The Battle of Neighborhoods (Week 2)

1. Introduction / Business Problem

Background

A foreign restaurant company is looking for the best place to open their business in the Philippines where it requires that the location should be in the following:

1. high concentration of corporations for prospect customers
2. proximity to shopping malls or grocery stores for food supplies
3. established competitors as basis for human traffic in the area

First, we need to determine which region and city in the Philippines is the best location and then finally to identify which neighborhood is ideal considering above requirements.

Target Audience

The project also aims to target the following audience:

1. Businesses looking for new location to open their shops
2. Employees and job seekers trying to find their preferred neighborhood
3. Travelers searching for a place to stay where proximity to amenities is important

2. Data

To solve the problem as defined, the following data are required:

1. **List of cities in the Philippines** from Wikipedia to ensure all top cities in the country are considered. The Wikipedia website's table containing the list of cities will be scraped using BeautifulSoup to be stored in Pandas DataFrame.

   Link: https://en.wikipedia.org/wiki/List_of_cities_in_the_Philippines

City	Population (2015) [4]	Area [5][i]	Density (2015)	Province [5][ii]	Region	Legal class [6]
🌐 Alaminos	89,708	164.26 km² (63.42 sq mi)	550/km² (1,400/sq mi)	Pangasinan	I	CC
🌐 Angeles	411,634 [vi]	60.27 km² (23.27 sq mi)	6,200/km² (16,000/sq mi)	Pampanga	III	HUC
🌐 Antipolo	776,386	306.10 km² (118.19 sq mi)	2,500/km² (6,500/sq mi)	Rizal	IV-A	CC
🌐 Bacolod	561,875	162.67 km² (62.81 sq mi)	3,500/km² (9,100/sq mi)	Negros Occidental	VI	HUC
🌐 Bacoor	600,609	46.17 km² (17.83 sq mi)	13,000/km² (34,000/sq mi)	Cavite	IV-A	CC

2. The following will also be utilized to ensure that there is business demand and pricing of commodities are stable for profitability of the company:

A. **Projected Population of the Philippines** from 2020 to 2045 (used as basis for long term business demand)

Link: https://psa.gov.ph/sites/default/files/attachments/hsd/pressrelease/2010%20CB%20-%20Tables%20for%20Special%20Release.xlsx

Table 3. Projected Regional and Provincial Population by Selected Age Group, and by Five-Calendar Years, Philippines: 2010-2045 (Medium Assumption)

| Region/Prov/ Age/Sex	2010	2015	2020	2025	2030	2035	2040	2045
NATIONAL CAPITAL REGION								
Pop 0-4	1,172,000	1,339,600	1,230,700	1,096,800	1,000,300	926,100	858,600	772,300
Pop 0-14	3,446,100	3,550,200	3,577,900	3,518,700	3,201,000	2,918,600	2,695,200	2,475,400
Pop 15-64	8,041,800	8,556,200	8,974,200	9,262,400	9,666,800	9,901,900	9,959,400	9,817,900
Pop 60 & over	684,900	899,900	1,185,300	1,503,100	1,860,600	2,228,400	2,656,700	3,108,800
Pop 65 & over	402,900	545,300	728,800	974,100	1,245,600	1,545,100	1,853,300	2,215,000
Female 15-49	3,503,300	3,619,000	3,671,200	3,682,300	3,715,200	3,647,100	3,507,300	3,341,200

B. **Consumer Price Index (CPI)** for All Income Households by Commodity Group and Geographic Area 2012 to 2018 – Philippines (used to gauge and ensure stability of pricing and expenses)

Link: http://openstat.psa.gov.ph/sites/default/files/CPI_2012%3D100_2012-2018_v_1.xlsx

| Geographic Location	Code	Description	Jan	Nov_1	Dec_1	Ave_1
NCR - National Capital Region	01	Food And Non-Alcoholic Beverages	98.6	130.0	129.6	127.7
NCR - National Capital Region	02	Alcoholic Beverages, Tobacco And Other Vegetable-Based Tobacco Products	96.7	182.1	182.2	179.0
NCR - National Capital Region	03	Clothing And Footwear	96.0	119.7	120.0	118.5
NCR - National Capital Region	04	Housing, Water, Electricity, Gas And Other Fuels	98.0	106.8	106.8	105.7
NCR - National Capital Region	05	Furnishings, Household Equipment And Routine Household Maintenance	97.5	116.8	116.9	115.5
NCR - National Capital Region	06	Health	99.1	120.2	120.3	117.8
NCR - National Capital Region	07	Transport	99.9	111.4	106.2	105.1
NCR - National Capital Region	08	Communication	99.7	101.4	101.4	101.2
NCR - National Capital Region	09	Recreation And Culture	99.1	113.0	113.0	111.7
NCR - National Capital Region	10	Education	98.1	123.0	123.0	122.6
NCR - National Capital Region	11	Restaurants And Miscellaneous Goods And Services	99.4	112.1	112.1	110.1

