

The Battle of Neighborhoods

1. Introduction & Business Problem

Problem Background

The City of New York, is one of the most populous cities in the United States. It contains a diversity of multicultural ethnicity that provides good opportunities in several ways of business. It is the financial capital of USA, so it's an attractive city for the commerce. The city is considered as a center for banking and finance, retailing, world trade, transportation, tourism, traditional media, advertising, legal services, accountancy and other important business activities in the United States.

City brings good opportunities for people, but it also very competitive about markets, one of them is food market. As it is highly developed city so cost of doing business is also one of the highest. In other words, any new business or product need to be analyzed very carefully before to launch to the market. The objectives as result of the analysis could help to make a reasonable judge about introducing a new product or establish a good understanding of a new market environment. The analysis will help to reduce the risk in the investment making the return will be reasonable.

Problem Description

A restaurant is a place where meals are prepared and served to customers in return for money. The New York City contains several types of excellent food related with the gastronomy of many parts of the world. Many restaurants are influenced for the immigrant history, so there is a competitive market to show the culture through the preparation of tasty dishes. Next, will be presented examples of kinds meals that there are in New York currently.

Ashkenazi Jewish cuisine: Much of the cuisine usually associated with New York City stems in part from its large community of Ashkenazi Jews and their descendants. Among their famous dishes are: New York-style pastrami, pastrami on rye, brisket, corned beef, tongue, knish, New York-style bagels and lox, Bagel and cream cheese, whitefish with and without pike and others.

Italian-American cuisine: Like the Ashkenazi-Jewish community, much of the cuisine usually associated with New York City stems in part from its large community of Italian-Americans and their descendants. Their main dishes are: Cappuccino, New York-style pizza, Spaghetti and meatballs, Cannoli, Chicken parmigiana, Sausage and peppers, New York-style Italian ice, Sicilian style pizza, pasta primavera and others.

Chino-Latino cuisine: It is a cuisine associated with New York City stems, by and large, to the earliest migration of Chinese migrants to Cuba in the mid-1800s. They have dishes as: Fried rice, Fried Pork Chop, Lumpiang Shanghai, Sesame Chicken, Chicken and Broccoli, Egg Drop Soup, Oxtail stew, Cuban chicharrones de pollo, White Rice with Black Beans and Churrasco

Cuban-Chino Food: Cuban and Chinese food are similar in many ways such that a huge portion of their dishes revolve around white meats such as pork and starches such as rice.

As we can see, there are many kinds of meals in New York city, so it is evident that there are a competitive market. It is important to develop a financial and strategy plan to decide to open this kind of business. It necessary consider factors related with the population of the city, meal business

and also topics about index of crime. These factors, help to make important decisions about the location to open a new restaurant.

Target Audience

It helps to ABC company or a personal business to have an idea about the environment of restaurant in New York city. The main insight is to locate and recommend the management the correct location to open a restaurant through the help of data analysis and algorithms related with Data Science. The analysis will be included clusters about the borough of New York

2. Data Description

Neighborhood has a total of 5 boroughs and 306 neighborhoods. In order to segment the neighborhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood.

This dataset exists for free on the web. The link to the dataset is the following: https://geo.nyu.edu/catalog/nyu_2451_34572

The information related with Cuisine of New York can be easily founded through the following link: https://en.wikipedia.org/wiki/Cuisine_of_New_York_City

Crimes and delinquency information can be extracted from the following link: <https://www1.nyc.gov/site/nypd/stats/crime-statistics/borough-and-precinct-crime-stats.page>

