RESTAURANT LOCATION FINDER

A CAPSTONE PROJECT REPORT

RINAV SAXENA

DATE - 14082020

CONTENTS

INTRODUCTION

- Good Morning/Afternoon/Evening. This report is about the Capstone project on Coursera.
- Many people are shifting their focus from 9 to 5 jobs to businesses. One such business is the restaurant business and therefore location is the first problem which takes the spotlight.
- One such example would be the growth of restaurants seen particularly where IT parks are coming up. After living 3 years in Chennai (2016-2019), I witnessed an increase in the number of North Indian Restaurants coming up towards the outskirts of Chennai where IT parks were and are dominant.
- Thus, the question becomes relevant here - Which location is optimum to come up with a restaurant?
- In this report, I will be going over one such solution as to how does one go about selecting a restaurant. There was a time when someone had asked me this very question I did not know as to how to go about selecting an area. I had some inputs/ideas as to how would one would decide a location for their restaurant after the decision was made.
- Now, any problem can be solved quickly if its more specific and to the point. It's this very reason for choosing this topic.

INTRODUCTION CONTD.

- So, first let me define the statement that I will be trying to find a solution for – “How to determine where to place a Restaurant based on some data available?”
- The above statement is actually a super-set of the below statements which are more explicit, direct and specific:
  - What type of restaurant does one want to put up?
  - In which locality are they wanting to target?
  - What is the budget and consequently, prices of land?
  - As per requirements what space are they willing to acquire?
  - What is the competition nearby as per selections made?
  - Where would they get the raw material from?
  - Population density in each area.

So, how does one go about and Compute the expected solution of the Super-Set statement based on the expected outcomes of the sub-set statements and their weights to the original statement? In this report, I will explore the answers to some statements based on Location Data available on Foursquare and the city of Pune (India) is chosen.

COLLECTION OF DATA

- This section contains 3 parts.
  - **Importing data onto notebook.** -> Getting pin codes of Pune City with their Lat/Long into a dataframe in the notebook.
  - **Importing data onto a map.** -> plotting these lat/long on a map using folium library.
  - **Fetching Foursquare location data.** -> summarizing a table which contains all buildings (with category) within 1000 m radius with the Pin Code as reference.

COLLECTION OF DATA –

IMPORTING DATA ONTO NOTEBOOK.

- Lets start with the choosing of a reference point for our search. Fixed pin codes for Pune district are chosen. There are around 34 unique pin codes in the city of Pune. The link to the raw file extracted is available below:
- https://github.com/sanand0/pincode/blob/master/data/IN.csv
- The csv file was downloaded and is saved on my laptop. When loaded, the table is shown below on Jupyter Notebook converted into a Dataframe.

```
pune_df
```

Out[19]:

	Pin Code	Area Name	State Name	District Name	Taluka Name	Latitude	Longitude	Accuracy
0	411001	Pune	Maharashtra	Pune	Pune City	18.5196	73.8554	4
1	411001	N.W. College	Maharashtra	Pune	Pune City	18.5196	73.8554	3
2	411001	Dr.B.A. Chowk	Maharashtra	Pune	Pune City	18.5196	73.8554	3
3	411001	Pune Cantt East	Maharashtra	Pune	Pune City	18.5196	73.8554	3
4	411001	Pune New Bazar	Maharashtra	Pune	Pune City	18.5196	73.8554	3
...	...	...	...	...	...	...	...	...
146	412307	Manjari BK	Maharashtra	Pune	Haveli	18.5000	73.9771	1
147	412307	Manjari Farm	Maharashtra	Pune	Haveli	18.5000	73.9771	1
148	412308	Phursungi	Maharashtra	Pune	Haveli	18.4361	73.9712	4
149	412308	Vadki	Maharashtra	Pune	Haveli	18.4361	73.9712	3
150	412308	Uruli Devachi	Maharashtra	Pune	Haveli	18.4361	73.9712	4