3. **Foursquare API** - to be used to get the top venues of neighborhoods
   Link: https://developer.foursquare.com/places-api#accountTypes
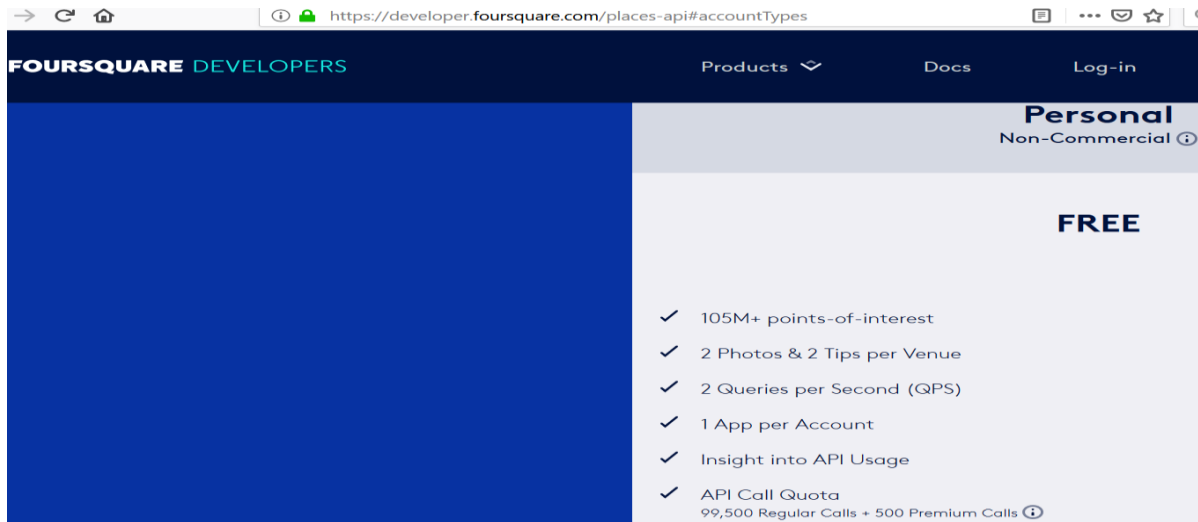


3. Methodology

Overview
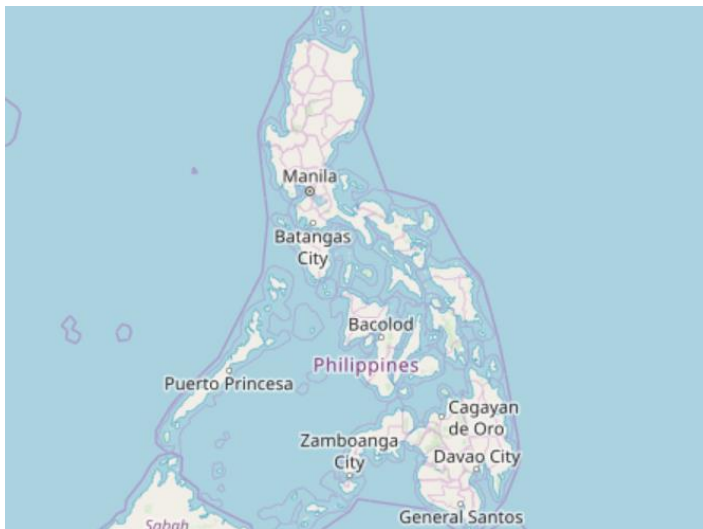
The Philippines is an archipelago that comprises over 7,000 islands with a total land area of 115,831 square miles, grouped into three: Luzon (north), Visayas (center) and Mindanao (south). The country has diverse population which is spread all over cities and provinces.

In order to achieve the objective of finding the ideal location to open a restaurant the following steps were performed:

1. First, to find the best city in the Philippines considering customer demands and business operational cost. Accordingly, density per city for customer demand, population projection for long term viability of the business, and consumer purchasing index (CPI) were used as basis. CPI is a statistical estimate which measures changes in the price level of market basket of consumer goods and services purchased by households.

2. Second, clustering the neighborhoods of the selected City using **Kmeans**. Kmeans is an unsupervised machine learning clustering algorithm, which can partition unlabeled data with similar characteristics to quickly discover insights.

3. Finally, select the best cluster of neighborhoods visually based on the cloud map of categories of venues generated from Foursquare.

    (Note: Please Jupyter Notebook for the detailed step by step procedures performed on exploratory analysis)

Cities of the Philippines
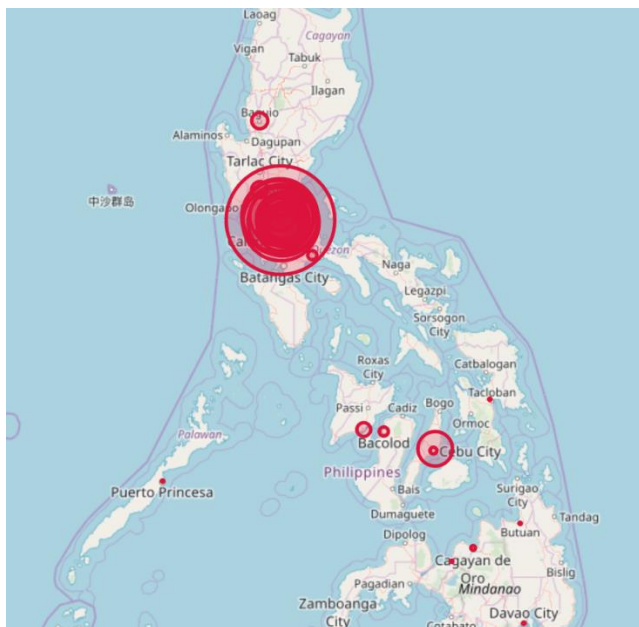
	City	Population	Area(sq mi)	Density(/sq mi)	Region
0	Caloocan	1583978	20.59	78000.0	NCR
1	Las Piñas	588894	12.62	47000.0	NCR
2	Makati	582602	8.33	70000.0	NCR
3	Malabon	365525	6.07	60000.0	NCR
4	Mandaluyong	386276	8.21	47000.0	NCR
5	Manila	1780148	16.56	110000.0	NCR
6	Marikina	450741	8.31	54000.0	NCR
7	Muntinlupa	504509	15.35	34000.0	NCR
8	Navotas	249463	4.16	73000.0	NCR
9	Parañaque	665822	18.41	36000.0	NCR
10	Pasay	416522	5.39	78000.0	NCR
11	Pasig	755300	11.97	41000.0	NCR
12	Quezon City	2936116	64.17	44000.0	NCR
13	San Juan	122180	2.30	54000.0	NCR
14	Taguig	804915	20.72	39000.0	NCR
15	Valenzuela	620422	18.15	34000.0	NCR

As per Philippine Statistics Authority (https://psa.gov.ph), the National Capital Region (NCR) or commonly known as Metro Manila has a population of 12.8M in only an area of 239 square miles (620 sq km) as of 2015. This is roughly 13% of the total population in the country.

