Analysis of the Restaurant Market in South Mumbai

Table:

Introduction:

Mumbai is the financial, commercial and entertainment capital of India and also one of the world's top ten hubs of commerce in terms of global financial flow. Mumbai's business and investment opportunities, as well as its potential to offer a higher standard of living, attracts migrants not from only India but also from other countries, making the city a multicultural. It is a major hub for world trade, jewelry, finance and banking, film industry, arts, information technology, healthcare, media, entertainment, fashion, tourism etc.

"South Mumbai "is the Mumbai City district which is the southernmost precinct of Greater Mumbai. It extends from Colaba in the south to Mahim and Sion in the north. It comprises the city's main business localities, making it the wealthiest urban precinct in India. But at the same time high business opportunities and development makes South Mumbai as the extremely competitive. In this fierce market, the risk volume is even higher for new start-ups or business enterprises or for making an expansion of business especially for small and medium enterprises.

Due to this, any new business plan or expansion needs to be analyzed carefully. The insight derived from analysis will give better understanding of business environment which help in maneuvering the market. This will help to indentify a strategy with low risk and high potential.

Restaurant Business:

A restaurant is a place where cooked food is sold to the public. Meals of restaurants are generally served and eaten on the premises, but many restaurants also offer take-out and food delivery services, and some offer only take-out and delivery.

Type of restaurants

1. Sit-down Restaurant

2. QSR (Quick Service Restaurant) or Fast Food Restaurant or Cafeteria or Tea House

At some, you do not have to even get out of the car to eat. You can pay and get your order from a window. These places are called drive-through(s).

3. Restaurant Chain or Franchises
   Some restaurants are a chain, meaning that there are a lot of restaurants that have the same name and serve the same food. McDonald's, Burger King, and Pizza Hut are examples of chain restaurants that are all over the world. Applebee's and Mainland China are examples of this type of chain restaurant where people sit down to eat it. In short any restaurant chain can be either Type 1 or Type 2 of restaurants.

Problem Statement:

"South Mumbai" is the Mumbai City district which is the southernmost precinct of Greater Mumbai. It extends from Colaba in the south to Mahim and Sion in the north. It comprises the city's main business localities, making it the wealthiest urban precinct in India. But at the same time high business opportunities and development makes South Mumbai as the extremely competitive. In this fierce market, the risk volume is even higher for new start-ups or business enterprises or for making an expansion of business especially for small and medium enterprises.

Due to this, any new business plan or expansion needs to be analyzed carefully. The insight derived from analysis will give better understanding of business environment which help in maneuvering the market.

In a case of Restaurant industry, it is evident that to start a restaurant in right location is very effective and wise strategic plan, but many people especially who haven't much knowledge and exploration about demographics of South Mumbai are facing many issues to find the suitable restaurant location. Apart from location, many restaurateurs and investors don't know what kind of restaurant they need to start. Those questions are needed to be solved by analysis of the Restaurant Business in South Mumbai.

Description of Data:

- ## Require Data:

To choose a right location and serving type, effective data analysis is essential. Data we require are:

1. Property rate of different location (rent / purchase)
2. Demography of different location
3. Restaurants and their types in different locations
4. Menu or Cuisine type served by competitors or restaurants

   Etc

.

- ## Collection of Data:

1. Open Government Data (OGD) Platform India (Digital India Initiative) (All India Pin code directory) https://data.gov.in/resources/all-india-pincode-directory-contact-details-along-latitude-and-longitude
2. Municipal Corporation of Greater Mumbai (Mumbai ward distribution data) http://dm.mcgm.gov.in/home

3. Research of property rate from different Property websites (Moneycontrol.com, 99acres.com, MagicBricks.com, Housing.com) and different realtors to collect the data manually

• Fetching data from CSV file downloaded from Open Government Data (OGD) Platform India (Digital India Initiative)

```
In [2]: url = "mumbai_neighbourhoods.csv"
        mumbai_data = pd.read_csv(url)
        mumbai_data.tail()
```

