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New Ramen Restaurant in New York City

Where is the best place to open the restaurant?

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Introduction

New York City has is the place where is high competition for restaurant businesses. Every year, new restaurants open, and many restaurants cannot survive the competition and close down for good. One factor of the successful restaurant business is the location. Even though the restaurant has an excellent chef and serves excellent food, if the accessibility was good enough, it cannot build enough positive reviews to attract more people to come.

Objectives

- **<u>Find the best location to open a new Ramen restaurant in New York City</u>**
  - Identify the area where is the small number of crimes occurred in the past.
  - Find the less competitive area for the ramen restaurant
    - Number of the restaurants in each borough
    - Number of the ramen restaurants in each borough

Data

- FourSquare API data

  to identify the low number of restaurant/ramen shops in the neighborhood.

- NYPD Complaint Data Historical
  - This dataset includes all valid felony, misdemeanor, and violation crimes reported to the New York City Police Department (NYPD) from 2006 to the end of last year (2017). For additional details, please see the attached data dictionary in the ‘About’ section. (NYC Open Data, 2018)

Snapshot of the crime dataset (31 Columns/40,000 observations)

Column Name	Description	Type
CMPLNT_NUM	Randomly generated persistent ID for each complaint	Number
CMPLNT_FR_DT	Exact date of occurrence for the reported event (or starting date of occurrence, if CMPLNT_TO_DT exists)	Date & Time
CMPLNT_FR_TM	Exact time of occurrence for the reported event (or starting time of occurrence, if CMPLNT_TO_TM exists)	Plain Text
CMPLNT_TO_DT	Ending date of occurrence for the reported event, if exact time of occurrence is unknown	Date & Time
CMPLNT_TO_TM	Ending time of occurrence for the reported event, if exact time of occurrence is unknown	Plain Text
ADDR_PCT_CD	The precinct in which the incident occurred	Number
RPT_DT	Date event was reported to police	Date & Time
KY_CD	Three digit offense classification code	Number
OFNS_DESC	Description of offense corresponding with key code	Plain Text
PD_CD	Three digit internal classification code (more granular than Key Code)	Number
PD_DESC	Description of internal classification corresponding with PD code (more granular than Offense Description)	Plain Text
CRM_ATPT_CPTD_CD	Indicator of whether crime was successfully completed or attempted, but failed or was interrupted prematurely	Plain Text
LAW_CAT_CD	Level of offense: felony, misdemeanor, violation	Plain Text
BORO_NM	The name of the borough in which the incident occurred	Plain Text
LOC_OF_OCCUR_DESC	Specific location of occurrence in or around the premises; inside, opposite of, front of, rear of	Plain Text
PREM_TYP_DESC	Specific description of premises; grocery store, residence, street, etc.	Plain Text
JURIS_DESC	Description of the jurisdiction code	Plain Text
JURISDICTION_CODE	Jurisdiction responsible for incident. Either internal, like Police(0), Transit(1), and Housing(2); or external(3), like Correction, Port Authority, etc.	Number
PARKS_NM	Name of NYC park, playground or greenspace of occurrence, if applicable (state parks are not included)	Plain Text
HADEVELOPT	Name of NYCHA housing development of occurrence, if applicable	Plain Text
HOUSING_PSA	Development Level Code	Plain Text
X_COORD_CD	X-coordinate for New York State Plane Coordinate System, Long Island Zone, NAD 83, units feet (FIPS 3104)	Number
Y_COORD_CD	Y-coordinate for New York State Plane Coordinate System, Long Island Zone, NAD 83, units feet (FIPS 3104)	Number
SUSP_AGE_GROUP	Suspect's Age Group	Plain Text
SUSP_RACE	Suspect's Race Description	Plain Text
SUSP_SEX	Suspect's Sex Description	Plain Text
TRANSIT_DISTRICT	Transit district in which the offense occurred.	Number
Latitude	Midblock Latitude coordinate for Global Coordinate System, WGS 1984, decimal degrees (EPSG 4326)	Number
Longitude	Midblock Longitude coordinate for Global Coordinate System, WGS 1984, decimal degrees (EPSG 4326)	Number
Lat_Lon	Geospatial Location Point (latitude and Longitude combined)	Location
PATROL_BORO	The name of the patrol borough in which the incident occurred	Plain Text
STATION_NAME	Transit station name	Plain Text
VIC_AGE_GROUP	Victim's Age Group	Plain Text
VIC_RACE	Victim's Race Description	Plain Text
VIC_SEX	Victim's Sex Description	Plain Text

The number of crimes in each borough

- Brooklyn has the highest number of crimes among 5 borough.
- Staten Island has the lowest number of crimes.