NCR (Metro Manila)

Population of Highly Urbanized Cities in the Philippines
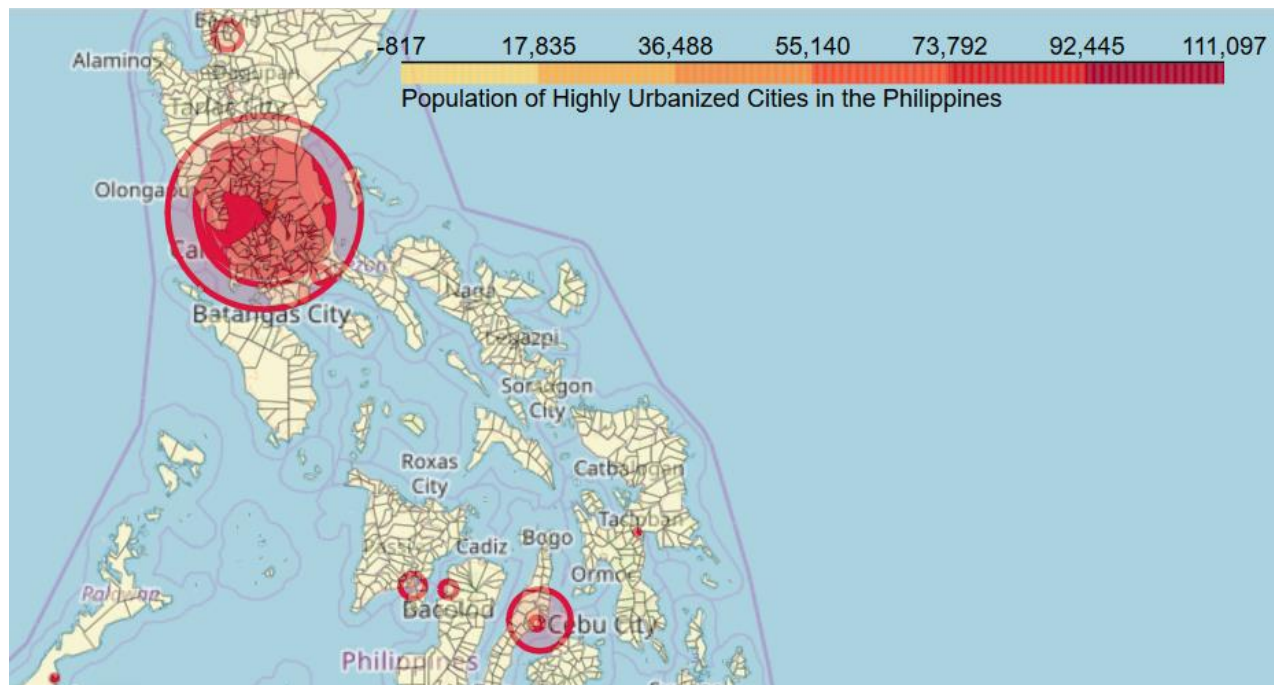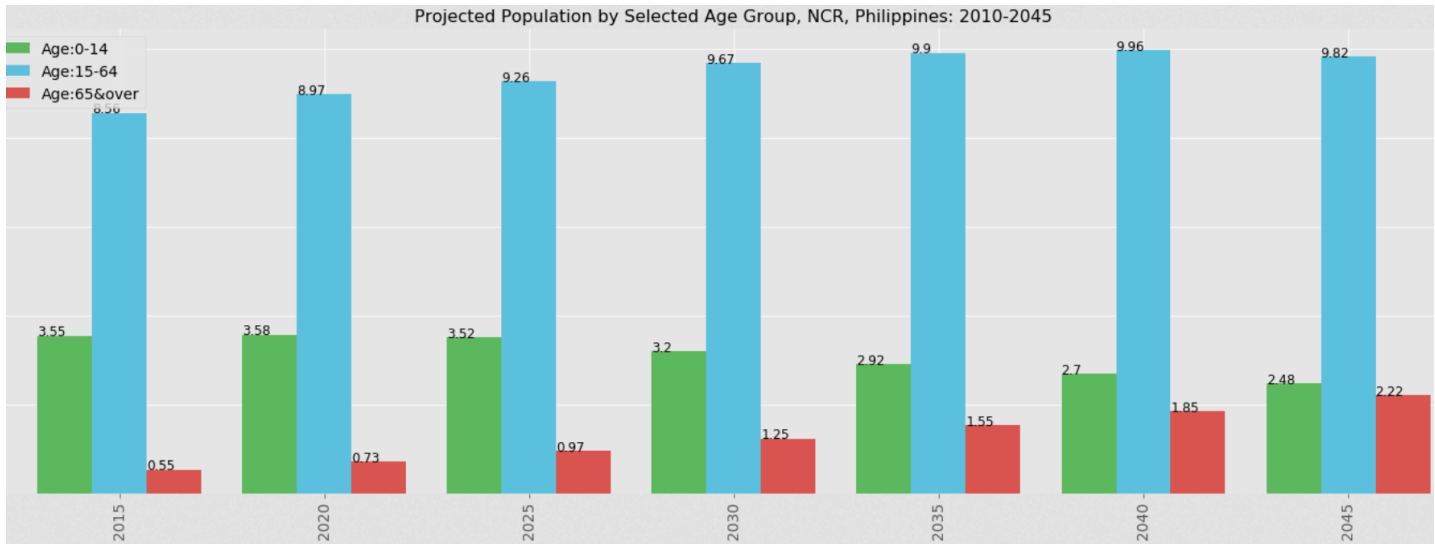
The top 5 cities are Manila (110,000), Pasay (78,000), Caloocan (78,000), Navotas (73,000) and Makati (70,000) in terms of Density per square mile.

