Soccer Stadium | Tour Provider | Burrito Place | Farm | Food & Drink Shop | Flower Shop | Flea Market | Fish Market | Fish & Chips Shop |
| 31.603320 | -8.003300 | RESIDENCE MOUNA | 1.0 | Nightclub | Art Gallery | Bay | Coffee Shop | Bathing Area | Wine Bar | Fish & Chips Shop | French Restaurant | Food Court | Food & Drink Shop |
| 31.604750 | -7.971450 | LOTISSEMENT AL MHITA, LOTISSEMENT ALBEK, LOTIS... | 1.0 | Bike Rental / Bike Share | Restaurant | Café | Deli / Bodega | Fast Food Restaurant | French Restaurant | Food Court | Food & Drink Shop | Flower Shop | Flea Market |

Activer Windows
Accédez aux paramè

# 4

# Most Common Venues near Neighborhood - *Using Clustering*

Entrée [85]:

```
import numpy as np
num_top_venues = 10

indicators = ['st', 'nd', 'rd']

columns = ['Neighborhood']
for ind in np.arange(num_top_venues):
    try:
        columns.append('{}{} Most Common Venue'.format(ind+1, indicators[ind]))
    except:
        columns.append('{}the Most Common Venue'.format(ind+1))

locations_venues_sorted = pd.DataFrame(columns=columns)
locations_venues_sorted['Neighborhood'] = Marrakech_grouped['Neighborhood']

for ind in np.arange(Marrakech_grouped.shape[0]):
    locations_venues_sorted.iloc[ind, 1:] = return_most_common_venues(Marrakech_grouped.iloc[ind, :], num_top_venues)

locations_venues_sorted.head()
```

Out[85]:

| | Neighborhood | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4the Most Common Venue | 5the Most Common Venue | 6the Most Common Venue | 7the Most Common Venue | 8the Most Common Venue | 9the Most Common Venue | 10the Most Common Venue |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | ABDELLAOUIA, COMPLEXE HABOUS, DAR SAAD, HAY ZA... | Hotel | Café | Moroccan Restaurant | Sushi Restaurant | Dessert Shop | French Restaurant | Bed & Breakfast | Diner | Flea Market | Snack Place |
| 1 | ABRAJ EL KOUTOUBIA | Café | Restaurant | Coffee Shop | Farm | Food Court | Food & Drink Shop | Flower Shop | Flea Market | Fish Market | Fish & Chips Shop |
| 2 | AFAK, AFAK 1, AFAK 2 | Café | Coffee Shop | Bakery | Fast Food Restaurant | Farmers Market | French Restaurant | Food Court | Food & Drink Shop | Flower Shop | Flea Market |
| 3 | AGHBALOU | Herbs & Spices Store | Wine Bar | Farmers Market | French Restaurant | Food Court | Food & Drink Shop | Flower Shop | Flea Market | Fish Market | Fish & Chips Shop |
| 4 | AIN ITTI | Hotel | Café | Moroccan Restaurant | Sushi Restaurant | Dessert Shop | French Restaurant | Bed & Breakfast | Diner | Flea Market | Snack Place |