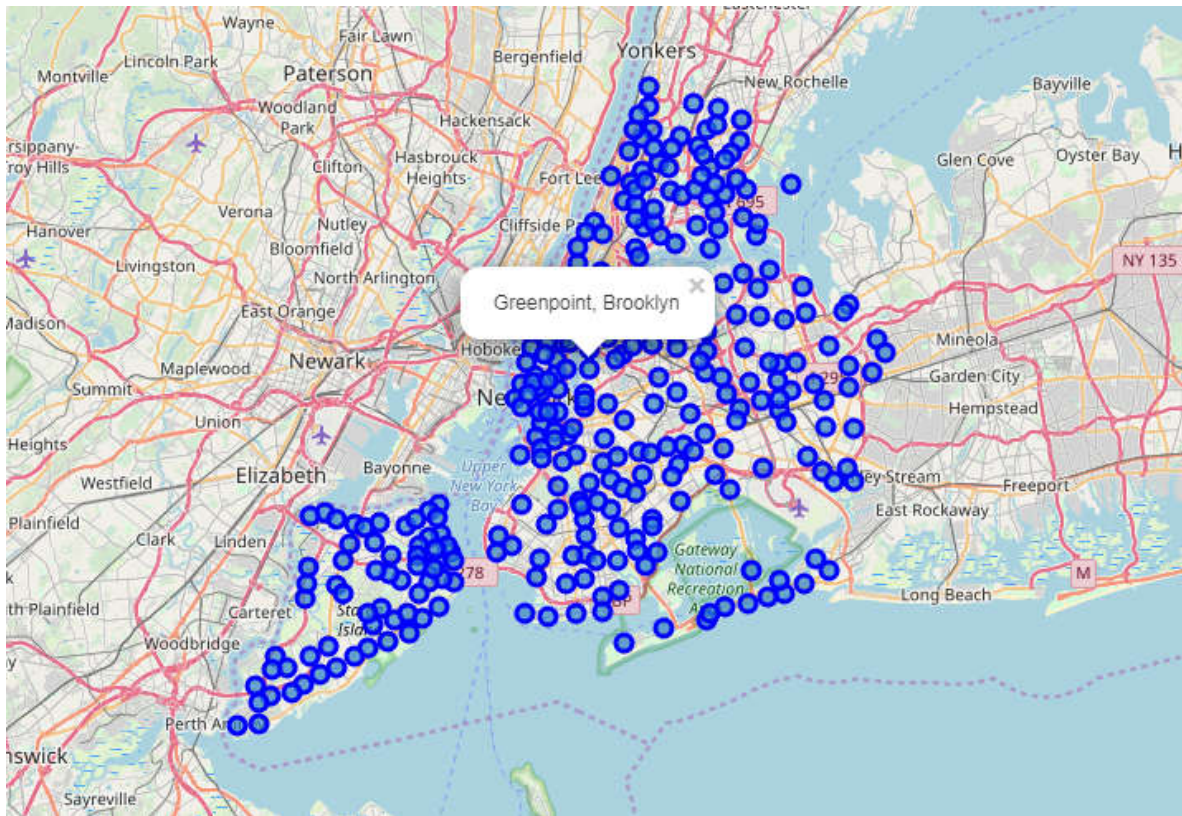
Finally, data related with geographical information and coordinates data can be used from Foursquare API, that will be leveraged to provision venues information for each neighborhood. This information will be very useful to explore conditions of neighborhoods in New York City.

3. Methodology of Analysis

3.1 Types of Cuisine

The goal is to give some recommendation for the company ABC to open a restaurant through a good location in New York city. It necessary to explore the data of how it is composed the city in Borough and Neighborhood

	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585



The types of food that are served can be resume in the following image.



In the same way, it is necessary to describe types of that each borough of New York City has.

- The Bronx borough has the following types of cuisine, where the Italian and Puerto Rican are the most preferred

	Borough	Neighborhood	Cuisine
0	Bronx	Bedford Park	Mexican, Puerto Rican, Dominican, Korean
1	Bronx	Belmont	Italian, Albanian
2	Bronx	City Island	Italian, Seafood
3	Bronx	Morris Park	Italian, Albanian
4	Bronx	Norwood	Filipino
5	Bronx	Riverdale	Jewish
6	Bronx	South Bronx	Puerto Rican, Dominican
7	Bronx	Wakefield	Jamaican, West Indian
8	Bronx	Woodlawn	Irish



- The Queens borough has the following types of cuisine. The most common types of food are the Italian and the Indian

