# The Battle of the Neighborhoods - Week 1

## Introduction and business idea

### Problem Background :-

###### Mumbai is one of the most populous city in India. It is well known for its diverse culture and religion. A large number of people migrates to Mumbai for the seek of job. Mumbai is not the capital of India but is not less than that. It provides large business opportunities and employment to the people arriving at Mumbai. The city is a major center for banking and finance, retailing, world trade, transportation, tourism, real estate, new media, traditional media, advertising, legal services, accountancy, insurance, theater, fashion, and the arts in India.

###### This also means that the market is highly competitive. As it is highly developing city so cost of doing business is also one of the highest. Thus, any new business venture or expansion needs to be analysed carefully. The insights derived from analysis will give good understanding of the business environment which help in strategically targeting the market. This will help in reduction of risk. And the Return on Investment will be reasonable

### Problem Description

###### Opening a new restaurant in a particular people needs to be analysied from different aspects. This City of India is famous for its excelllent cuisine. It's food culture includes an array of international cuisines influenced by the city's immigrant history.

###### So to survive in such a competitve world we need to analysis different factors such

###### Mumbai Population Mumbai City Demographics  online deliveries Nearby Restaurants  Cuisine served / Menu of the competitors  Saturated markets and many more

### Target Audience

###### The objective is to locate and recommend to the management which neighborhood of Mumbai city will be best choice to start a restaurant. The Management also expects to understand the rationale of the recommendations made.

### Success Criteria

###### The success criteria of the project will be a good recommendation of borough/Neighborhood choice to XYZ Company Ltd based on Lack of such restaurants in that location and nearest suppliers of ingredients.

**We will look all the nearby restaurant in a particular area using FourSquare API**

**Let's start data analysis:-**

**import** requests *# library to handle requests*

**import** pandas **as** pd *# library for data analsysis*

**import** numpy **as** np *# library to handle data in a vectorized manner*

**import** random *# library for random number generation*

​

**!**conda install **-**c conda**-**forge geopy **--**yes

**from** geopy.geocoders **import** Nominatim *# module to convert an address into latitude and longitude values*

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*# libraries for displaying images*

**from** IPython.display **import** Image

**from** IPython.core.display **import** HTML

*# tranforming json file into a pandas dataframe library*

**from** pandas.io.json **import** json\_normalize

​

**!**conda install **-**c conda**-**forge folium**=**0.5.0 **--**yes

**import** folium *# plotting library*

​

print('Folium installed')

print('Libraries imported.')

Solving environment: done

CLIENT\_ID **=** 'FAQNWSOCZ3LSTUM24SHITAZUKOST3XDBL3WQKI1KMEIVCNVZ' *# your Foursquare ID*

CLIENT\_SECRET **=** '3XFXM3D0HCIWRIQWBSSOZINK3PT3PKR3RMLWLPJ5FEKBMKBQ' *# your Foursquare Secret*

VERSION **=** '20180604'

LIMIT **=** 30

print('Your credentails:')

print('CLIENT\_ID: ' **+** CLIENT\_ID)

print('CLIENT\_SECRET:' **+** CLIENT\_SECRET)

Your credentails:

CLIENT\_ID: FAQNWSOCZ3LSTUM24SHITAZUKOST3XDBL3WQKI1KMEIVCNVZ

CLIENT\_SECRET:3XFXM3D0HCIWRIQWBSSOZINK3PT3PKR3RMLWLPJ5FEKBMKBQ

In [4]:

address **=** 'Taj Hotel Mumbai'

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geolocator **=** Nominatim(user\_agent**=**"foursquare\_agent")

location **=** geolocator.geocode(address)

latitude **=** location.latitude

longitude **=** location.longitude

print(latitude, longitude)

19.0927246 72.8543519250365

search\_query **=** 'continental food'

radius **=** 500

print(search\_query **+** ' .... OK!')

continental food .... OK!

