Capstone Project

Presentation

June
2020

Overview

Background

- Fast pace of college students; students do not have time to cook.

- Students choose to eat out in restaurants more often.

- For students at Columbia University, many of them live around campus; high demand for restaurants near campus.

- The high proportion of international students gives opportunity to not only American restaurants but restaurants which make other cuisines.

Overview

Business Problem

- Many individuals and small businesses want to capture this opportunity to open a new restaurant around Columbia University's campus.

- But they do not have the knowledge of what type of restaurant to open as they do not possess the knowledge of restaurant popularity among students.

- Certainly, they do not want to waste money on opening an unpopular restaurant, and they are eager to fill this gap of information.

Data Acquisition

Step 1

Use Google API to get the geographical coordinates of Columbia University:
(40.8079488, -73.96179735775709)

Data Acquisition

Step 2

Use the Foursquare API to explore the neighborhood, and store relevant information into a data frame.

	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Alma Mater Statue	40.807726	-73.962252	Outdoor Sculpture
1	Arts and Crafts Beer Parlor	40.806689	-73.961094	Pub
2	Nous Espresso Bar - Graduate Student Center	40.807533	-73.960879	Café
3	Columbia Greenmarket	40.807195	-73.964335	Farmers Market
4	Morningside Park	40.806144	-73.958797	Park

Data Analyses

Count how many venues are in each venue category.

	Category	Count
0	Coffee Shop	7
1	Park	5
2	Italian Restaurant	5
3	American Restaurant	4
4	Seafood Restaurant	4
5	Mexican Restaurant	4
6	Bakery	3
7	Grocery Store	3
8	Playground	3
9	Bookstore	3
10	Chinese Restaurant	3
11	Bagel Shop	2
12	Sandwich Place	2
13	Burger Joint	2
14	Wine Shop	2
15	Pizza Place	2
16	Caribbean Restaurant	2
17	Farmers Market	2
18	Salon / Barbershop	1
19	Ethiopian Restaurant	1
20	Food Truck	1
21	Dessert Shop	1

22	Whisky Bar	1
23	Spa	1
24	Vietnamese Restaurant	1
25	Middle Eastern Restaurant	1
26	Greek Restaurant	1
27	Ramen Restaurant	1
28	Thai Restaurant	1
29	Food Court	1
30	Latin American Restaurant	1
31	Hawaiian Restaurant	1
32	Bank	1
33	Fountain	1
34	Juice Bar	1
35	Gastropub	1
36	Salad Place	1
37	Gay Bar	1
38	Cocktail Bar	1
39	Arts & Crafts Store	1
40	Wine Bar	1
41	Garden	1
42	Speakeasy	1
43	Dog Run	1
44	Indian Restaurant	1
45	Dumpling Restaurant	1

46	Southern / Soul Food Restaurant	1
47	Outdoor Sculpture	1
48	Pub	1
49	French Restaurant	1
50	Café	1
51	Boutique	1
52	Historic Site	1
53	African Restaurant	1
54	Ice Cream Shop	1
55	Theater	1
56	Tennis Court	1
57	Deli / Bodega	1
58	Pharmacy	1
59	Music Venue	1

There are 60 unique categories, but we are only interested in the most common ones. Let's only focus on the top 10 most common venues.

- We can see clearly that coffee shops, parks, Italian restaurants are most common.

- But in this list, there are many venues that are not in the restaurant category, such as bookstore, playground, grocery store, bakery, park, and coffee shop.