Out[2]:

	Neighbourhood	Pincode	officeType	Deliverystatus	regionname	circlename	Taluk	Districtname	statename	Telephone	Related Suboffice	Borough
1002	Wada	421303	NaN	Delivery	Mumbai	Maharashtra	Wada	Thane	MAHARASHTRA	02526-271413	NaN	Palghar
1003	Waki B.O	401602	B.O	Delivery	Mumbai	Maharashtra	Dahanu	Thane	MAHARASHTRA	NaN	Dahanu Road	Palghar
1004	Waki B.O	421303	B.O	Delivery	Mumbai	Maharashtra	Vikramgad	Thane	MAHARASHTRA	NaN	Wada	Palghar
1005	Zap B.O	401603	B.O	Delivery	Mumbai	Maharashtra	Jawhar	Thane	MAHARASHTRA	NaN	Jawhar	Palghar
1006	Zari B.O	401606	B.O	Delivery	Mumbai	Maharashtra	Talasari	Thane	MAHARASHTRA	NaN	Talasari	Palghar

4. Foursquare API (Restaurants details of South Mumbai)

https://developer.foursquare.com/

- Next, we are going to start utilizing the Foursquare API to explore the South Mumbabi for data collection

In [139]:
```
CLIENT_ID = 'XXXXXX' # your Foursquare ID
CLIENT_SECRET = 'XXXX' # your Foursquare Secret
VERSION = '20180605' # Foursquare API version

print('Your credentails:')
print('CLIENT_ID: ' + CLIENT_ID)
print('CLIENT_SECRET:' + CLIENT_SECRET)
```

```
Your credentails:
CLIENT_ID: XXXXXX
CLIENT_SECRET:XXXX
```

1.Taking first area of South Mumbai and creating url

In [14]:
```
first_lat = south_mumbai_data['Latitude'][0]
first_long = south_mumbai_data['Longitude'][0]
radius = 500
LIMIT = 100
url = 'https://api.foursquare.com/v2/venues/explore?&client_id={}&client_secret={}&v={}&ll={},{}&radius={}&limit={}'.format(
    CLIENT_ID,
    CLIENT_SECRET,
    VERSION,
    first_lat,
    first_long,
    radius,
    LIMIT)
```

2.Getting results

In [15]:
```
results = requests.get(url).json()
```

5. GeoJSON (for representing simple geographical features)

6. Administrative divisions of Mumbai - Wikipedia (For Population of South Mumbai)

https://en.wikipedia.org/wiki/Administrative_divisions_of_Mumbai

- Fetching details from wikipedia page of Administrative divisions of Mumbai 1.Fetch data from wikipedia

In [12]:
```
# fetching data from wikipedia page and storing into m_wiki_data
url = "https://en.wikipedia.org/wiki/Administrative_divisions_of_Mumbai"
m_wiki_data = requests.get(url).text
interm = m_wiki_data[m_wiki_data.find("<table"):m_wiki_data.find("</table>")+8]
population_sm = pd.read_html(interm, header = 0)[0]
population_sm.head()
```

Out[12]:

	Ward	Population
0	A	210926
1	B	140480
2	C	190670
3	D	378610
4	E	439390

Methodology:

1. Data Cleaning

   Removing duplicity and redundancy from dataframes to make data consistence.

- Data cleaning as removing redundancy and unwanted duplicity

1.Join all the AreaName by Pincode

In [4]:
```
def neighbourhood_list(grouped):
    return ', '.join(sorted(grouped['Neighbourhood'].tolist()))

grp = mumbai_data.groupby(['Pincode', 'Borough'])
south_mumbai_data = grp.apply(neighbourhood_list).reset_index(name='Neighbourhood')
```

2. Data Filtering

   Our project is based on 'South Mumbai' so we filter out the data that related to only South Mumbai from each dataframes.