url **=** 'https://api.foursquare.com/v2/venues/search?client\_id={}&client\_secret={}&ll={},{}&v={}&query={}&radius={}&limit={}'.format(CLIENT\_ID, CLIENT\_SECRET, latitude, longitude, VERSION, search\_query, radius, LIMIT)

url

Out[15]:

'https://api.foursquare.com/v2/venues/search?client\_id=FAQNWSOCZ3LSTUM24SHITAZUKOST3XDBL3WQKI1KMEIVCNVZ&client\_secret=3XFXM3D0HCIWRIQWBSSOZINK3PT3PKR3RMLWLPJ5FEKBMKBQ&ll=19.0927246,72.8543519250365&v=20180604&query=continental food&radius=500&limit=30'

In [16]:

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

results

Out[16]:

{'meta': {'code': 200, 'requestId': '5d34048c9ba3e5002c881e5e'},

'response': {'venues': [{'id': '4df55e01aeb7170aa2f79c12',

'name': 'Terminal f',

'location': {'address': 'Mumbai Domestic Airport',

'crossStreet': 'Andheri',

'lat': 19.092658318104025,

'lng': 72.85391449928284,

'labeledLatLngs': [{'label': 'display',

'lat': 19.092658318104025,

'lng': 72.85391449928284}],

'distance': 46,

'cc': 'IN',

'city': 'Mumbai',

'state': 'Mahārāshtra',

'country': 'India',

'formattedAddress': ['Mumbai Domestic Airport (Andheri)',

'Mumbai',

'Mahārāshtra',

'India']},

'categories': [{'id': '4bf58dd8d48988d120951735',

'name': 'Food Court',

'pluralName': 'Food Courts',

'shortName': 'Food Court',

'icon': {'prefix': 'https://ss3.4sqi.net/img/categories\_v2/shops/food\_foodcourt\_',

'suffix': '.png'},

'primary': True}],

'referralId': 'v-1563690124',

'hasPerk': False},

{'id': '54143c4e498ec214217a3c7d',

'name': 'Terminal The Food Court',

'location': {'lat': 19.091929737047227,

'lng': 72.85357587973951,

'labeledLatLngs': [{'label': 'display',

'lat': 19.091929737047227,

'lng': 72.85357587973951}],

'distance': 120,

'cc': 'IN',

'country': 'India',

'formattedAddress': ['India']},

'categories': [{'id': '4bf58dd8d48988d128941735',

'name': 'Cafeteria',

'pluralName': 'Cafeterias',

'shortName': 'Cafeteria',

'icon': {'prefix': 'https://ss3.4sqi.net/img/categories\_v2/education/cafeteria\_',