Venue Summary
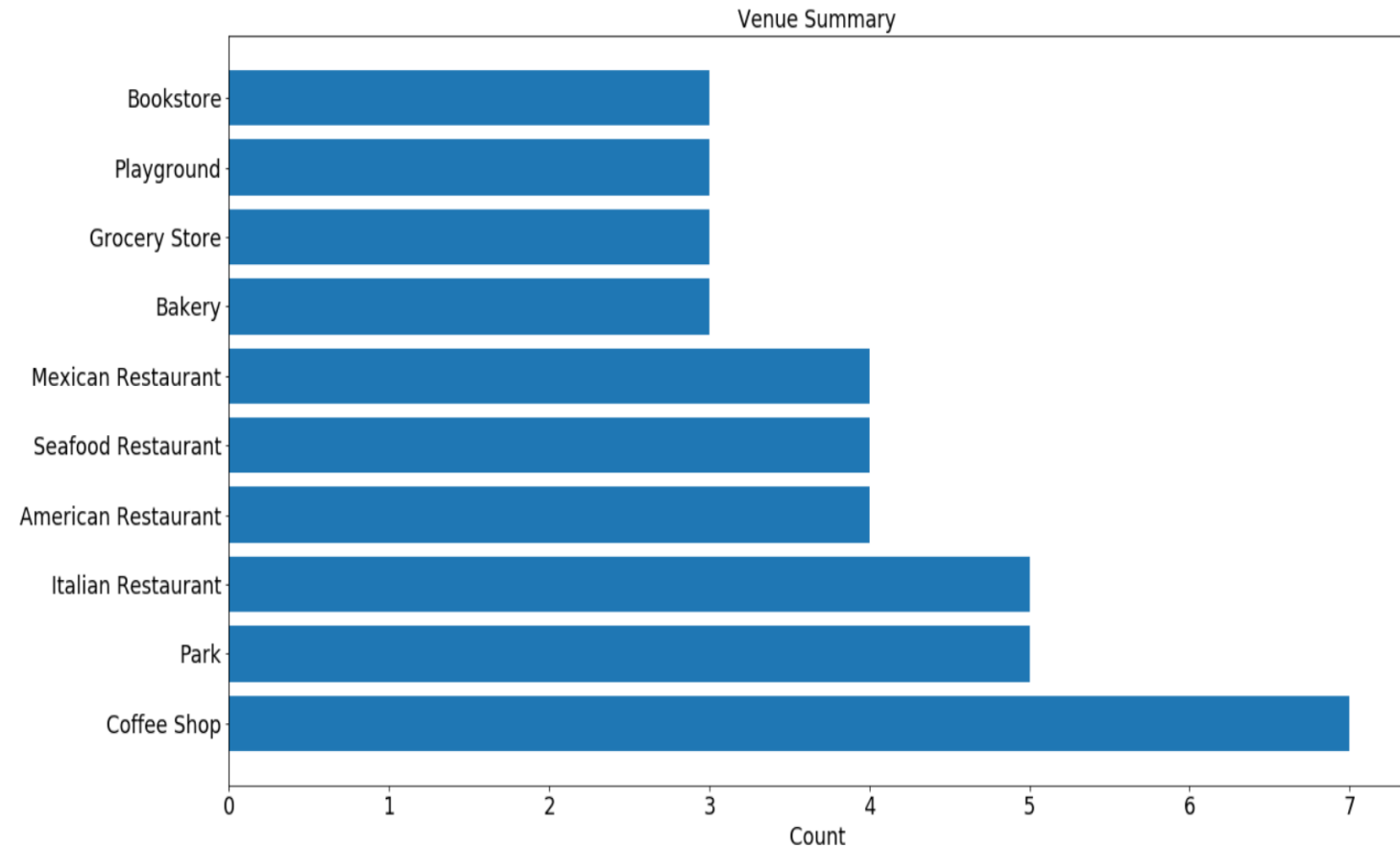
Let us only search for restaurants when we make request to Foursquare, and again we store the information into a data frame.

	name	categories	address	crossStreet	lat	lng	labeledLatLngs	distance	postalCode	cc	city	state	country	formattedAddress	neighborhood	
0	Tom's Restaurant	Diner	2880 Broadway	at W 112th St	40.805436	-73.965334	[{'label': 'display', 'lat': 40.805436, 'lng':...	408	10025	US	New York	NY	United States	[2880 Broadway (at W 112th St), New York, NY 1...	NaN	415c9
1	Chocolat Restaurant & Bar	American Restaurant	2223 Frederick Douglass Blvd	at W 120th St	40.806982	-73.953751	[{'label': 'display', 'lat': 40.8069823, 'lng'...	686	10026	US	New York	NY	United States	[2223 Frederick Douglass Blvd (at W 120th St),...	NaN	505e73
2	Acosta Deli - Restaurant	Latin American Restaurant	934 Amsterdam Ave	106th	40.800293	-73.965621	[{'label': 'display', 'lat': 40.80029263884989...	911	10025	US	New York	NY	United States	[934 Amsterdam Ave (106th), New York, NY 10025...	NaN	4cb1f
3	Accra Restaurant	African Restaurant	2065 Adam Clayton Powell Jr Blvd	At West 122nd street	40.807868	-73.949107	[{'label': 'display', 'lat': 40.80786779413678...	1069	10027	US	New York	NY	United States	[2065 Adam Clayton Powell Jr Blvd (At West 122...	Central Harlem	513e60
4	Amsterdam Pizza Restaurant	Diner	1343 Amsterdam Ave	at 125th St	40.813465	-73.955948	[{'label': 'display', 'lat': 40.8134651184082,...	787	10027	US	New York	NY	United States	[1343 Amsterdam Ave (at 125th St), New York, N...	NaN	4c03f

Count the number of restaurants in each category.