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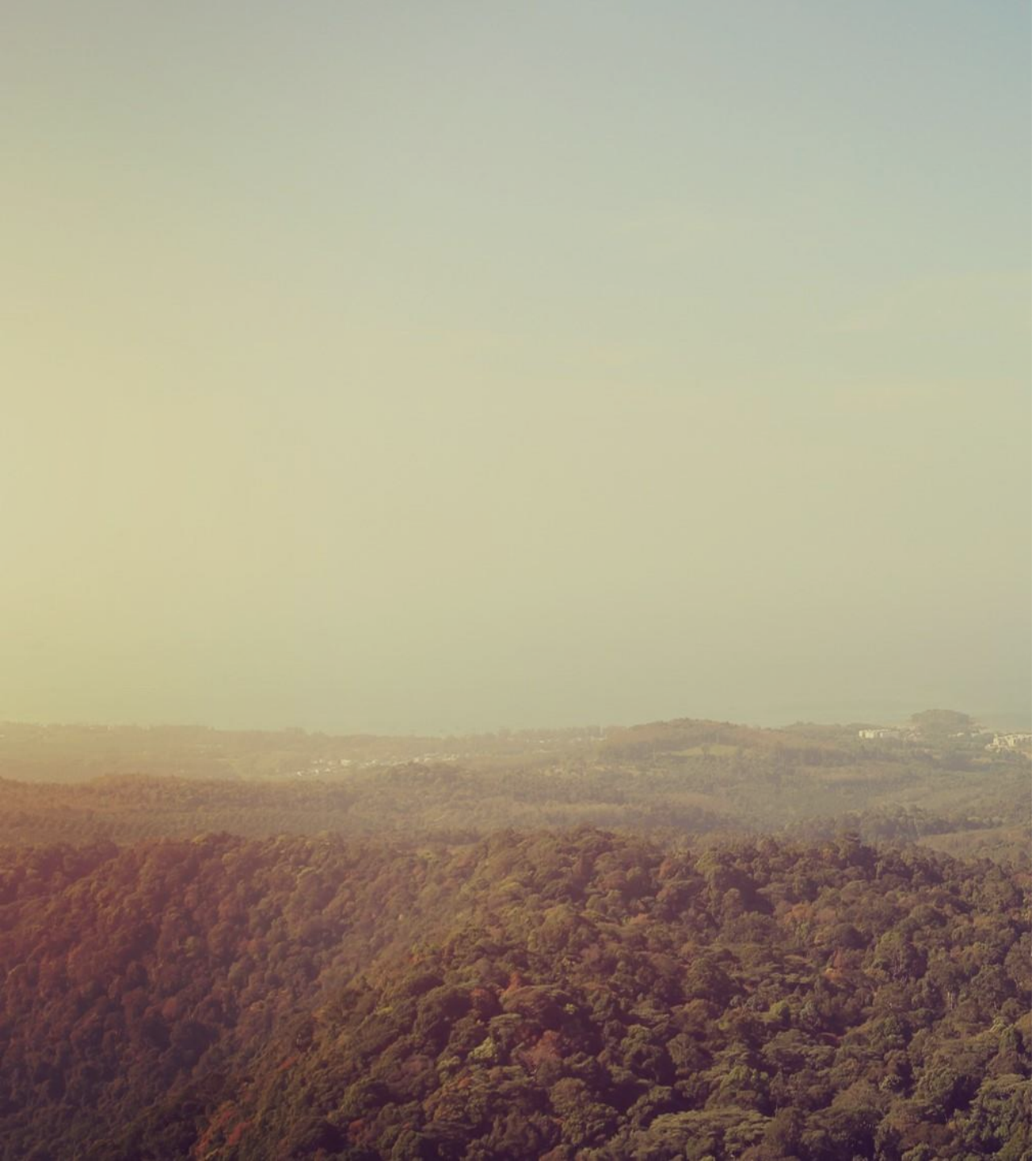
Accédez aux paramètres