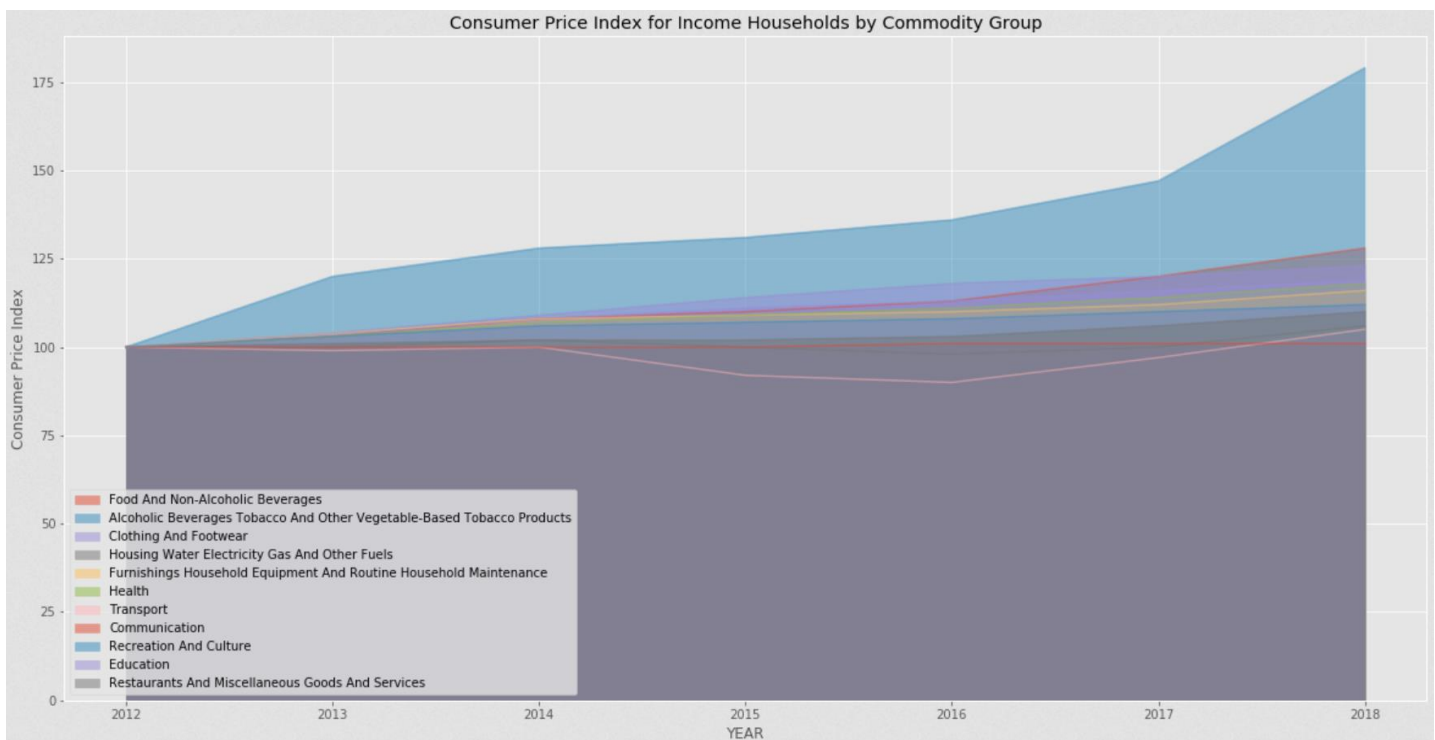Top Cities of National Capital Region of the Philippines
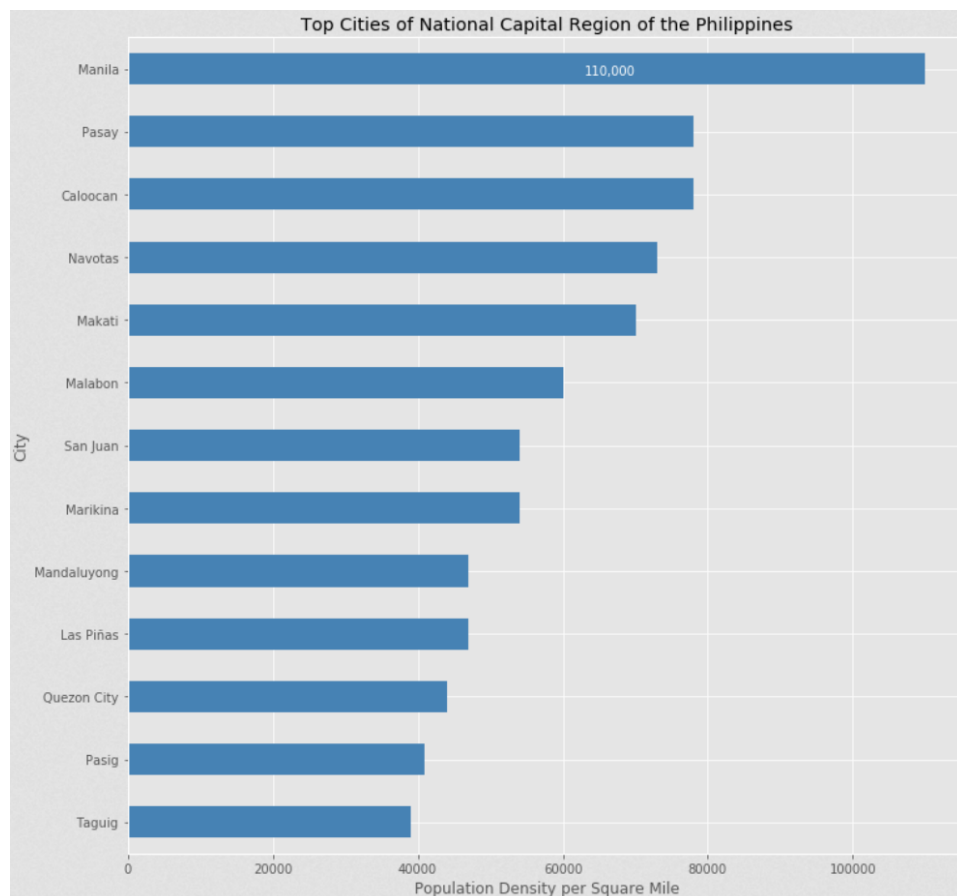
Projected Population