	Category	Count
0	Chinese Restaurant	6
1	Food	5
2	Restaurant	4
3	Latin American Restaurant	4
4	Seafood Restaurant	3
5	Spanish Restaurant	3
6	Caribbean Restaurant	3
7	Diner	2
8	African Restaurant	2
9	Middle Eastern Restaurant	2
10	Korean Restaurant	2
11	Mexican Restaurant	1
12	American Restaurant	1
13	Breakfast Spot	1
14	Eastern European Restaurant	1
15	Cocktail Bar	1
16	Metro Station	1
17	Pizza Place	1
18	Housing Development	1
19	Thai Restaurant	1
20	Music Venue	1
21	Indian Restaurant	1

- Remove ambiguous categories like food, restaurant, and dinner.
- Choose only top 7.

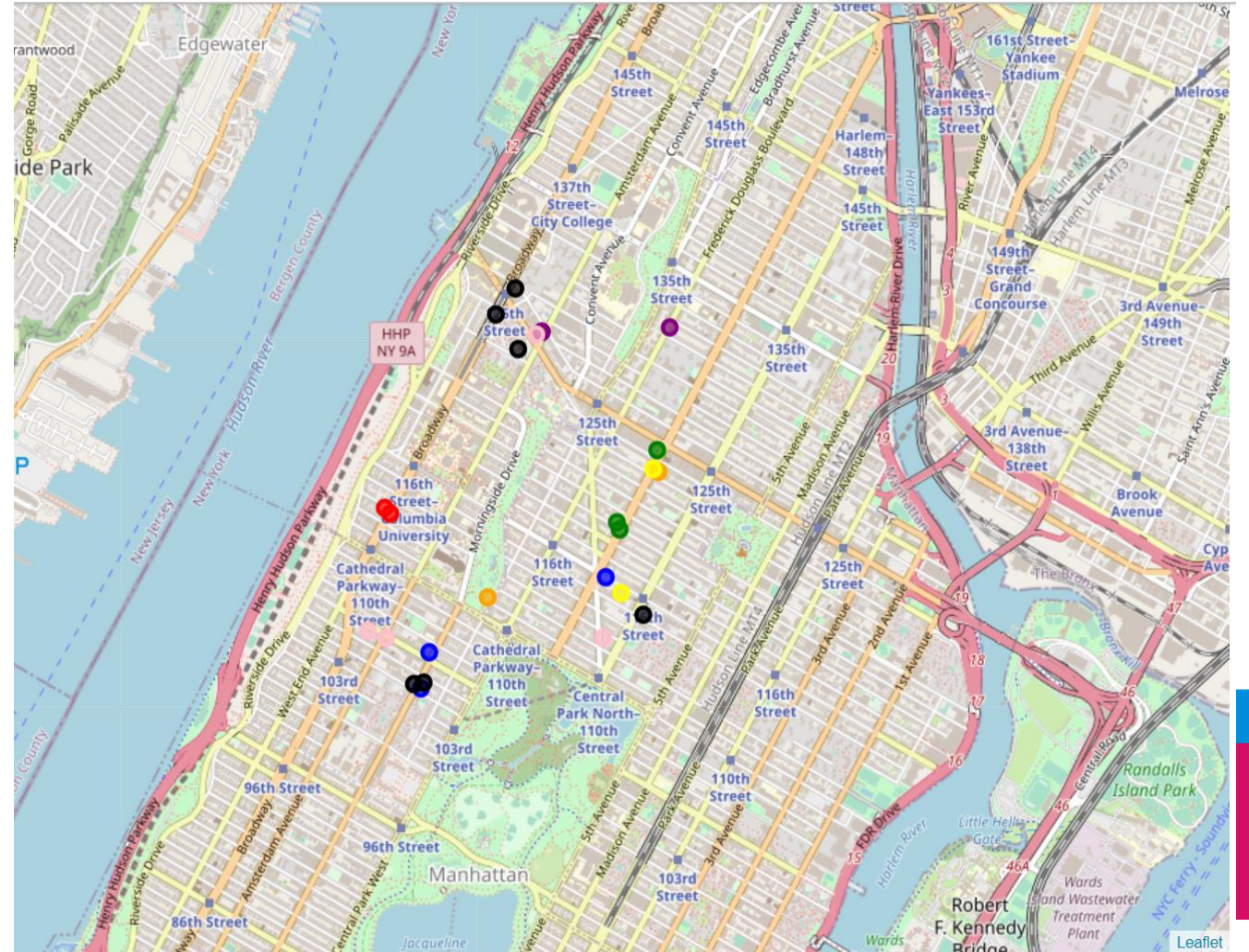|	Category	Count
0	Chinese Restaurant	6
1	Latin American Restaurant	4
2	Seafood Restaurant	3
3	Spanish Restaurant	3
4	Caribbean Restaurant	3
5	African Restaurant	2
6	Middle Eastern Restaurant	2
7	Korean Restaurant	2

Results

we find that the 8 most common restaurant categories are Chinese, Latin American, Seafood, Spanish, Caribbean, African, Middle Eastern, and Korean.