	Borough	Neighborhood	Cuisine
0	Queens	Astoria	Greek, Italian, Eastern European, Brazilian, E...
1	Queens	Bellerose	Indian and Pakistani
2	Queens	Flushing	Chinese and Korean
3	Queens	Forest Hills	Jewish, Russian, Uzbek
4	Queens	Kew Gardens Hills	Jewish, Russian, Uzbek
5	Queens	Rego Park	Jewish, Russian, Uzbek
6	Queens	Howard Beach	Italian
7	Queens	Ozone Park	Italian
8	Queens	Glendale	German and Polish
9	Queens	Jackson Heights	Indian, Pakistani, Bangladeshi, Colombian, Ecu...
10	Queens	Jamaica	Bangladeshi, Caribbean, American, African, Creole
11	Queens	Little Neck	Arab, Chinese, and Italian
12	Queens	Richmond Hill	Indian, Guyanese, West Indian, Pakistani, Bang...
13	Queens	The Rockaways	Irish, Jewish
14	Queens	Woodhaven	Irish, Dominican, Mexican, Guyanese
15	Queens	Woodside	Filipino, Irish, Mexican, Tibetan, Romanian
16	Queens	Sunnyside	Filipino, Irish, Mexican, Tibetan, Romanian

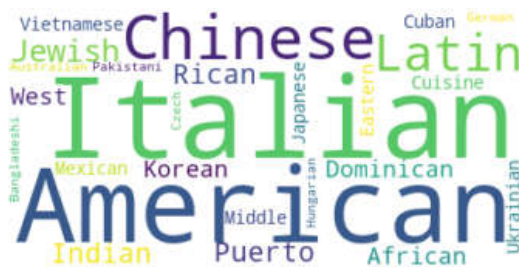
- The Staten Island is the borough with the lowest number of neighborhoods. The most cuisine are Italian and Russian.

	Borough	Neighborhood	Cuisine
0	Staten Island	Port Richmond	Mexican, Indian, Italian
1	Staten Island	Rossville	Italian, Russian, Arab, Polish
2	Staten Island	South Beach	Italian, Russian, Arab, Polish
3	Staten Island	Great Kills	Italian, Russian, Arab, Polish
4	Staten Island	Tompkinsville	Italian, Sri Lankan, Pakistani, Indian



- The last borough Manhattan has the following types of cuisine

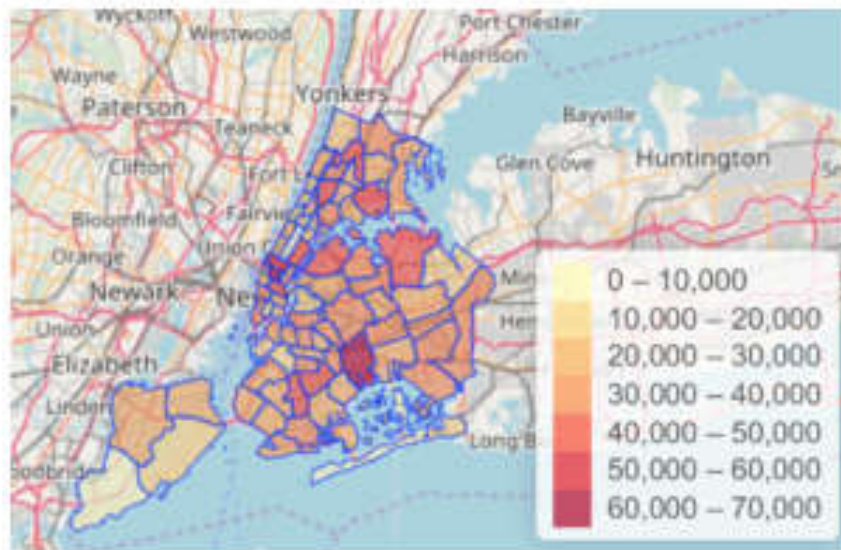
	Borough	Neighborhood	Cuisine
0	Manhattan	Chinatown	Chinese and Vietnamese
1	Manhattan	East Harlem	Puerto Rican, Mexican, Dominican, Chinese, Cub...
2	Manhattan	East Village	Japanese, Korean, Indian and Ukrainian
3	Manhattan	Greenwich Village	Italian and Middle Eastern
4	Manhattan	Harlem	Italian, African American, Latin American, Wes...
5	Manhattan	Koreatown	Korean
6	Manhattan	Nolita	Australian
7	Manhattan	Little Italy	Italian
8	Manhattan	Lower East Side	Puerto Rican, Jewish, Italian, Latin American
9	Manhattan	Murray Hill	Indian, Pakistani, Bangladeshi
10	Manhattan	Upper West Side	Jewish, Chinese, Latin American
11	Manhattan	Manhattan	Jewish, Chinese, Latin American
12	Manhattan	Washington Heights	Dominican, Puerto Rican, Italian, Jewish
13	Manhattan	Upper East Side	German, Czech, Hungarian