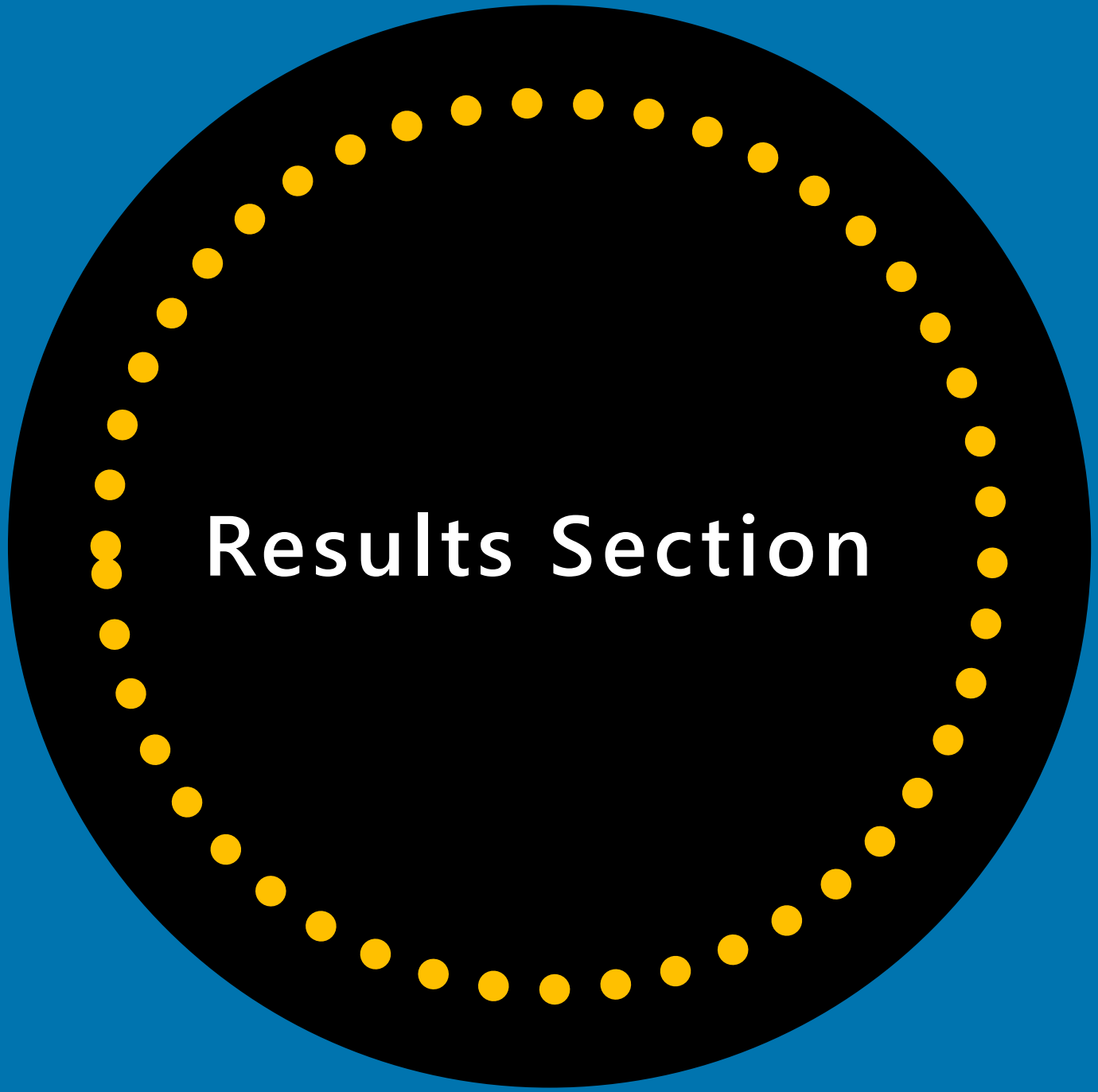


# 5

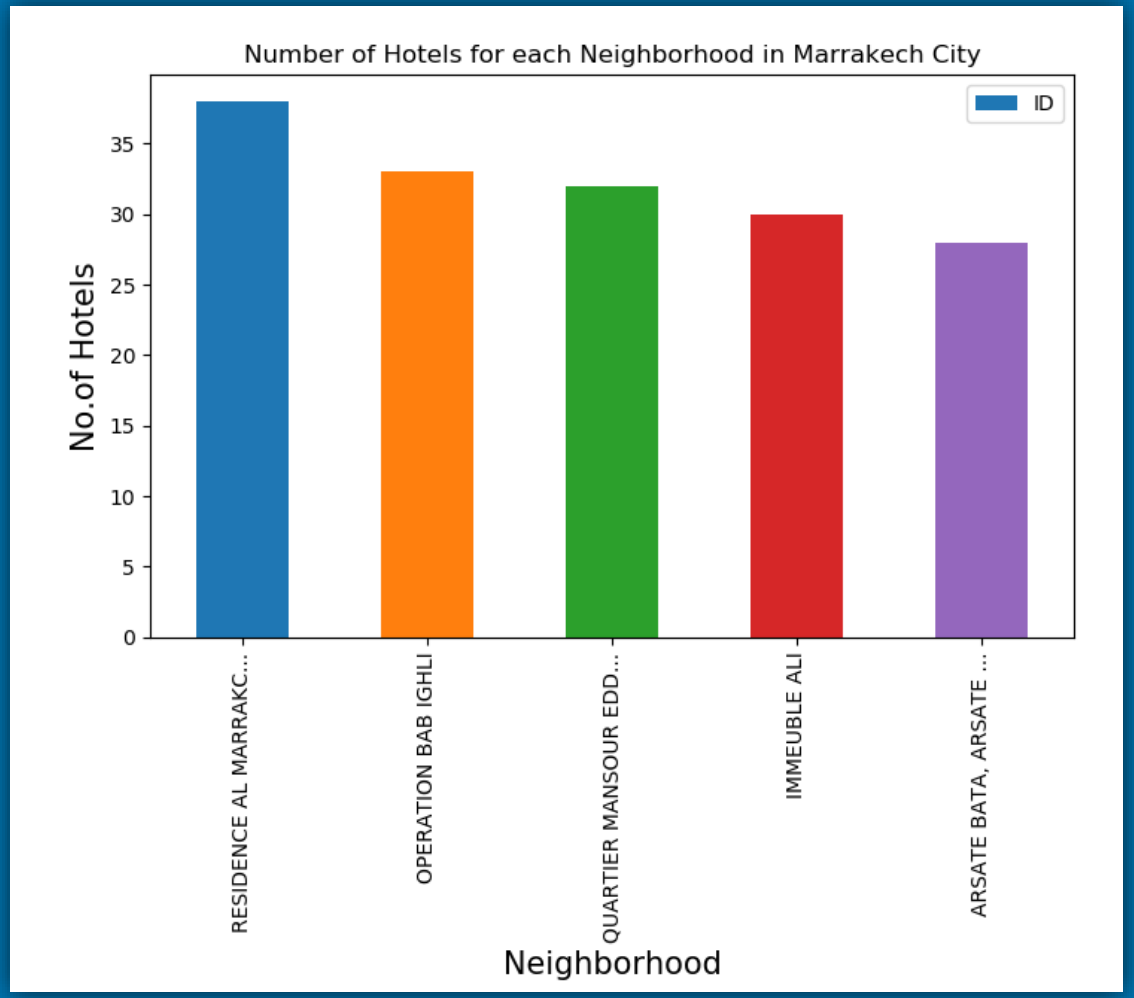
## Work Flow

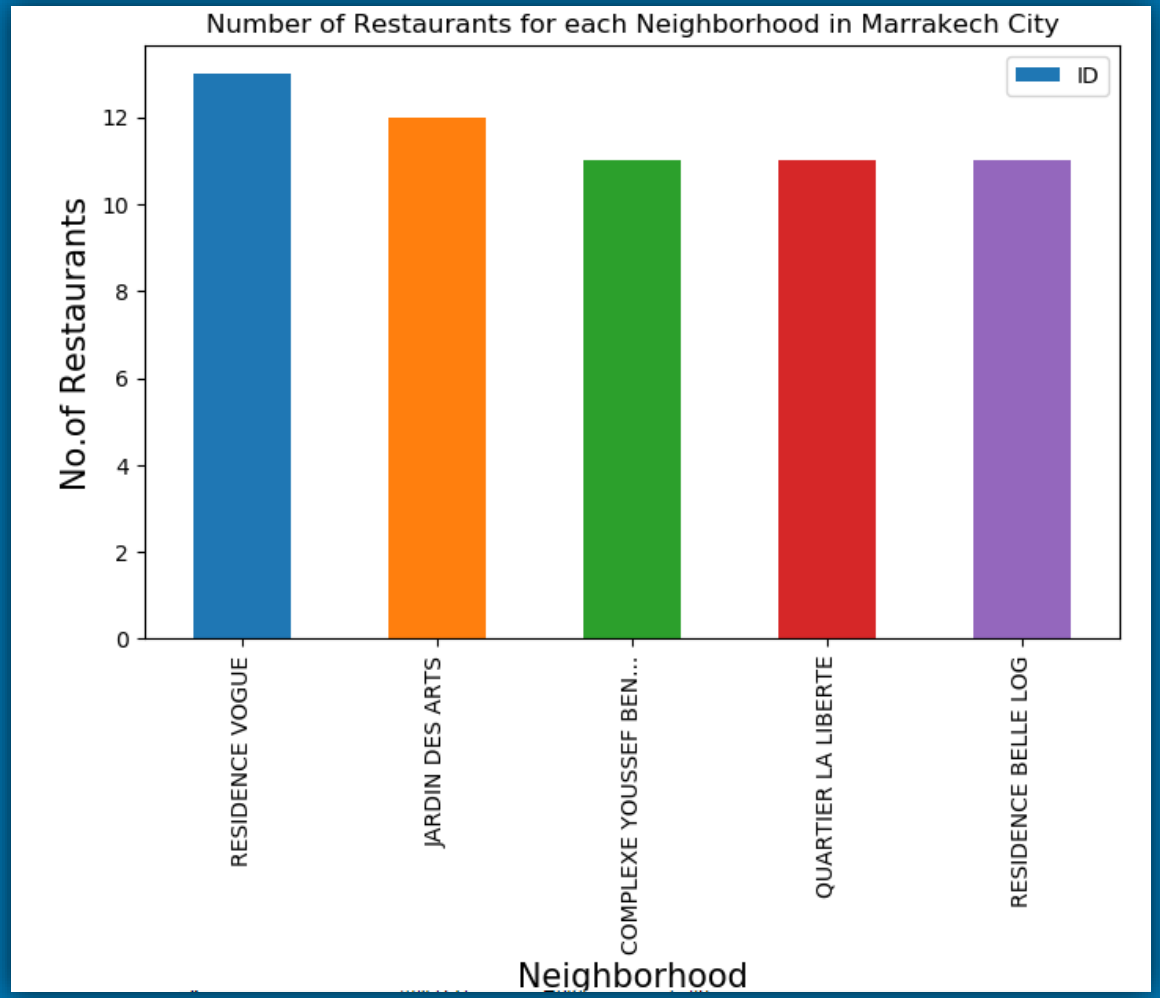
## Foursquare API

Using credentials of Foursquare API features of near-by places of the neighborhoods would be mined. Due to http request limitations the number of places per neighborhood parameter would reasonably be set to 20 and the radius parameter would be set to 700.