151 rows × 8 columns

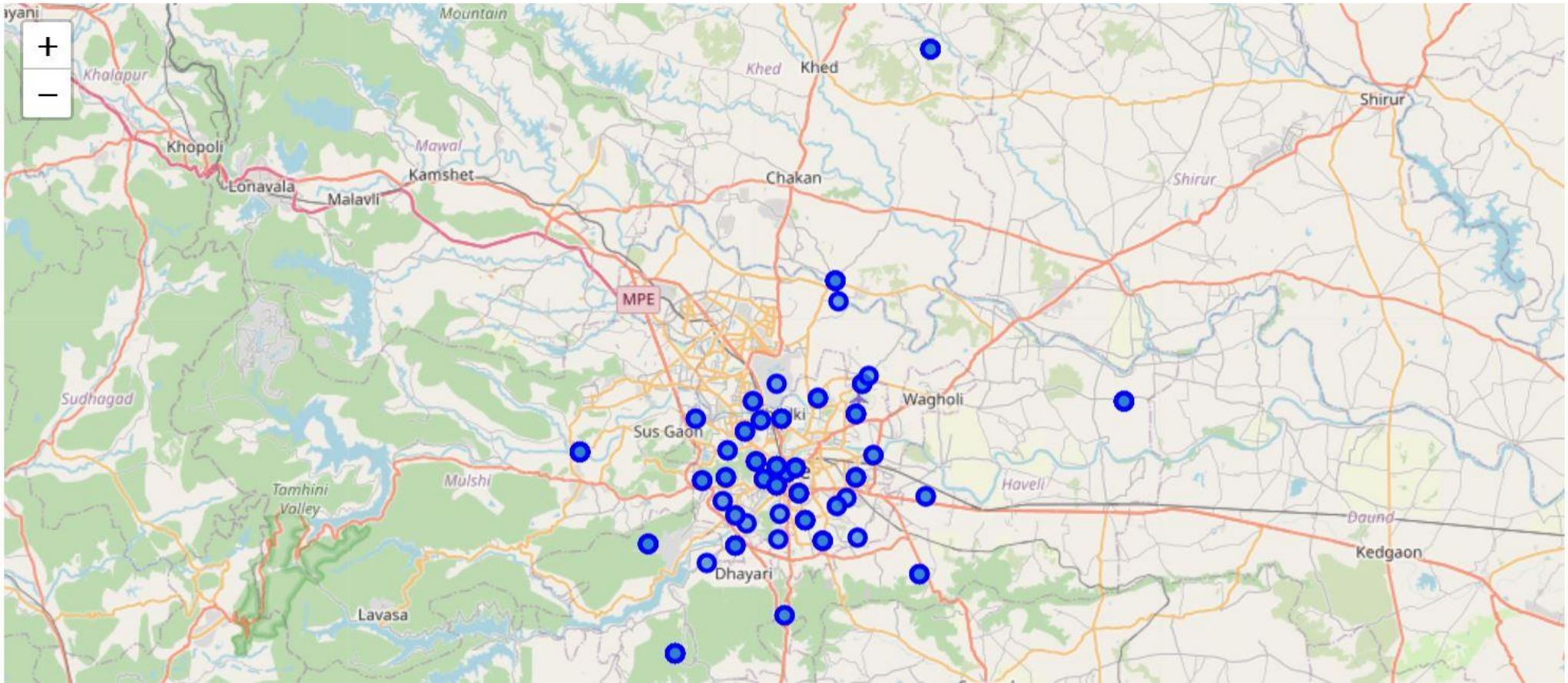
COLLECTION OF DATA –

IMPORTING DATA ONTO A MAP.

- The dataframe pune_df is then plotted on a folium map with Pin Codes as center.

```
map_pun
```

Out[22]:



COLLECTION OF DATA –

FETCHING FOURSQUARE LOCATION DATA.