Top Restaurant Summary
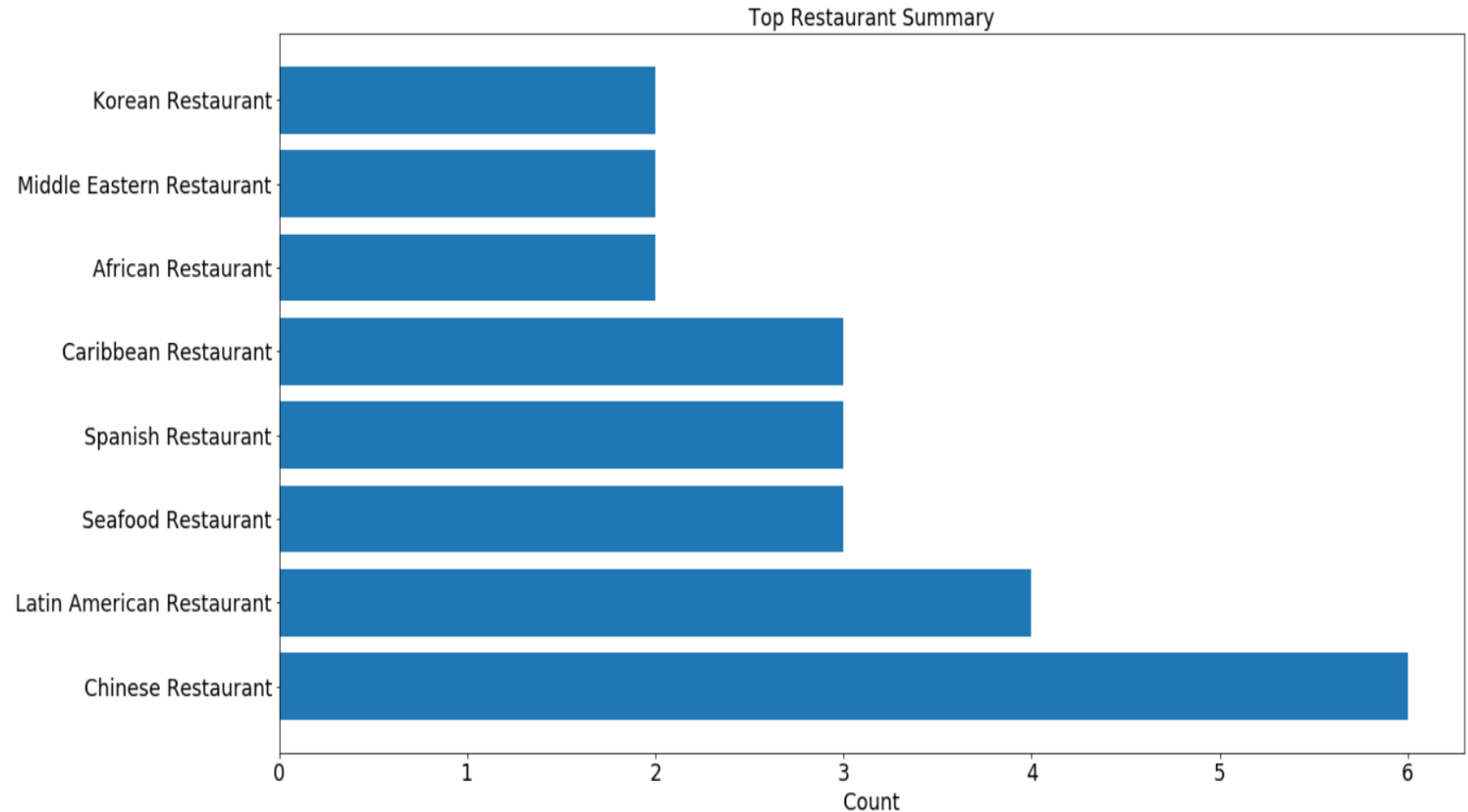
Discussion

We can also look at clusters. We can see that Korean restaurants (red dots) are located at the west side, where Caribbean restaurants (green dots) are located on the east side. African restaurants (yellow dots) are also located on the east side, where seafood restaurants (purple dots) are located on the north side.

Therefore, choosing a good location is also something to consider when opening a new restaurant, you might want to decide on a strategy whether you want to open the restaurant near other restaurant of the same type to exploit synergy and maybe eat their pie, or you want to open the restaurant at a distant location with the same type of restaurants to explore new demand.

Thank You