3.2 Index Crime in New York

The level of crime could be represented through the following table

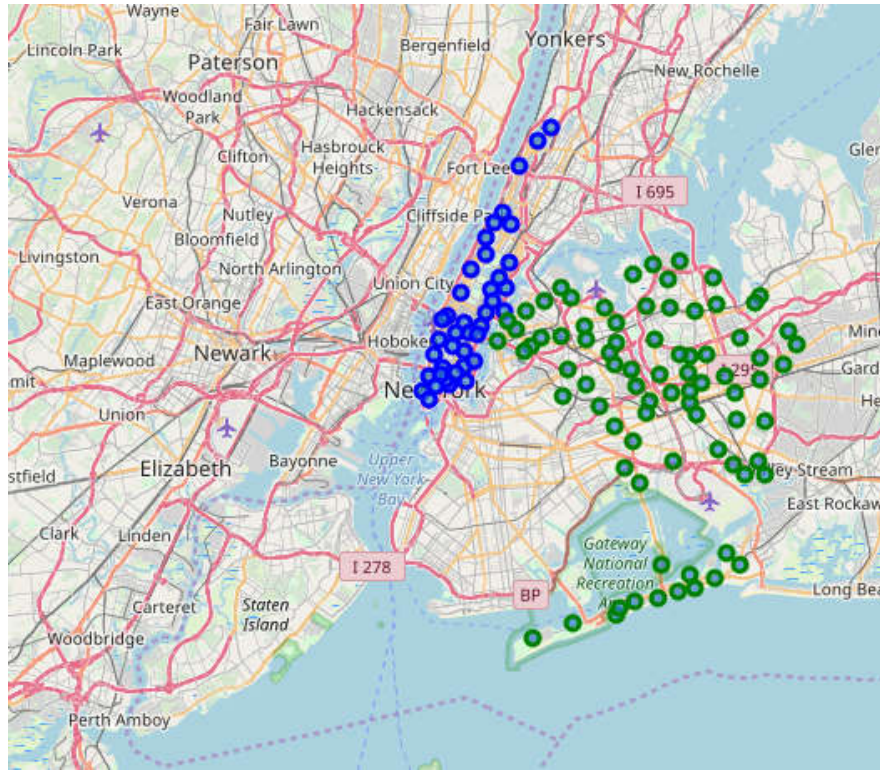
	Borough	Quantity
0	Bronx	19257
1	Brooklyn	27999
2	Manhattan	26828
3	Queens	18935
4	Staten Island	2699



4. Results

4.1 Exploring data of Manhattan and Queens

Using the Foursquare Api can we visualized the number of neighborhoods that are part of the Manhattan and Queens Borough. There are 121 points distributed between Manhattan and Queens.

