

Applied Data Science Capstone by IBM/Coursera - The Battle of Neighborhoods

Report for the project

For the busy lifestyle in Hong Kong, insufficient time to sleep is a common issues among Hong Kong Workers. In spite of taking leave, they may seek for some refreshment during their working hours, or taking a coffee break in the morning section. One of the chain coffee shop is going to set up their first chain coffee shop in Central, Hong Kong - the International Financial Center of the World. They would like to understand the market in Central and seeking for advisory.

With this project, we will try to discover

1. Number of coffee shop in Central, Hong Kong
2. How many direct competitors on the location they have selected

Preparation

At the starting, we have to include several libraries needed

- request: obtaining information for foursquare
- pandas: DataFrame
- numpy: Mathematical calculation
- folium: Map of visualization

```
In [124]: import requests # library to handle requests
import pandas as pd # library for data analysis
import numpy as np
!pip install folium
import folium
```

```
Requirement already satisfied: folium in ./opt/anaconda3/lib/python3.8/site-packages (0.12.1)
Requirement already satisfied: branca>=0.3.0 in ./opt/anaconda3/lib/python3.8/site-packages (from folium) (0.4.2)
Requirement already satisfied: Jinja2>=2.9 in ./opt/anaconda3/lib/python3.8/site-packages (from folium) (2.11.3)
Requirement already satisfied: requests in ./opt/anaconda3/lib/python3.8/site-packages (from folium) (2.25.1)
Requirement already satisfied: numpy in ./opt/anaconda3/lib/python3.8/site-packages (from folium) (1.20.1)
Requirement already satisfied: MarkupSafe>=0.23 in ./opt/anaconda3/lib/python3.8/site-packages (from Jinja2>=2.9->folium) (1.1.1)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in ./opt/anaconda3/lib/python3.8/site-packages (from requests->folium) (1.26.4)
Requirement already satisfied: idna<3,>=2.5 in ./opt/anaconda3/lib/python3.8/site-packages (from requests->folium) (2.10)
Requirement already satisfied: chardet<5,>=3.0.2 in ./opt/anaconda3/lib/python3.8/site-packages (from requests->folium) (4.0.0)
Requirement already satisfied: certifi>=2017.4.17 in ./opt/anaconda3/lib/python3.8/site-packages (from requests->folium) (2020.12.5)
```

```
In [2]: CLIENT_ID = 'J1M0XTRHBWE15KLRANUDIT2MZL5DALCMWTJFOJ2FVS45NMLY' # your Foursquare
```

```
CLIENT_SECRET = 'N5JWVWW4NR22RDPP4GWYCU4JLMMRRGXHAFODNPCQDSKQMHKR' # your Foursquare
VERSION = '20180604'
LIMIT = 40
print('Your credentails:')
print('CLIENT_ID: ' + CLIENT_ID)
print('CLIENT_SECRET: ' + CLIENT_SECRET)
```

Your credentails:

CLIENT_ID: J1M0XTRHBWE15KLRANUDIT2MZL5DALCMWTJFOJ2FVS45NMLY

CLIENT_SECRET: N5JWVWW4NR22RDPP4GWYCU4JLMMRRGXHAFODNPCQDSKQMHKR

Data Extraction

In this project we are going to use Foursquare as the datasources to provide the life of shops selling coffee

We have to login foursquare with the credential provided, and the parameters to get the list we have to check

In [82]:

```
import requests

request_parameters = {
    "client_id": CLIENT_ID,
    "client_secret": CLIENT_SECRET,
    "v": '20180605',
    "section": "coffee",
    "near": "Hong Kong",
    "radius": 1000,
    "limit": 50}

data = requests.get("https://api.foursquare.com/v2/venues/explore", params=request_parameters)
d=data.json()["response"]
```

Add the results into Pandas DataFrame for Analysis

In [110]:

```
df_raw = []

for item in items:
    venue = item["venue"]
    categories, uid, name, location = venue["categories"], venue["id"], venue["name"], venue["location"]

    category = categories[0]["shortName"]

    address = location['address']
    lat = location["lat"]
    lng = location["lng"]
    datarow = (uid, name, category, address, lat, lng)
    df_raw.append(datarow)

df = pd.DataFrame(df_raw, columns=["uid", "shop", "category", "address", "lat", "lng"])
df.shape[0]
```