Offence by borough

- Petit Larceny has the highest number of the offence categories.

Crime complaints on NYC map

Crime complaints are populated in Manhattan, Bronx, and Brooklyn area on a map

The frequency of restaurants/ramen restaurants in each borough

0: The Bronx

1: Brooklyn

2: Manhattan

3: Queens

4: Staten Island

- Staten Island has the least frequency for the all the categories. (Restaurant, Ramen Restaurant, and Japanese Restaurant)

```
In [18]: nyc_grouped['Restaurant']

Out[18]: 0    0.007669
         1    0.012023
         2    0.009631
         3    0.009303
         4    0.010695
         Name: Restaurant, dtype: float64
```

```
In [19]: nyc_grouped['Ramen Restaurant']

Out[19]: 0    0.000000
         1    0.002186
         2    0.004240
         3    0.001584
         4    0.000000
         Name: Ramen Restaurant, dtype: float64
```

```
In [20]: nyc_grouped['Japanese Restaurant']

Out[20]: 0    0.000935
         1    0.008996
         2    0.012876
         3    0.010293
         4    0.005348
         Name: Japanese Restaurant, dtype: float64
```

Cluster Analysis (Number of clusters =3)

- Clusters are assigned, and shown on a map by color.

Cluster 1

The Bronx area's most populated venue is the pizza place, doughnut shop, and grocery store..etc

In [63]:
```
#Details for Cluster 1
nyc_merged.loc[nyc_merged['Cluster_Labels'] == 0, nyc_merged.columns[[1] + list(range(3, nyc_merged.shape[1]))]]
```

Out[63]:

	latitude	Cluster_Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	40.827414	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant
6	40.819127	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant
9	40.861392	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant
24	40.828767	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant
27	40.840930	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant
30	40.840627	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant
31	40.841695	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant
36	40.829155	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant
40	40.887451	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant
47	40.848674	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant
52	40.861843	0	Pizza Place	Donut Shop	Grocery Store	Fast Food Restaurant	Deli / Bodega	Pharmacy	Chinese Restaurant	Fried Chicken Joint	Sandwich Place	Spanish Restaurant

Cluster 2

Manhattan, Queens and Brooklyn areas have a lot of restaurants (Pizza place, coffee shop, bar...etc)

[64]:
```
#Cluster 2
nyc_merged.loc[nyc_merged['Cluster_Labels'] == 1, nyc_merged.columns[[1] + list(range(3, nyc_merged.shape[1]))]]
```

Out[64]:

	latitude	Cluster_Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
1	40.637097	1	Pizza Place	Coffee Shop	Bar	Deli / Bodega	Bakery	Chinese Restaurant	Grocery Store	Caribbean Restaurant	Café	Mexican Restaurant
2	40.679260	1	Pizza Place	Chinese Restaurant	Bakery	Deli / Bodega	Grocery Store	Korean Restaurant	Pharmacy	Donut Shop	Mexican Restaurant	Sandwich Place
3	40.687402	1	Pizza Place	Coffee Shop	Bar	Deli / Bodega	Bakery	Chinese Restaurant	Grocery Store	Caribbean Restaurant	Café	Mexican Restaurant
4	40.831576	1	Coffee Shop	Italian Restaurant	Pizza Place	Hotel	American Restaurant	Theater	Bakery	Bar	Café	Mexican Restaurant
5	40.643368	1	Pizza Place	Coffee Shop	Bar	Deli / Bodega	Bakery	Chinese Restaurant	Grocery Store	Caribbean Restaurant	Café	Mexican Restaurant
7	40.673329	1	Pizza Place	Coffee Shop	Bar	Deli / Bodega	Bakery	Chinese Restaurant	Grocery Store	Caribbean Restaurant	Café	Mexican Restaurant
8	40.849415	1	Coffee Shop	Italian Restaurant	Pizza Place	Hotel	American Restaurant	Theater	Bakery	Bar	Café	Mexican Restaurant
10	40.638923	1	Pizza Place	Coffee Shop	Bar	Deli / Bodega	Bakery	Chinese Restaurant	Grocery Store	Caribbean Restaurant	Café	Mexican Restaurant
12	40.676902	1	Pizza Place	Coffee Shop	Bar	Deli / Bodega	Bakery	Chinese Restaurant	Grocery Store	Caribbean Restaurant	Café	Mexican Restaurant
13	40.662856	1	Pizza Place	Coffee Shop	Bar	Deli / Bodega	Bakery	Chinese Restaurant	Grocery Store	Caribbean Restaurant	Café	Mexican Restaurant
14	40.789689	1	Pizza Place	Chinese Restaurant	Bakery	Deli / Bodega	Grocery Store	Korean Restaurant	Pharmacy	Donut Shop	Mexican Restaurant	Sandwich Place