'suffix': '.png'},

'primary': True}],

'referralId': 'v-1563690124',

'hasPerk': False},

{'id': '526a7c92498e559cef26bc85',

'name': 'Comēsum The Food Junction',

'location': {'address': 'Terminal 1A',

'lat': 19.093051,

'lng': 72.853146,

'labeledLatLngs': [{'label': 'display',

'lat': 19.093051,

'lng': 72.853146}],

'distance': 131,

'postalCode': '400099',

'cc': 'IN',

'city': 'Mumbai',

'state': 'Mahārāshtra',

'country': 'India',

'formattedAddress': ['Terminal 1A',

'Mumbai 400099',

'Mahārāshtra',

'India']},

'categories': [{'id': '4bf58dd8d48988d16d941735',

'name': 'Café',

'pluralName': 'Cafés',

'shortName': 'Café',

'icon': {'prefix': 'https://ss3.4sqi.net/img/categories\_v2/food/cafe\_',

'suffix': '.png'},

'primary': True}],

'referralId': 'v-1563690124',

'hasPerk': False},

{'id': '4de64f5a2271f377c2a6eb07',

'name': "Foodie's Bar",

'location': {'address': 'Domestic Airport',

'crossStreet': 'Santa Cruz (East)',

'lat': 19.09339064061189,

'lng': 72.8535804952821,

'labeledLatLngs': [{'label': 'display',

'lat': 19.09339064061189,

'lng': 72.8535804952821}],

'distance': 109,

'cc': 'IN',

'city': 'Mumbai',

'state': 'Mahārāshtra',

'country': 'India',

'formattedAddress': ['Domestic Airport (Santa Cruz (East))',

'Mumbai',

'Mahārāshtra',

'India']},

'categories': [{'id': '4bf58dd8d48988d116941735',

'name': 'Bar',

'pluralName': 'Bars',

'shortName': 'Bar',

'icon': {'prefix': 'https://ss3.4sqi.net/img/categories\_v2/nightlife/pub\_',

'suffix': '.png'},

'primary': True}],

'referralId': 'v-1563690124',

'hasPerk': False},

{'id': '4d9d47a45c33a35daf68fea0',

'name': 'Mumbai StrEAT Food',

'location': {'address': 'Mumbai Domestic Airport, Terminal 1',

'crossStreet': 'Off Western Expressway',

'lat': 19.092102098290177,

'lng': 72.85690482149371,

'labeledLatLngs': [{'label': 'display',

'lat': 19.092102098290177,

'lng': 72.85690482149371}],

'distance': 277,

'cc': 'IN',

'city': 'Mumbai',

'state': 'Mahārāshtra',

'country': 'India',

'formattedAddress': ['Mumbai Domestic Airport, Terminal 1 (Off Western Expressway)',

'Mumbai',

'Mahārāshtra',

'India']},

'categories': [{'id': '4bf58dd8d48988d1c7941735',

'name': 'Snack Place',

'pluralName': 'Snack Places',

'shortName': 'Snacks',

'icon': {'prefix': 'https://ss3.4sqi.net/img/categories\_v2/food/snacks\_',

'suffix': '.png'},

'primary': True}],

'referralId': 'v-1563690124',

'hasPerk': False},

{'id': '5380791e498e17831b194f6b',

'name': "Baba's Hospitality and Food Services",

'location': {'lat': 19.096514899924387,

'lng': 72.85445860184711,

'labeledLatLngs': [{'label': 'display',

'lat': 19.096514899924387,

'lng': 72.85445860184711}],

'distance': 422,

'cc': 'IN',

'country': 'India',

'formattedAddress': ['India']},

'categories': [{'id': '4bf58dd8d48988d128941735',

'name': 'Cafeteria',

'pluralName': 'Cafeterias',

'shortName': 'Cafeteria',

'icon': {'prefix': 'https://ss3.4sqi.net/img/categories\_v2/education/cafeteria\_',

'suffix': '.png'},

'primary': True}],

'referralId': 'v-1563690124',

'hasPerk': False},

{'id': '5a8bb4490f013c14357f491d',

'name': 'Street Foods By Punjab Grill',

'location': {'lat': 19.09229,

'lng': 72.856092,

'labeledLatLngs': [{'label': 'display',

'lat': 19.09229,

'lng': 72.856092}],

'distance': 189,

'postalCode': '400070',

'cc': 'IN',

'city': 'Mumbai',

'state': 'Mahārāshtra',

'country': 'India',

'formattedAddress': ['Mumbai 400070', 'Mahārāshtra', 'India']},

'categories': [{'id': '54135bf5e4b08f3d2429dff0',

'name': 'Punjabi Restaurant',

'pluralName': 'Punjabi Restaurants',

'shortName': 'Punjabi',

'icon': {'prefix': 'https://ss3.4sqi.net/img/categories\_v2/food/default\_',

'suffix': '.png'},

'primary': True}],

'referralId': 'v-1563690124',

'hasPerk': False}]}}

*# assign relevant part of JSON to venues*

venues **=** results['response']['venues']

​

*# tranform venues into a dataframe*

dataframe **=** json\_normalize(venues)

dataframe.head()