Out[110]: 50

In [111]:

```
df
```

Out[111]:

uid	shop	category	address	lat	lng
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	uid	shop	category	address	lat	lng
0	4b1b34f3f964a52093f923e3	Pret A Manger	Sandwiches	Unit 1015, 1/F, ifc mall, 1 Harbour View St	22.284379	114.158362
1	4b42db5af964a52081da25e3	Fuel Espresso	Coffee Shop	Shop 3023, 3/F, IFC Mall, 1 Harbour View St	22.285075	114.157297
2	53997153498e6ead0c55517b	Venchi Chocolate	Desserts	Stanley Street	22.282686	114.155382
3	5a0d44de0531e8240b3b2bea	% Arabica	Coffee Shop	G/F Shop 1050, ifc mall	22.286275	114.157790
4	4b0588d9f964a520efdc22e3	Café Causette	Café	M/F, Mandarin Oriental Hong Kong, 5 Connaught ...	22.281921	114.159477
5	55012f2c498e77729637acdc	Coco Espresso	Café	Shop D, G/F, World Trust Tower, 50 Stanley St	22.282936	114.155180
6	5a8fdb70f96b2c5099742dcb	Coco Espresso	Coffee Shop	13-15 Jervois Street	22.285117	114.152466
7	56077b78498e40df12baa041	Cupping Room	Coffee Shop	18 Cochrane St	22.283160	114.154494
8	55866df7498edcdb402ba294	agnès b. café l.p.g	Café	Shop 3002-05 podium Level 3, IFC Mall, 1Harbou...	22.284538	114.158676
9	537c8948498e3e9c9b80a348	The Envoy	Cocktail	3/F, The Pottinger Hong Kong, 74 Queen's Rd C	22.283092	114.155437
10	4efc6e54be7bd3135a6ddae2	agnès b. CAFÉ L.P.G.	Café	G/F, Chung San House, 8-10 Gough St	22.284135	114.152805
11	4f275069e5e8940a57d3d658	Pret A Manger	Sandwiches	Shop 1, Entrance Hall, The Center, 99 Queen's ...	22.284698	114.154548
12	546af6e0498ef3a86908ebc8	Sunny Hills (微熱山丘)	Bakery	G/F, 8 Chancery Ln	22.280951	114.153623

	uid	shop	category	address	lat	lng
13	4b8bac69f964a52080a632e3	Nespresso	Coffee Shop	Shop 1058, 1/F, IFC Mall, 1 Harbour View St	22.285665	114.158143
14	4ee090f50e01452f9264ab4b	TWG Tea	Tea Room	Shop 1022-1023, 1/F, IFC Mall, 1 Harbour View St	22.284712	114.157964
15	594095bb7269fe1c7c7da666	Fuel Espresso	Coffee Shop	G/F, Chater House, 25 Chater Rd	22.282217	114.158493
16	51eb71cf498efde267049825	Cupping Room	Café	Shop LG, The Centre Mark, 287-299 Queen's Rd C	22.285107	114.150544
17	584798f07220e601a0169e32	Fineprint	Coffee Shop	38 Peel Street	22.282661	114.152736
18	50f8deeee4b0c24382136fa2	Common Ground	Café	19 Shing Wong St	22.283228	114.150953
19	563b2b85cd102e39b962a2f4	Why 50	Café	Shop E, G/F, Fu Fai Commercial Centre, 27 Hill...	22.285155	114.151289
20	5b18ecaff62f2b0039b6164c	Barista By Givres	Coffee Shop	7 Staunton St	22.281638	114.153186
21	4cc8d11fdbbc376b00bdba3bc	Sweet Secrets Cafe and Cake Shop	Cupcakes	G/F, 35 Graham Street	22.282894	114.153501
22	4d47b54d11618cfa3d2fcc23	Fuel Espresso	Coffee Shop	Shop B47A, B/F, The Landmark, 12-16 Des Voeux ...	22.280628	114.157730
23	58f7177dec79e20cae15ce77	Halfway Coffee (半路咖啡)	Café	12 Tung Street	22.284570	114.149967
24	50de6806e4b0fe5bc341bc72	Hazel & Hershey	Café	69 Peel St	22.282196	114.152077
25	585f7dd007ac07684412779f	Sweetpea Café	Coffee Shop	4 Shin Hing Street, Central Hong Kong	22.284068	114.152257
26	4f1314ae1081cbea0521eb7f	mymy Caffè	Coffee Shop	皇后大道中 176號錦安大廈地下E1舖	22.284679	114.153314
27	50ea402c80550ef207081472	Café Queen	Café	Shop A, G/F, Tern Centre, 237 Queens Rd C	22.284825	114.151756