- Project is focus on 'South Mumbai' so data filtering as per requirement

In [3]:
```
mumbai_data = mumbai_data[mumbai_data.Borough=='South Mumbai']
mumbai_data.head()
```

Out[3]:

	Neighbourhood	Pincode	officeType	Deliverystatus	regionname	circlename	Taluk	Districtname	statename	Telephone	Related Suboffice	Borough	longi
0	B.P.Lane	400003	NaN	Non-Delivery	Mumbai	Maharashtra	NaN	Mumbai	MAHARASHTRA	022-23421653	NaN	South Mumbai	
1	BEST STaff Quarters	400012	NaN	Non-Delivery	Mumbai	Maharashtra	NaN	Mumbai	MAHARASHTRA	022-24180776	NaN	South Mumbai	
2	Chamarbaug	400012	NaN	Non-Delivery	Mumbai	Maharashtra	Mumbai	Mumbai	MAHARASHTRA	022-24705407	NaN	South Mumbai	
3	Chinchbunder	400009	NaN	Delivery	Mumbai	Maharashtra	NaN	Mumbai	MAHARASHTRA	022-23771116	NaN	South Mumbai	
4	Cotton Exchange	400033	NaN	Non-Delivery	Mumbai	Maharashtra	Mumbai	Mumbai	MAHARASHTRA	022-23742035	NaN	South Mumbai	

3. Data Transformation

   Adding or transforming data columns of dataframes like co-ordinates etc which is going to require for creating maps and graphs etc.

3.Getting Coordinates as per pincode

In [6]:
```
def get_latlng(postal_code):
    # initialize your variable to None
    lat_lng_coords = None
    # loop until you get the coordinates
    while(lat_lng_coords is None):
        g = geocoder.arcgis('{}, Mumbai, Maharashtra'.format(postal_code))
        lat_lng_coords = g.latlng
    return lat_lng_coords
```

e.g, For Pincode 400001

In [7]:
```
get_latlng('400001')
```

Out[7]:
```
[18.938919252000062, 72.83747000000005]
```

Now appling this functions for all pincode of areas of South Mumbai

In [8]:
```
latitude = []
longitude = []
for row in south_mumbai_data['Pincode']:
    coordinate = get_latlng(row)
    latitude.append(coordinate[0])
    longitude.append(coordinate[1])

south_mumbai_data['Latitude']=latitude
south_mumbai_data['Longitude']=longitude
south_mumbai_data.head()
```

Out[8]:

	Pincode	Borough	Neighbourhood	Latitude	Longitude
0	400001	South Mumbai	Bazargate , CSMT , M.P.T. , Stock Exchange , T...	18.938919	72.837470
1	400002	South Mumbai	Kalbadevi , Ramwadi , S. C. Court , Thakurdwar	18.947760	72.826815

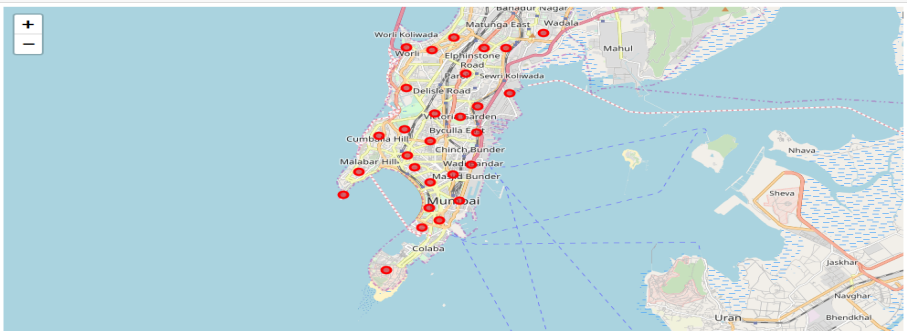
4. Data Visualization and Analysis

Applying data to generate maps and graphs to visualization and analysis behind the pattern style and information hidden behinds the data.