The projected population in Metro Manila is expected to increase by 630,000 or 5% from 2015 to 2020, and will continue to increase gradually every 5 years until 2045, particularly senior citizens.

Consumer Price Index

The trend of Consumer Price Index from 2012 to 2018 for Metro Manila of all household goods and services including Foods are steady except for Alcoholic Beverages and Tobacco which incurred a 79% increase (100 to 179) due to sin taxes imposed by the government.

Accordingly, business operational costs such as food and beverage supplies, lease and rentals, electricity, water, gas, communication and transportation are expected to be stable as well in the future.

4. Results and Discussion

The best city

Based on the above exploratory data analysis and qualitative research about the cities mentioned, the City of **Makati** was selected due to the following:

1. It is one of the top 5 cities in Density per square mile (70,000 / sq mi) with a population of 582,602.

2. It is currently the top business district in the country with the highest concentration of multinational and local corporations.

3. Strategically located in the center of Metro Manila, as shown in the map below, it is surrounded by other cities such as Mandaluyong, Pasig, Taguig, Pasay and Manila.
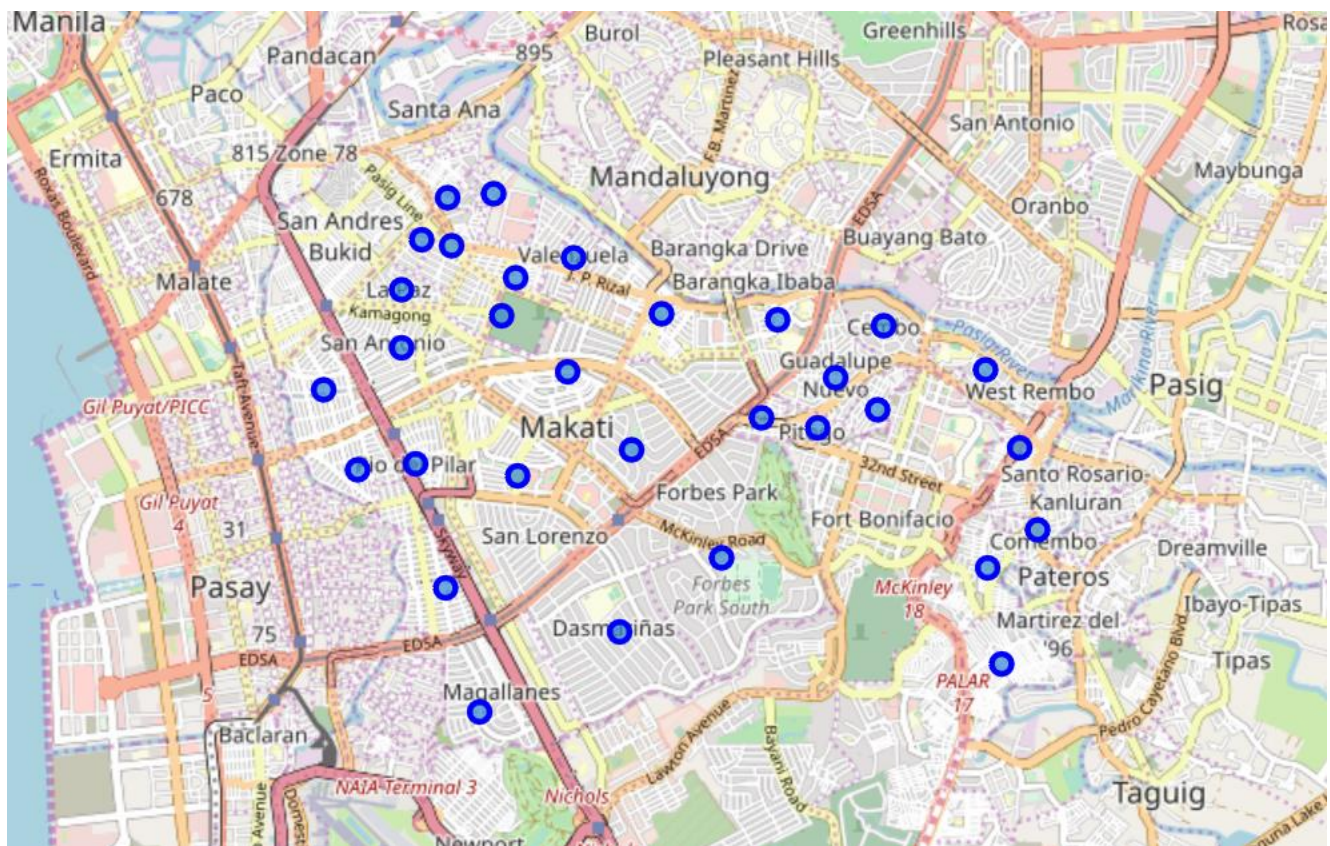
(Note: Please Jupyter Notebook for the detailed step by step procedures performed on clustering of neighborhoods)