	uid	shop	category	address	lat	lng
28	4b5b248af964a5202fe628e3	Veggie SF Café	Vegetarian / Vegan	10/F, Stanley 11, 11 Stanley St	22.282284	114.155768
29	4f06c1f0e4b0e53f582b66be	Teakha (茶·家)	Tea Room	18 Tai Ping Shan St	22.284506	114.148407
30	56ab5c04498e9e5b39df6362	Metta	Café	21/F, California Tower, 30-32 D'Aguilar St	22.281163	114.155381
31	50910215e4b07b9c2dba6264	Le Salon de Thé de Joël Robuchon	Café	Shop 315, 3/F, The Landmark, 16 Des Voeux Rd C	22.281155	114.157625
32	58cb7ecd2bc5e20a90d019ba	Elephant Grounds	Coffee Shop	G/F, 61 Caine Rd	22.281069	114.152388
33	4b30d8c0f964a52017fc24e3	Classified	Café	108 Hollywood Rd	22.284029	114.150716
34	585df84b8d8e995f7383927f	Cupping Room	Coffee Shop	Shop 8, Silver Jubilee Mansion, 62-72 Po Hing ...	22.284030	114.148409
35	551753e2498eb43066c33d41	TheNest	Café	St. John Catholic Church	22.279166	114.159996
36	584ccb478f0be42a4d8b96ed	The Coffee Academics	Café	24 D'Aguilar Street	22.281229	114.155606
37	5743ccc6498ec71de6b986d3	NODI	Coffee Shop	Shop 115, 1/F, Landmark Charter, 8 Connaught Rd C	22.282049	114.158598
38	4ba3a212f964a520244e38e3	Starbucks (星巴克)	Coffee Shop	Shop E, Central Pier 7 (Star Ferry), Man Kwong St	22.286795	114.160942
39	56272616498e4e24f054aef7	Lady M Cake Boutique	Café	Shop 2096A, 2/F, IFC, 1 Harbour View St	22.284895	114.159241
40	592ff27dc3658844b47d532d	Tom Dixon	Accessories	52 Hollywood Rd	22.282622	114.153235
41	4b7f78faf964a520803030e3	Barista Jam	Coffee Shop	Shop D, G/F, 126-128 Jervois St	22.285563	114.150324

	uid	shop	category	address	lat	lng
42	4caab8c436fa6dcb00f8d278	The Canteen	Café	19 Mercer St	22.285261	114.151921
43	52f1f07b498e3a724184aa03	Filters Lane	Coffee Shop	111 Caine Rd	22.282650	114.150698
44	519c6e2a498e5fbb88cd86df	Freshness Coffee	Coffee Shop	Shop 2B, G/F, Jadestone Court, 138 Caine Rd	22.282994	114.149215
45	52a147b0498e069268ea7411	Café 8	Café	Central Pier No. 8 - Rooftop	22.286348	114.161896
46	5125af34e4b0cb7220ffca32	Caféine	Café	202 Queen's Rd C	22.285038	114.152278
47	4eacd882775bad292f30b122	simplylife CAFÉ	Café	Shop B32, B/F, The Landmark, 12-16 Des Voeux Rd C	22.281222	114.157683
48	4cfb7023c671721e5b8dc318	Homei	Café	22-24A Tai Ping Shan St	22.284730	114.148377
49	529b3100498ef27b34483538	Man Mo Café	Café	40 Upper Lascar Row, Central	22.285019	114.149493

Let's try to visual how's the location for the existing shops!

- Red: Coffee Shop, direct competitor
- Orange: Cafe, indirect competitor
- Green: Others

In [117...

```

from folium import plugins

maphk = folium.Map(location=(center["lat"], center["lng"]), zoom_start=16)

for (j, row) in df.iterrows():
    label = folium.Popup("Name: " + row["shop"] + ", Address: " + row["address"] + ", Category: " + row["category"])
    category = row["category"]

    if category == "Coffee Shop":
        scolor = "red"
    elif category == "Café":
        scolor = "orange"
    else:
        scolor = "green"

    folium.CircleMarker(
        [row["lat"], row["lng"]],
        radius=10,
        popup=label,
        color=scolor,
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7,
        parse_html=False).add_to(maphk)

```

```
maphk
```

Out[117... Make this Notebook Trusted to load map: File -> Trust Notebook

Even though there are a lot of shops will sell coffee, but not all of them are coffee shops

Let's try to mark the place selected for the new store to see how many competitors around other new store

```
In [121...  
lat = center["lat"]  
lng = center["lng"]  
  
folium.CircleMarker(  
    [lat, lng],  
    radius=10,  
    popup="O Day Roi!",  
    color='Grey',  
    fill=True,  
    fill_color='#ff00ff',  
    fill_opacity=0.7,  
    parse_html=False).add_to(maphk)  
  
maphk
```

Out[121... Make this Notebook Trusted to load map: File -> Trust Notebook

There are 7 shops around but only 3 are coffee shops, however there is still a potential to setup a new shop as the place selected is a commercial center, and most of the office are there. The demand of coffee should be still high!

Conclusion

With the help of using four square and python, we can locate all the shops near our selected location in an effective manner, with the help of visualization, decision making can be done in proper and effective manner, it helps the chain company to decide whether they should continue their plan on setting up a new plan

According to the plan and map analysed, there are a lot of coffee shops or cafe available in the selected area, it means the demand and capacity for adopting new coffee shop is high since there are several buildings and offices with coffee lovers! It would be a good signal to the investor to continue their plan to set up a new chain store in the designated area