Out[17]:

|  | **categories** | **hasPerk** | **id** | **location.address** | **location.cc** | **location.city** | **location.country** | **location.crossStreet** | **location.distance** | **location.formattedAddress** | **location.labeledLatLngs** | **location.lat** | **location.lng** | **location.postalCode** | **location.state** | **name** | **referralId** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | [{'id': '4bf58dd8d48988d120951735', 'name': 'F... | False | 4df55e01aeb7170aa2f79c12 | Mumbai Domestic Airport | IN | Mumbai | India | Andheri | 46 | [Mumbai Domestic Airport (Andheri), Mumbai, Ma... | [{'label': 'display', 'lat': 19.09265831810402... | 19.092658 | 72.853914 | NaN | Mahārāshtra | Terminal f | v-1563690124 |
| **1** | [{'id': '4bf58dd8d48988d128941735', 'name': 'C... | False | 54143c4e498ec214217a3c7d | NaN | IN | NaN | India | NaN | 120 | [India] | [{'label': 'display', 'lat': 19.09192973704722... | 19.091930 | 72.853576 | NaN | NaN | Terminal The Food Court | v-1563690124 |
| **2** | [{'id': '4bf58dd8d48988d16d941735', 'name': 'C... | False | 526a7c92498e559cef26bc85 | Terminal 1A | IN | Mumbai | India | NaN | 131 | [Terminal 1A, Mumbai 400099, Mahārāshtra, India] | [{'label': 'display', 'lat': 19.093051, 'lng':... | 19.093051 | 72.853146 | 400099 | Mahārāshtra | Comēsum The Food Junction | v-1563690124 |
| **3** | [{'id': '4bf58dd8d48988d116941735', 'name': 'B... | False | 4de64f5a2271f377c2a6eb07 | Domestic Airport | IN | Mumbai | India | Santa Cruz (East) | 109 | [Domestic Airport (Santa Cruz (East)), Mumbai,... | [{'label': 'display', 'lat': 19.09339064061189... | 19.093391 | 72.853580 | NaN | Mahārāshtra | Foodie's Bar | v-1563690124 |
| **4** | [{'id': '4bf58dd8d48988d1c7941735', 'name': 'S... | False | 4d9d47a45c33a35daf68fea0 | Mumbai Domestic Airport, Terminal 1 | IN | Mumbai | India | Off Western Expressway | 277 | [Mumbai Domestic Airport, Terminal 1 (Off West... | [{'label': 'display', 'lat': 19.09210209829017... | 19.092102 | 72.856905 | NaN | Mahārāshtra | Mumbai StrEAT Food | v-1563690124 |

In [18]:

*# keep only columns that include venue name, and anything that is associated with location*

filtered\_columns **=** ['name', 'categories'] **+** [col **for** col **in** dataframe.columns **if** col.startswith('location.')] **+** ['id']

dataframe\_filtered **=** dataframe.loc[:, filtered\_columns]

​

*# function that extracts the category of the venue*

**def** get\_category\_type(row):

**try**:

categories\_list **=** row['categories']

**except**:

categories\_list **=** row['venue.categories']

**if** len(categories\_list) **==** 0:

**return** **None**

**else**:

**return** categories\_list[0]['name']

​

*# filter the category for each row*

dataframe\_filtered['categories'] **=** dataframe\_filtered.apply(get\_category\_type, axis**=**1)

​

*# clean column names by keeping only last term*

dataframe\_filtered.columns **=** [column.split('.')[**-**1] **for** column **in** dataframe\_filtered.columns]