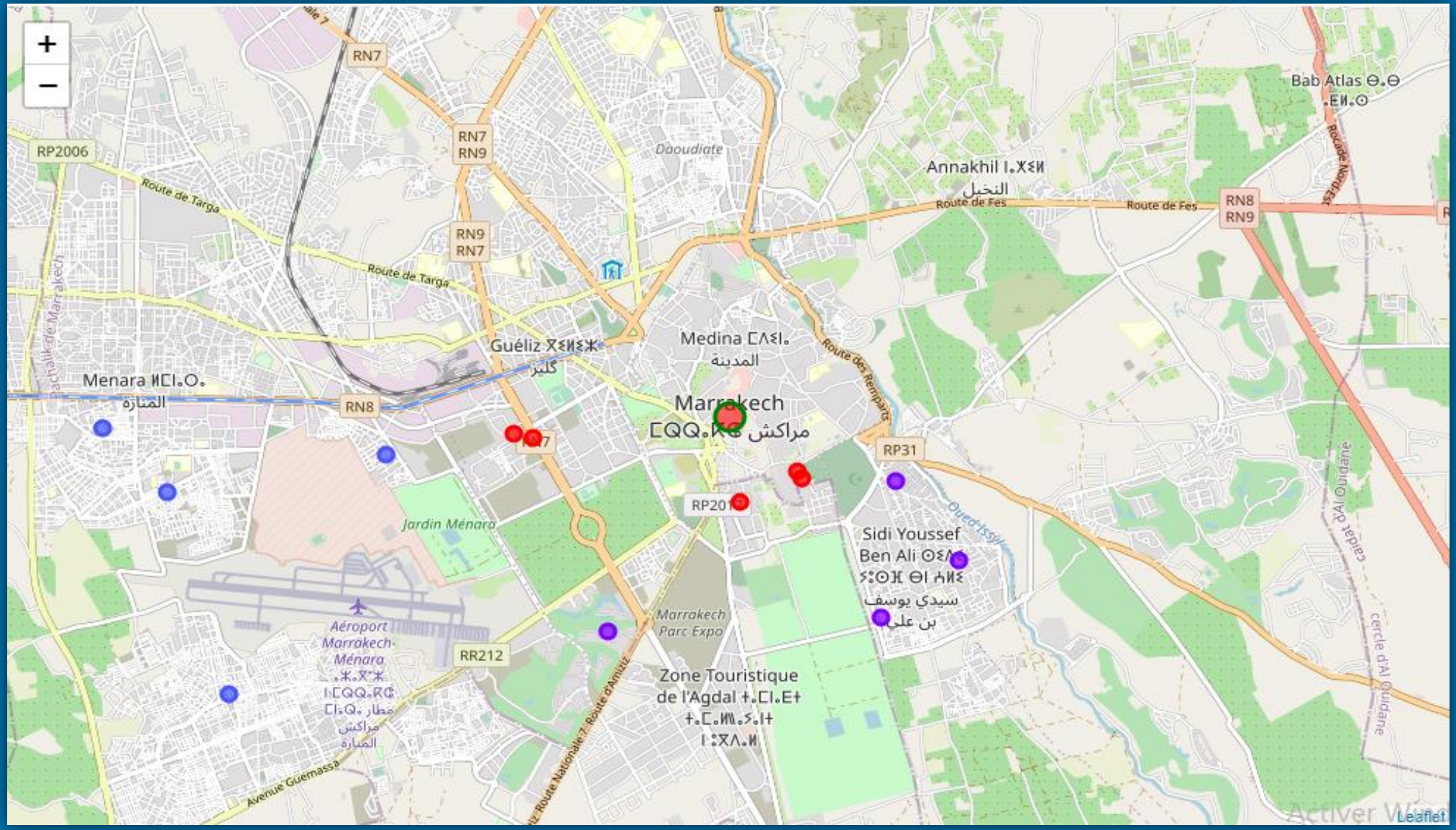

Results Section

# Bar charts that present Number of restaurants and hotels for each Nighberhood in Marrakech

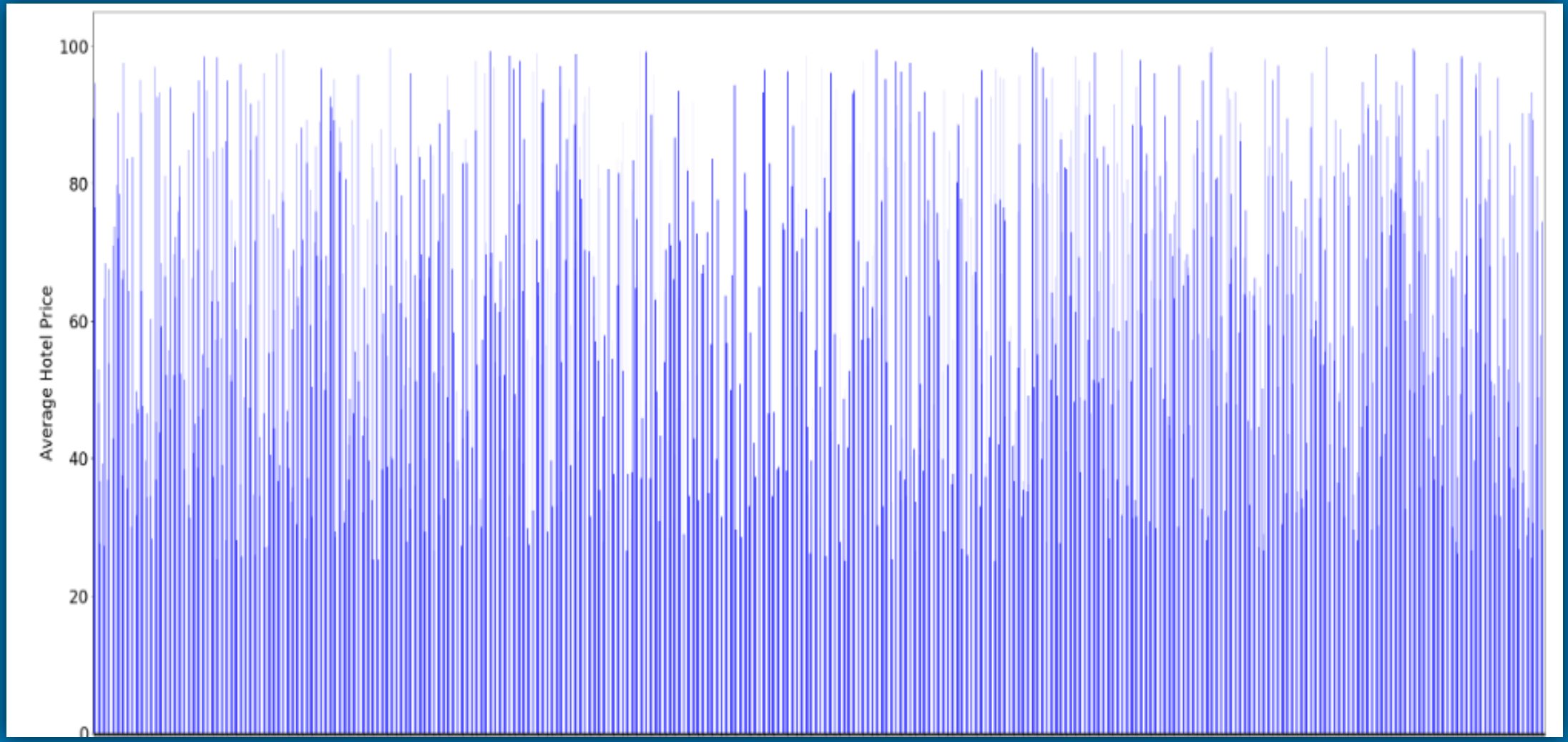


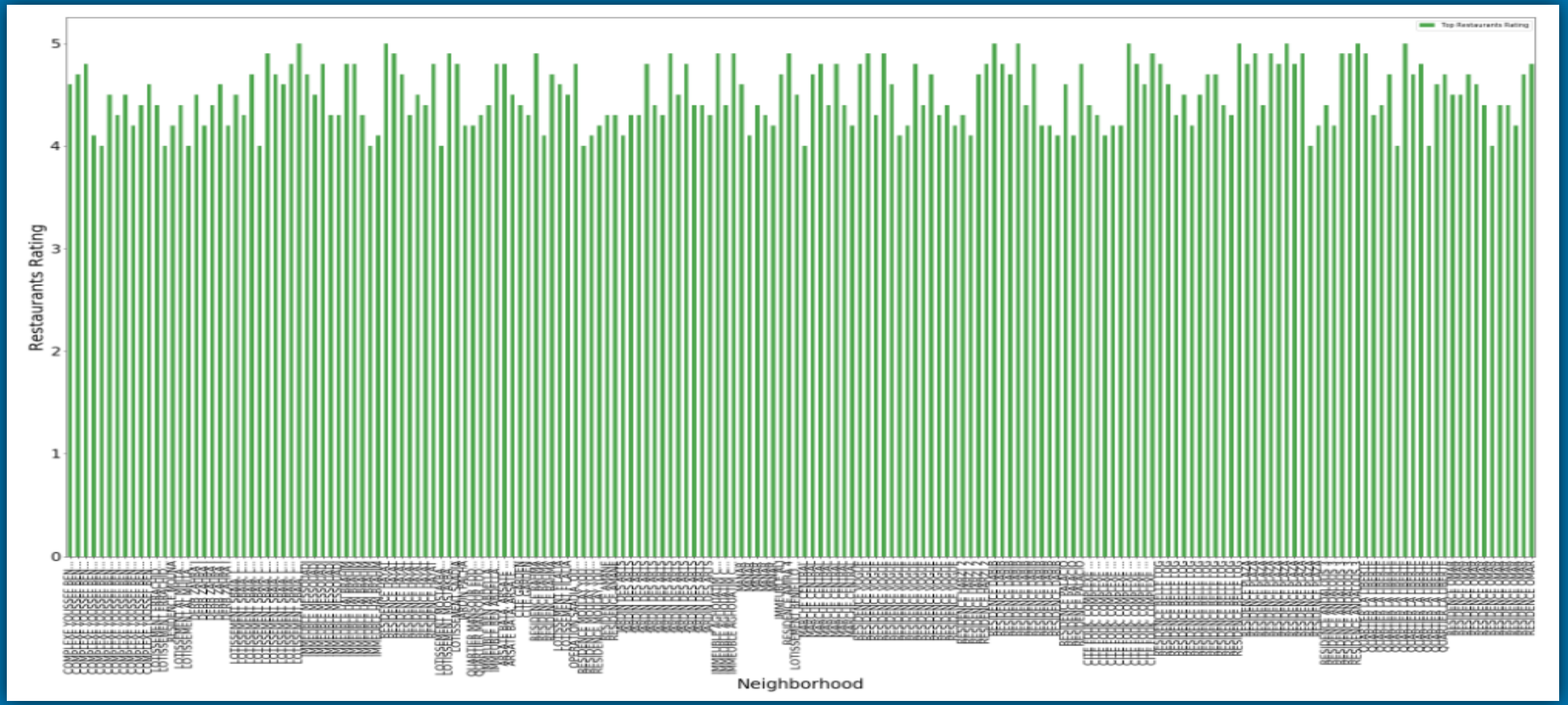
# Map of Clusters in Marrakech



# Average Hotel Price by Clusters in Marrakech



# Restaurants Ratings by Clusters in Marrakech



# Discussion Section

The purpose of this Project is to help tourists to get awareness of the area and neighborhood in this city before traveling to it, also in exploring better facilities around the neighborhood they want to stay at. It will help people making smart and efficient decision on selecting great neighborhood out of numbers of other neighborhoods in Marrakech city.

## —CONCLUSION

In this Capstone project, I used k-means cluster algorithm, so I choosed to separate the neighborhood into **10** different clusters and for **1387** different latitude and longitude from dataset, which have very-similar locations around them. Using the charts above results presented to a particular neighborhood based on average hotel prices and restaurant rating have been made.

# Done ☺

THANK YOU

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