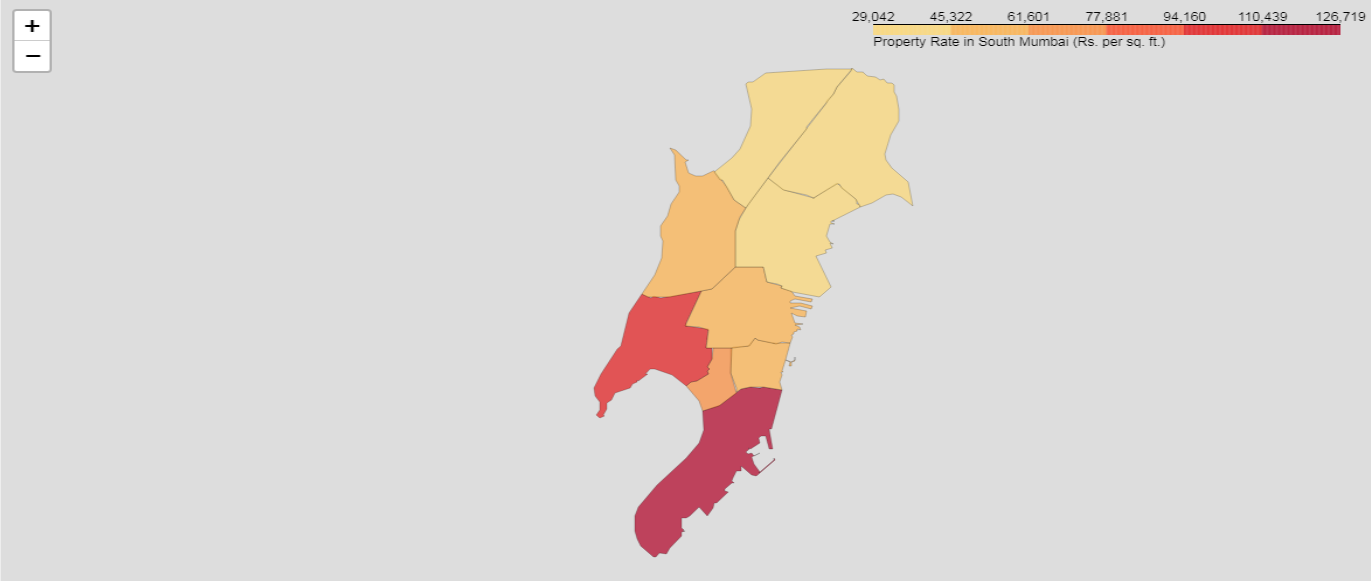
- Map of South Mumbai

```
for lat, lng, borough, neighborhood in zip(south_mumbai_data['Latitude'], south_mumbai_data['Longitude'], south_mumbai_data['
Borough'], south_mumbai_data['Neighbourhood']):
    label = '{}, {}'.format(neighborhood, borough)
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=5,
        popup=label,
        color='red',
        fill=True,
        fill_color='#cc3139',
        fill_opacity=0.7,
        parse_html=False).add_to(map_south_mumbai)

map_south_mumbai
```

Out[18]:



- Choropleth Maps of Properties of South Mumbai :