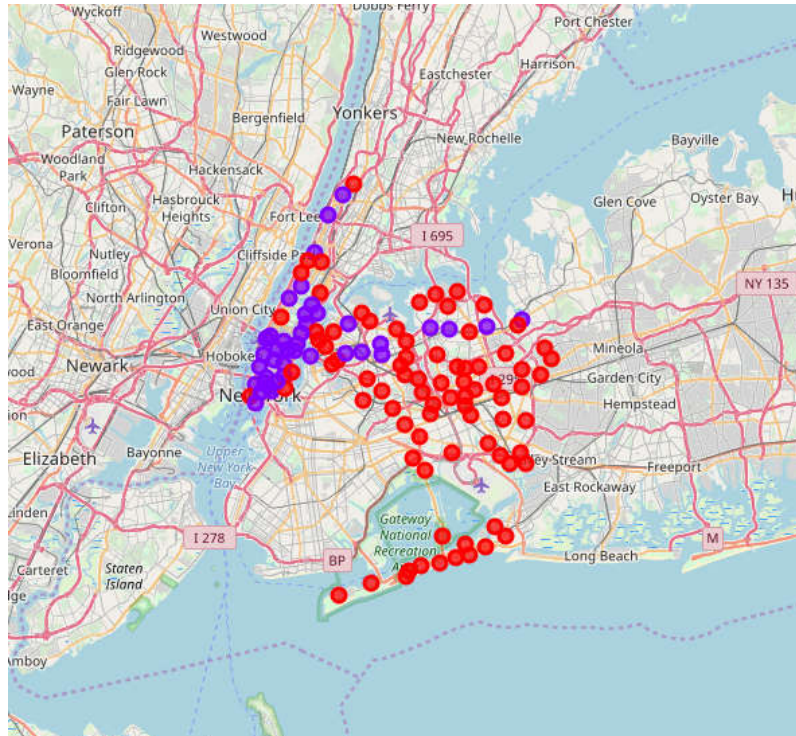


In the same way, using the Foursquare API we obtained that in Manhattan and Queens there are 5395 venues and 394 unique categories. The following table is an example of this

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.91066	Arturo's	40.874412	-73.910271	Pizza Place
1	Marble Hill	40.876551	-73.91066	Bikram Yoga	40.876844	-73.906204	Yoga Studio
2	Marble Hill	40.876551	-73.91066	Tibbett Diner	40.880404	-73.908937	Diner
3	Marble Hill	40.876551	-73.91066	Starbucks	40.877531	-73.905582	Coffee Shop
4	Marble Hill	40.876551	-73.91066	Dunkin'	40.877136	-73.906666	Donut Shop

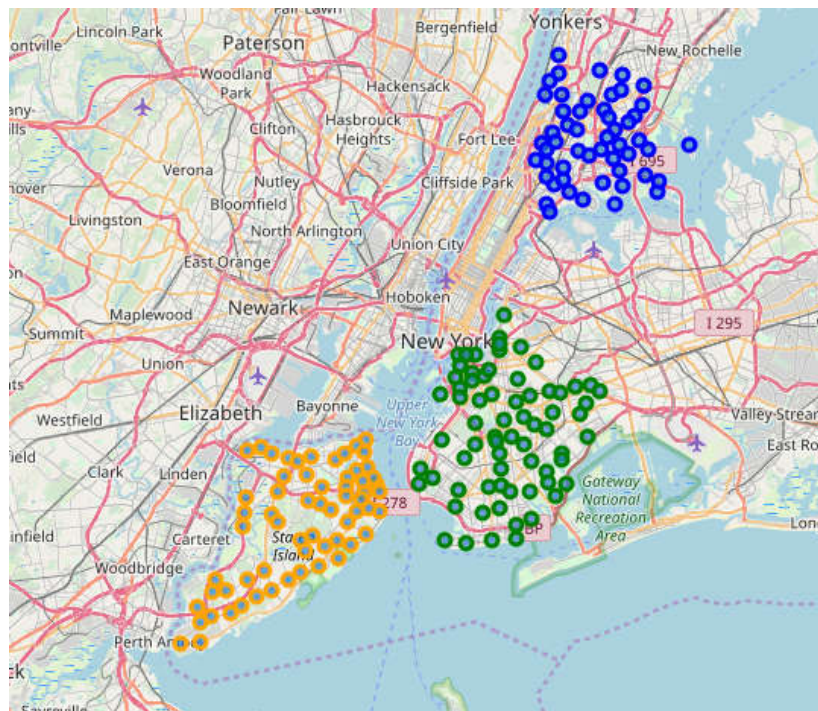
Using k-means algorithm we can check the neighborhoods with more quantity of restaurant. We divided 2 clusters that show places where the restaurant business is saturated and not.