Cluster 3

Non restaurants venues are more populated in Staten Island,
although pizza place and Italian restaurant are popular in the area.

```
#Cluster 3
nyc_merged.loc[nyc_merged['Cluster_Labels'] == 2, nyc_merged.columns[[1] + list(range(3, nyc_merged.shape[1]))]]
```

56]:

	latitude	Cluster_Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
11	40.591872	2	Bus Stop	Pizza Place	Deli / Bodega	Italian Restaurant	Cosmetics Shop	Clothing Store	Bagel Shop	Sandwich Place	Chinese Restaurant	Liquor Store
61	40.528464	2	Bus Stop	Pizza Place	Deli / Bodega	Italian Restaurant	Cosmetics Shop	Clothing Store	Bagel Shop	Sandwich Place	Chinese Restaurant	Liquor Store
81	40.621570	2	Bus Stop	Pizza Place	Deli / Bodega	Italian Restaurant	Cosmetics Shop	Clothing Store	Bagel Shop	Sandwich Place	Chinese Restaurant	Liquor Store
118	40.573850	2	Bus Stop	Pizza Place	Deli / Bodega	Italian Restaurant	Cosmetics Shop	Clothing Store	Bagel Shop	Sandwich Place	Chinese Restaurant	Liquor Store
134	40.623816	2	Bus Stop	Pizza Place	Deli / Bodega	Italian Restaurant	Cosmetics Shop	Clothing Store	Bagel Shop	Sandwich Place	Chinese Restaurant	Liquor Store
146	40.605687	2	Bus Stop	Pizza Place	Deli / Bodega	Italian Restaurant	Cosmetics Shop	Clothing Store	Bagel Shop	Sandwich Place	Chinese Restaurant	Liquor Store
156	40.633366	2	Bus Stop	Pizza Place	Deli / Bodega	Italian Restaurant	Cosmetics Shop	Clothing Store	Bagel Shop	Sandwich Place	Chinese Restaurant	Liquor Store

Result

- Based on NYPD complaint data, the bar chart and map show Staten Island is the safest borough in New York City
- the foursquare data shows that the highest number of the restaurant exists in Manhattan, and Staten Island has the least number of restaurants.
- There are more Japanese restaurants in Manhattan and Brooklyn than three other boroughs, The Bronx and Queens.
- Staten Island is less likely to be competitive and the safest borough among five boroughs for a new ramen shop.
- Cluster analysis revealed that Manhattan, Queens and Brooklyn areas have a lot of restaurants (Pizza place, coffee shop, bar,,,etc.)
- The Bronx area's most populated venue is the pizza place, doughnut shop, and grocery store,,,etc.
- Non restaurants venues are more populated in Staten Island, although pizza place and Italian restaurant are popular in the area. For a ramen shop, there are less competitive and more opportunity for the restaurant location.

Conclusion

- Staten Island is the best place for a new ramen shop to open in New York City.
- Staten Island shows the least number of crimes occurred, and the least number of restaurants and ramen shop among the borough.
- For the future analysis, the study should include other factors which can lead the successful of the establishing a business such as population in the area.

References

- NYPD Complaint Data Historical, retrieved from: https://data.cityofnewyork.us/Public-Safety/NYPD-Complaint-Data-Historic/qgea-i56i