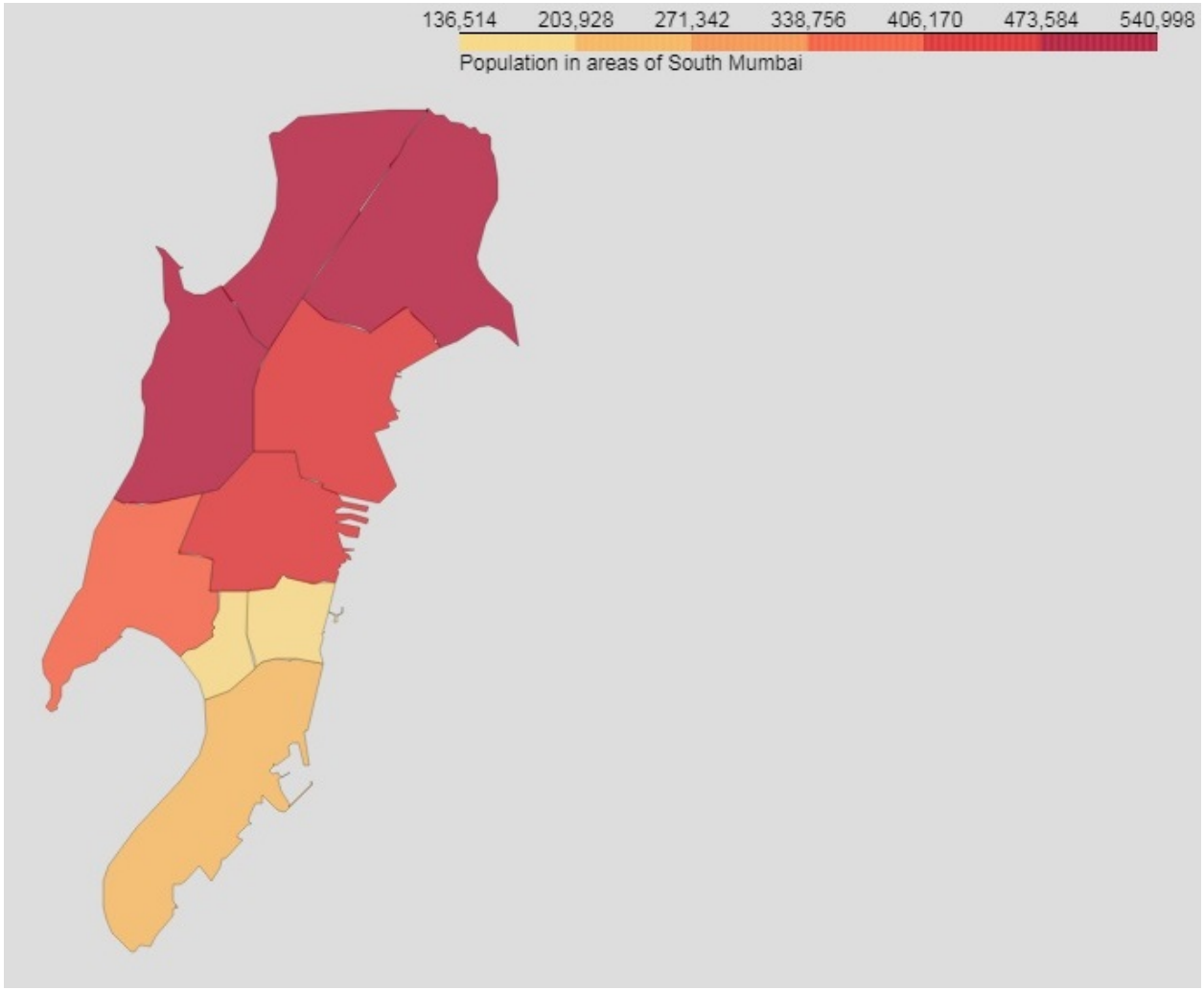


Top 5 Costliest Property Area of South Mumbai

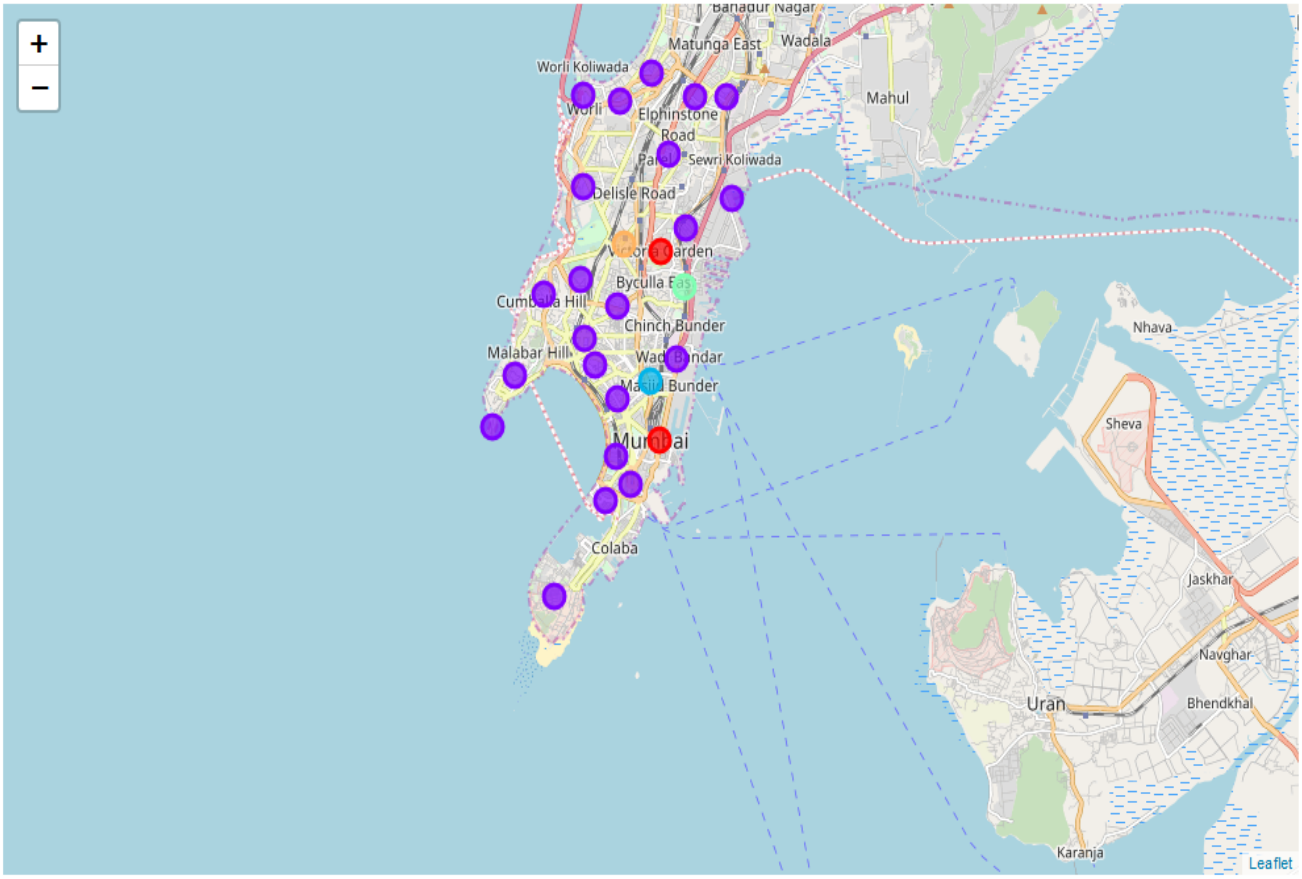
Area	Avg. Price (Rs. Per Sq. Ft.)
Asvini , Colaba , Colaba Bazar , Holiday Camp , V.W.T.C.	68817
New Prabhadevi Road , Prabhadevi	84831
Cumballa Hill , Cumballa Sea Face , Dr Deshmukh Marg , Gowalia Tank	94247
Nariman Point , New Yogakshema	109457
Malabar Hill	125761
Rajbhavan (Mumbai)	125761