	Borough	Neighborhood	Latitude	Longitude	Total	Cluster_Labels
0	Manhattan	Marble Hill	40.876551	-73.910660	2	0
1	Manhattan	Chinatown	40.715618	-73.994279	44	1
2	Manhattan	Washington Heights	40.851903	-73.936900	21	1
3	Manhattan	Inwood	40.867684	-73.921210	18	1
4	Manhattan	Hamilton Heights	40.823604	-73.949688	18	1



4.2 Exploring data of Bronx, Brooklyn and Staten Island

Using the Foursquare Api can we visualized the number of neighborhoods that are part of the Bronx, Brooklyn and Staten Island Borough. There are 185 points distributed between the mentioned boroughs

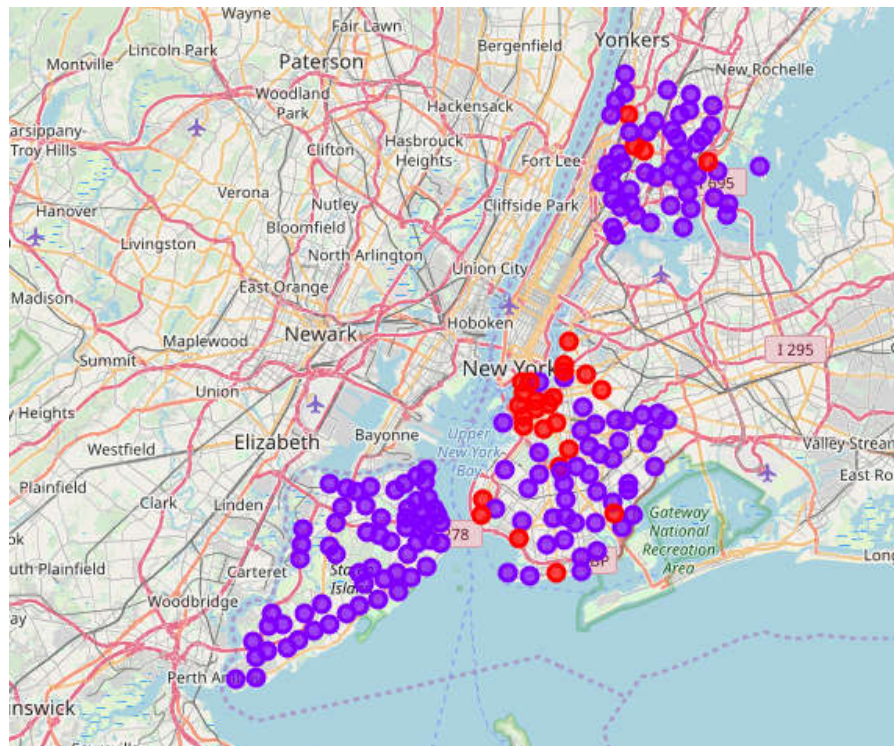


On the 3 boroughs mentioned previously, there are 4813 venues and 331 unique categories.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Wakefield	40.894705	-73.847201	Lollipops Gelato	40.894123	-73.845892	Dessert Shop
1	Wakefield	40.894705	-73.847201	Rite Aid	40.896649	-73.844846	Pharmacy
2	Wakefield	40.894705	-73.847201	Carvel Ice Cream	40.890487	-73.848568	Ice Cream Shop
3	Wakefield	40.894705	-73.847201	Shell	40.894187	-73.845862	Gas Station
4	Wakefield	40.894705	-73.847201	Dunkin'	40.890459	-73.849089	Donut Shop

Using the K-means algorithm we can visualize on the map the different clusters formed for the Bronx, Brooklyn and Staten Island borough

	Borough	Neighborhood	Latitude	Longitude	Total	Cluster_Labels
0	Bronx	Wakefield	40.894705	-73.847201	0	1
1	Bronx	Co-op City	40.874294	-73.829939	3	1
2	Bronx	Eastchester	40.887556	-73.827806	6	1
3	Bronx	Fieldston	40.895437	-73.905643	0	1
4	Bronx	Riverdale	40.890834	-73.912585	0	1



5. Conclusions and recommendations

The number of clusters that formed in all borough are 2. The clusters represent the boroughs in which there are a high number of restaurants and where are a reduce number of these. These could show big opportunities to open a new business in a specific area.

Borough like Bronx, Brooklyn and Staten Island could be good alternatives to start a new business because the number of restaurants is low. However, it's very important to analyze the crime ratio in order to explain because there are a reduce number of restaurants. In the same way, could be necessary analyze economy factors to give a good recommendation about open or not a restaurant.