As per Wikipedia, there are 31 neighborhoods in Makati which were clustered using Kmeans as shown below:
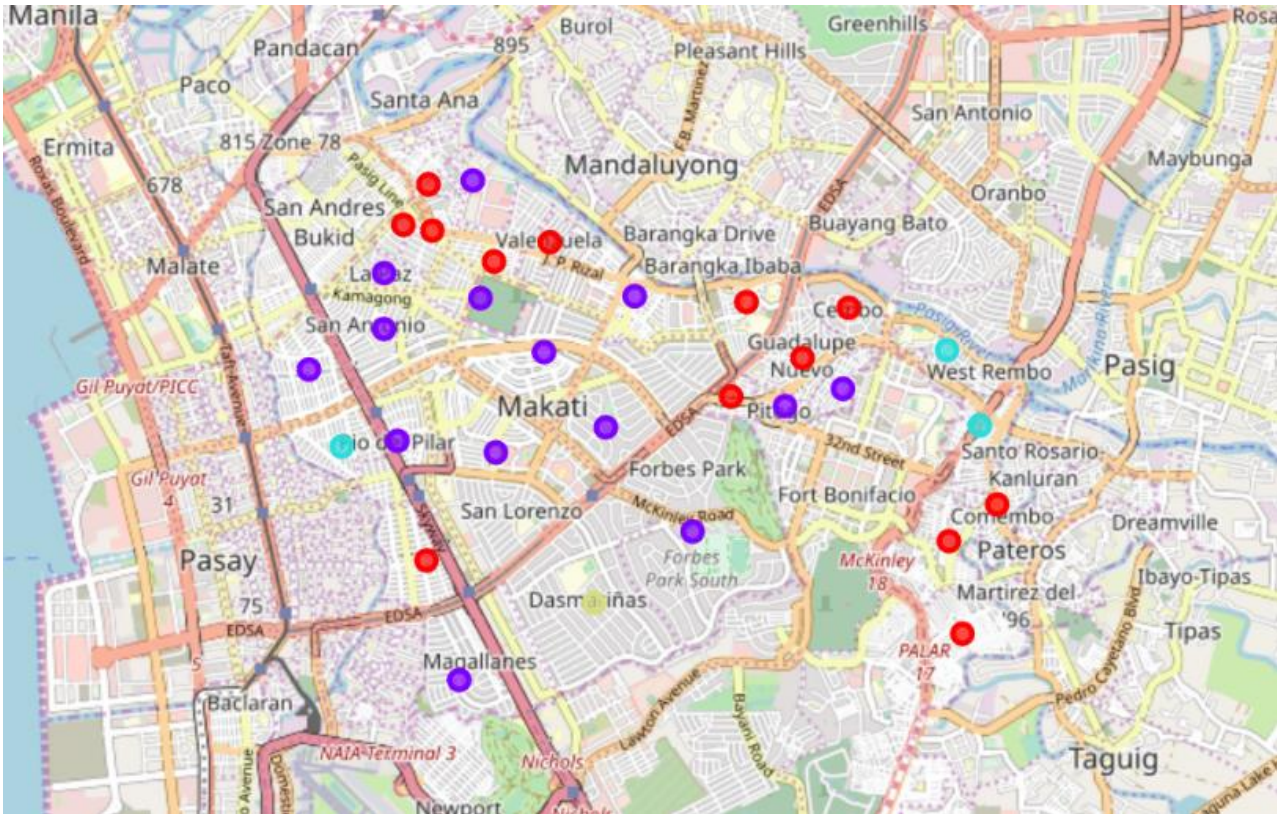
There are 4 Clusters, as follows:

Cluster 1

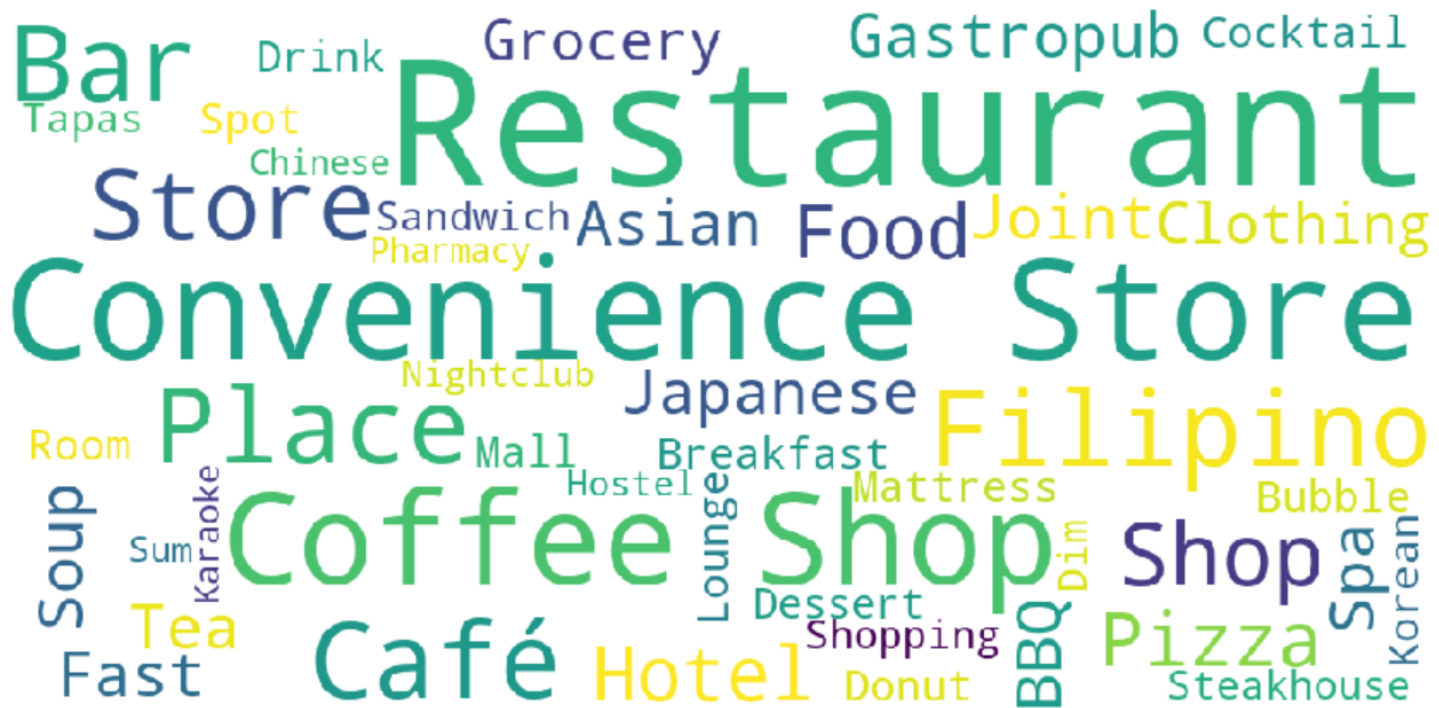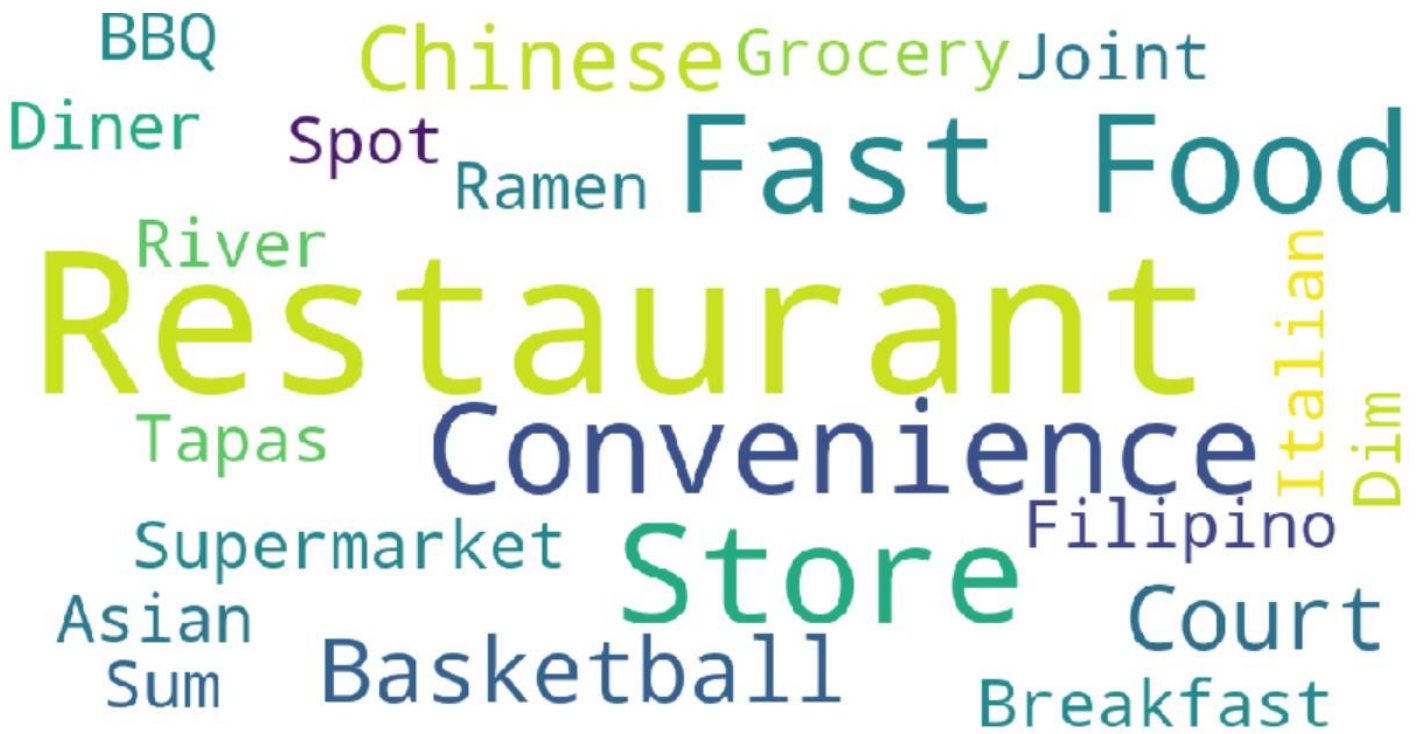|	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
3	Cembo	Park	Pharmacy	Basketball Court	Convenience Store	Cupcake Shop	Coworking Space	Farmers Market	Falafel Restaurant	Event Space	Empanada Restaurant
15	Pembo	Convenience Store	Basketball Court	Cosmetics Shop	Creperie	Cupcake Shop	Field	Fast Food Restaurant	Farmers Market	Falafel Restaurant	Event Space
20	Rizal	Basketball Court	Convenience Store	Breakfast Spot	Campground	Cupcake Shop	Coworking Space	Fast Food Restaurant	Farmers Market	Falafel Restaurant	Event Space