​

dataframe\_filtered

Out[18]:

|  | **name** | **categories** | **address** | **cc** | **city** | **country** | **crossStreet** | **distance** | **formattedAddress** | **labeledLatLngs** | **lat** | **lng** | **postalCode** | **state** | **id** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | Terminal f | Food Court | Mumbai Domestic Airport | IN | Mumbai | India | Andheri | 46 | [Mumbai Domestic Airport (Andheri), Mumbai, Ma... | [{'label': 'display', 'lat': 19.09265831810402... | 19.092658 | 72.853914 | NaN | Mahārāshtra | 4df55e01aeb7170aa2f79c12 |
| **1** | Terminal The Food Court | Cafeteria | NaN | IN | NaN | India | NaN | 120 | [India] | [{'label': 'display', 'lat': 19.09192973704722... | 19.091930 | 72.853576 | NaN | NaN | 54143c4e498ec214217a3c7d |
| **2** | Comēsum The Food Junction | Café | Terminal 1A | IN | Mumbai | India | NaN | 131 | [Terminal 1A, Mumbai 400099, Mahārāshtra, India] | [{'label': 'display', 'lat': 19.093051, 'lng':... | 19.093051 | 72.853146 | 400099 | Mahārāshtra | 526a7c92498e559cef26bc85 |
| **3** | Foodie's Bar | Bar | Domestic Airport | IN | Mumbai | India | Santa Cruz (East) | 109 | [Domestic Airport (Santa Cruz (East)), Mumbai,... | [{'label': 'display', 'lat': 19.09339064061189... | 19.093391 | 72.853580 | NaN | Mahārāshtra | 4de64f5a2271f377c2a6eb07 |
| **4** | Mumbai StrEAT Food | Snack Place | Mumbai Domestic Airport, Terminal 1 | IN | Mumbai | India | Off Western Expressway | 277 | [Mumbai Domestic Airport, Terminal 1 (Off West... | [{'label': 'display', 'lat': 19.09210209829017... | 19.092102 | 72.856905 | NaN | Mahārāshtra | 4d9d47a45c33a35daf68fea0 |
| **5** | Baba's Hospitality and Food Services | Cafeteria | NaN | IN | NaN | India | NaN | 422 | [India] | [{'label': 'display', 'lat': 19.09651489992438... | 19.096515 | 72.854459 | NaN | NaN | 5380791e498e17831b194f6b |
| **6** | Street Foods By Punjab Grill | Punjabi Restaurant | NaN | IN | Mumbai | India | NaN | 189 | [Mumbai 400070, Mahārāshtra, India] | [{'label': 'display', 'lat': 19.09229, 'lng': ... | 19.092290 | 72.856092 | 400070 | Mahārāshtra | 5a8bb4490f013c14357f491d |

In [19]:

dataframe\_filtered.name

Out[19]:

0 Terminal f

1 Terminal The Food Court

2 Comēsum The Food Junction

3 Foodie's Bar

4 Mumbai StrEAT Food

5 Baba's Hospitality and Food Services

6 Street Foods By Punjab Grill

Name: name, dtype: object

In [20]:

venues\_map **=** folium.Map(location**=**[latitude, longitude], zoom\_start**=**13) *# generate map centred around the Conrad Hotel*

​

*# add a red circle marker to represent the Conrad Hotel*

folium.features.CircleMarker(

[latitude, longitude],

radius**=**10,

color**=**'red',

popup**=**'Taj Hotel',

fill **=** **True**,

fill\_color **=** 'red',

fill\_opacity **=** 0.6

).add\_to(venues\_map)

​

*# add the Italian restaurants as blue circle markers*

**for** lat, lng, label **in** zip(dataframe\_filtered.lat, dataframe\_filtered.lng, dataframe\_filtered.categories):

folium.features.CircleMarker(

[lat, lng],

radius**=**5,

color**=**'blue',

popup**=**label,

fill **=** **True**,

fill\_color**=**'blue',

fill\_opacity**=**0.6

).add\_to(venues\_map)

​

*# display map*

venues\_map

Out[20]:

***As we know that Mumbai is famous for its tourist places like "Gateway of India", "Marine Lines", "Juhu beach" etc so a large number of people visit Mumbai everyday. And according to data analysis there is no nearby continental food restaurant, so it will be a great business of Continental Restaurant nearby Taj Hostel***