- Finally, after creating the login to foursquare server, I fetch all buildings within 1000 m radius of the pin code and finally will combine this data with the original pin code lat/long.
- First, a request is given to foursquare server to fetch a list containing all venues nearby.

```
In [23]: import requests

         results = requests.get(url).json()
         results
```

```
                  'type': 'general',
                  'reasonName': 'globalInteractionReason'}]},
                'venue': {'id': '4f579db56b740547b24e5d3a',
                 'name': 'Lal Mahal',
                 'location': {'address': 'Corner of Kasba Ganpati Mandir,',
                  'crossStreet': 'off Shivaji Road,',
                  'lat': 18.518719674058865,
                  'lng': 73.85655641555786,
                  'labeledLatLngs': [{'label': 'display',
                    'lat': 18.518719674058865,
                    'lng': 73.85655641555786}],
                  'distance': 156,
                  'postalCode': '411030',
                  'cc': 'IN',
                  'city': 'Pune',
                  'state': 'Mahārāshtra',
                  'country': 'India',
                  'formattedAddress': ['Corner of Kasba Ganpati Mandir, (off Shivaji Road,)',
                   'Pune 411030',
                   'Mahārāshtra',
```

COLLECTION OF DATA – CONTD.

FETCHING FOURSQUARE LOCATION DATA.

- Second, I explore the data with the type of category of building near all pin codes and generate the following table. This is just to get a list of all buildings nearby.

```
nearby_venues
```

```
C:\Users\DELL\anaconda3\lib\site-packages\ipykernel_launcher.py:6: FutureWa
use pandas.json_normalize instead
```

Out[25]:

	name	categories	lat	lng
0	Lal Mahal	Historic Site	18.518720	73.856556
1	Hotel Madhuban	Tea Room	18.519248	73.848688
2	Bhagat Tarachand	Indian Restaurant	18.514332	73.851317
3	Sujata Mastani	Ice Cream Shop	18.511793	73.852145
4	Krishna Juice Bar	Juice Bar	18.523553	73.847651
5	Fish Curry Rice	Seafood Restaurant	18.516415	73.850934
6	New Poona Bakery	Bakery	18.517028	73.854845
7	Raja Dinkar Kelkar museum	History Museum	18.510744	73.854389
8	Café Coffee Day	Coffee Shop	18.523131	73.848347
9	Mohan Ice Cream	Ice Cream Shop	18.520620	73.846070
10	Shaniwar Wada	Historic Site	18.520151	73.855187
11	Shrikrishna Bhuvan	Snack Place	18.513494	73.855074

COLLECTION OF DATA – CONTD.

FETCHING FOURSQUARE LOCATION DATA.

- Finally, collecting all this data and storing it in a final table - pune_venues as shown below:
- This ends the data_collection phase as I will be working on this data to finalize the location of a restaurant.

```
pune_venues
```

```
(813, 8)
```

Out[83]:

	Area Name	Area Latitude	Area Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Pune	18.5196	73.8554	Lal Mahal	18.518720	73.856556	Historic Site
1	Pune	18.5196	73.8554	Shaniwar Wada	18.520151	73.855187	Historic Site
2	N.W. College	18.5196	73.8554	Lal Mahal	18.518720	73.856556	Historic Site
3	N.W. College	18.5196	73.8554	Shaniwar Wada	18.520151	73.855187	Historic Site
4	Dr.B.A. Chowk	18.5196	73.8554	Lal Mahal	18.518720	73.856556	Historic Site
5	Dr.B.A. Chowk	18.5196	73.8554	Shaniwar Wada	18.520151	73.855187	Historic Site
6	Pune Cantt East	18.5196	73.8554	Lal Mahal	18.518720	73.856556	Historic Site
7	Pune Cantt East	18.5196	73.8554	Shaniwar Wada	18.520151	73.855187	Historic Site
8	Pune New Bazar	18.5196	73.8554	Lal Mahal	18.518720	73.856556	Historic Site
9	Pune New Bazar	18.5196	73.8554	Shaniwar Wada	18.520151	73.855187	Historic Site