Cluster 2

	Neighborhood	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	Bangkal	Convenience Store	Cocktail Bar	Bar	Fast Food Restaurant	Nightclub	Burger Joint	Restaurant	Resort	Chinese Restaurant	Pub
1	Bel-Air	Coffee Shop	Café	Steakhouse	Pizza Place	Japanese Restaurant	Spa	Restaurant	Filipino Restaurant	Creperie	Mediterranean Restaurant
2	Carmona	Gastropub	Coffee Shop	Clothing Store	Convenience Store	Shopping Mall	Seafood Restaurant	Burger Joint	Café	Restaurant	Pastry Shop
7	Forbes Park	Dessert Shop	Coffee Shop	Café	Lounge	Italian Restaurant	Japanese Restaurant	Breakfast Spot	Bar	Deli / Bodega	Field
11	La Paz	Convenience Store	Filipino Restaurant	Hotel	Bar	Cupcake Shop	Burger Joint	Café	Restaurant	Cosmetics Shop	Pizza Place
12	Magallanes	Spa	BBQ Joint	Food & Drink Shop	Mattress Store	Supermarket	Diner	Ice Cream Shop	Coffee Shop	Cupcake Shop	Electronics Store
13	Olympia	Convenience Store	Filipino Restaurant	Bar	Soup Place	Spa	Bike Shop	Beer Garden	Café	Shopping Mall	Tapas Restaurant
14	Palanan	Coffee Shop	Pizza Place	Pharmacy	Filipino Restaurant	Bakery	Garden	Bridal Shop	Snack Place	Fast Food Restaurant	Bookstore
16	Pinagkaisahan	Breakfast Spot	Sandwich Place	Convenience Store	Asian Restaurant	Grocery Store	Drugstore	Fast Food Restaurant	Farmers Market	Falafel Restaurant	Event Space
17	Pio del Pilar	Japanese Restaurant	Convenience Store	Pizza Place	Tea Room	Restaurant	Music Venue	Spa	Fast Food Restaurant	Coffee Shop	Diner
18	Pitogo	Coffee Shop	Convenience Store	Café	Bubble Tea Shop	Filipino Restaurant	Pizza Place	Fast Food Restaurant	Bar	Spa	Steakhouse
19	Poblacion	Coffee Shop	Korean Restaurant	Chinese Restaurant	Café	Breakfast Spot	Spa	Cocktail Bar	Hotel	Asian Restaurant	Pizza Place
21	San Antonio	Convenience Store	BBQ Joint	Bar	Japanese Restaurant	Filipino Restaurant	Bakery	Spa	Restaurant	Shopping Mall	Music Venue
23	San Lorenzo	Café	Spa	Shopping Mall	Coffee Shop	Japanese Restaurant	Cosmetics Shop	Filipino Restaurant	Clothing Store	Italian Restaurant	Gym
24	Santa Cruz	Grocery Store	Karaoke Bar	Filipino Restaurant	Convenience Store	BBQ Joint	Bakery	Hotel	Beer Bar	Japanese Restaurant	Korean Restaurant
25	Singkamas	Hostel	Grocery Store	Donut Shop	Soup Place	Convenience Store	Supermarket	BBQ Joint	Spa	Asian Restaurant	Diner
26	South Cembo	Coffee Shop	Café	Nightclub	Gastropub	Movie Theater	Hospital	Pizza Place	Shopping Mall	Burger Joint	Cantonese Restaurant
27	Tejeros	Convenience Store	Hotel	Tapas Restaurant	Dim Sum Restaurant	Donut Shop	Sandwich Place	Fast Food Restaurant	Filipino Restaurant	Spa	Beer Garden
28	Urdaneta	Coffee Shop	Clothing Store	Asian Restaurant	Filipino Restaurant	Department Store	Restaurant	Cocktail Bar	Comic Shop	Cosmetics Shop	Pharmacy
29	Valenzuela	Convenience Store	Filipino Restaurant	Fast Food Restaurant	Hotel	Boutique	Wings Joint	Italian Restaurant	Malay Restaurant	Men's Store	Empanada Restaurant

Cluster 3

	Neighborhood	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
4	Comembo	Convenience Store	Diner	Fast Food Restaurant	Grocery Store	Soup Place	Food & Drink Shop	Dessert Shop	Breakfast Spot	Gym / Fitness Center	Asian Restaurant
6	East Rembo	Fast Food Restaurant	River	Basketball Court	Breakfast Spot	Women's Store	Drugstore	Farmers Market	Falafel Restaurant	Event Space	Empanada Restaurant
8	Guadalupe Nuevo	Convenience Store	Fast Food Restaurant	Basketball Court	BBQ Joint	Smoke Shop	Farmers Market	Burger Joint	Electronics Store	Bakery	Breakfast Spot
9	Guadalupe Viejo	Fast Food Restaurant	Restaurant	Convenience Store	Italian Restaurant	Bakery	Market	Spanish Restaurant	Taco Place	Boutique	Bar
10	Kasilawan	Dim Sum Restaurant	Asian Restaurant	Convenience Store	Supermarket	Electronics Store	BBQ Joint	Grocery Store	Fast Food Restaurant	Department Store	Cupcake Shop
22	San Isidro	Fast Food Restaurant	Chinese Restaurant	Filipino Restaurant	Ramen Restaurant	Bar	Pizza Place	Pharmacy	Restaurant	Cupcake Shop	Convenience Store
30	West Rembo	Fast Food Restaurant	Convenience Store	Tapas Restaurant	Chinese Restaurant	Sandwich Place	Breakfast Spot	Soccer Stadium	Filipino Restaurant	Fried Chicken Joint	Coffee Shop

Cluster 4

	Neighborhood	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
5	Dasmariñas	Soccer Field	Baseball Field	Plaza	Gym	Basketball Court	Farmers Market	Falafel Restaurant	Event Space	Empanada Restaurant	Electronics Store

5. Conclusion

Based on the above, the neighborhoods of Cluster 2 is the ideal place to open the restaurant business in consideration of restaurants, groceries, malls and convenience stores being ubiquitous specifically around the area of the triangle which is the center of Cluster 2 drawn in the map below.