- Population Density in South Mumbai

In [19]:
```
#South Mumbai Coordinates
SM_COORDINATES = (18.96, 72.82)

southmumbai_geo = r'southmumbai.geojson'


# create empty map zoomed in on South Mumbai
map = folium.Map(location=SM_COORDINATES,tiles="Mapbox Bright", zoom_start=11)

# creation of the choropleth
map_sc = folium.Map(location=SM_COORDINATES,tiles="Mapbox Bright", zoom_start=11)


map_sc.choropleth(geo_data = southmumbai_geo,
                  name='choropleth',
                  data = southmumbai_propertyrate_data,
                  columns = ['Ward', 'Avg Price'],
                  key_on = 'feature.properties.Ward',
                  fill_color = 'YlOrRd',
                  fill_opacity = 0.7,
                  line_opacity = 0.2,
                  legend_name = 'Property Rate in South Mumbai (Rs. per sq. ft.)')

display(map_sc)
```



5. Clustering

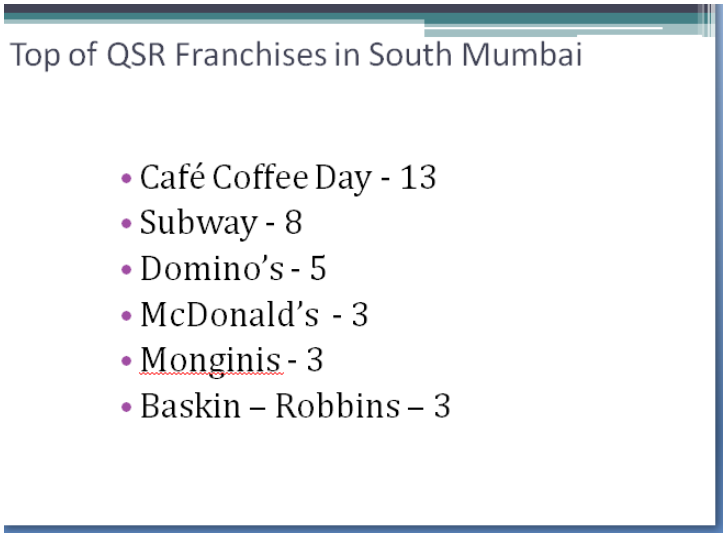


As majority of area of South Mumbai fall into Clustor 1 Cluster 1 details are useful to know which type of Restaurant service are popular in majority of South Mumbai

Clustering is the task of dividing the population or data points into a number of groups such that data points in the same groups are more similar to other data points in the same group and dissimilar to the data points in other groups. It is basically a collection of objects on the basis of similarity and dissimilarity between them.

We have applied clustering to the most popular places of all South Mumbai and find out the major cities are sharing similarities in case of venues.

Results:



- Most Popular Food in Restaurant is "Indian".
- Apart from Indian dishes other popular food items are

  1. Fast Foods (Burger, Vadapav, Pizza, Samosa etc.)

  2. Chinese Dishes

- Most saturated restaurant business area are Nariman Point, Marine Lines, Chaupati, Cumballa Hill, Gowalia Tank, Opera House, Girgaon etc.
- Least saturated restaurant business area are Antop Hill, Chunabhatti, Mazagaon, Reay Road, Chinchbunder, Dockyard Road, Cotton Exchange etc.

Discussion:

- Analysis is performed on limited data set.
- Re-run analysis with updated information.
- Home delivery option for restaurant is also gaining momentum due to food apps like Zomato, Foodpanda, Swiggy so location connectivity is also important
- Property price is variable even for the same location.

Conclusion:

- Analysis is performed on limited data set gathered from "Foursquare"
- Re-run analysis with updated information for better approach.
- Marine Lines and Nariman Point etc has high concentration of restaurant business . Wadala and Sion has good number of restaurants but not as many to count to saturated.
- For restaurant type it is mentioned that Indian Restaurant is preferred one however saturation and competition needed to identify for a preferred venues.
- This analysis can be used by any businessman, restaurateurs or investors who is interested venturing into South Mumbai Restaurant market.