

Opening a New Vegan Bakery in NYC

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1. Introduction

1.1 Background

Vegan lifestyle is continuously rising in popularity, driven by more choice of vegan restaurants than ever before. According to a study from earlier this year, nearly 114 million Americans are intending to eat more vegan food for health reasons. Research has linked the consumption of animal products with serious health conditions, including diabetes, heart disease, and cancer.

This report intends to find an optimal solution for people who want to open a vegan bakery in NYC. New York City is the most densely populated major city in United States with population of 8.4 million people. That means a wide customer base and ever increasing population facilitates the growth of various types of businesses in NYC.

1.2 Business Problem

Market has become overly saturated in almost every single industry in New York. People who start a new business will overcome challenges like fierce competition and expensive real estate in New York. Hence, it is necessary to study the target audience thoroughly and analyze carefully to select a suitable location for bakery.

2. Data Description

To consider the problem we can list the data as below:

- List of Neighborhoods
- Latitude and longitude coordinates of Neighborhood
- Neighborhood venues data

Data Source will be:

- Using Foursquare API
- https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-DS0701EN-SkillsNetwork/labs/newyork_data.json

3. Methodology

3.1 Data Requirements and Collection

1) Transform the data into a pandas frame

	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

Figure1. Dataframe result top 5 rows

2) Use geopy library to get the latitude and longitude values of New York City and visualize them using Folium

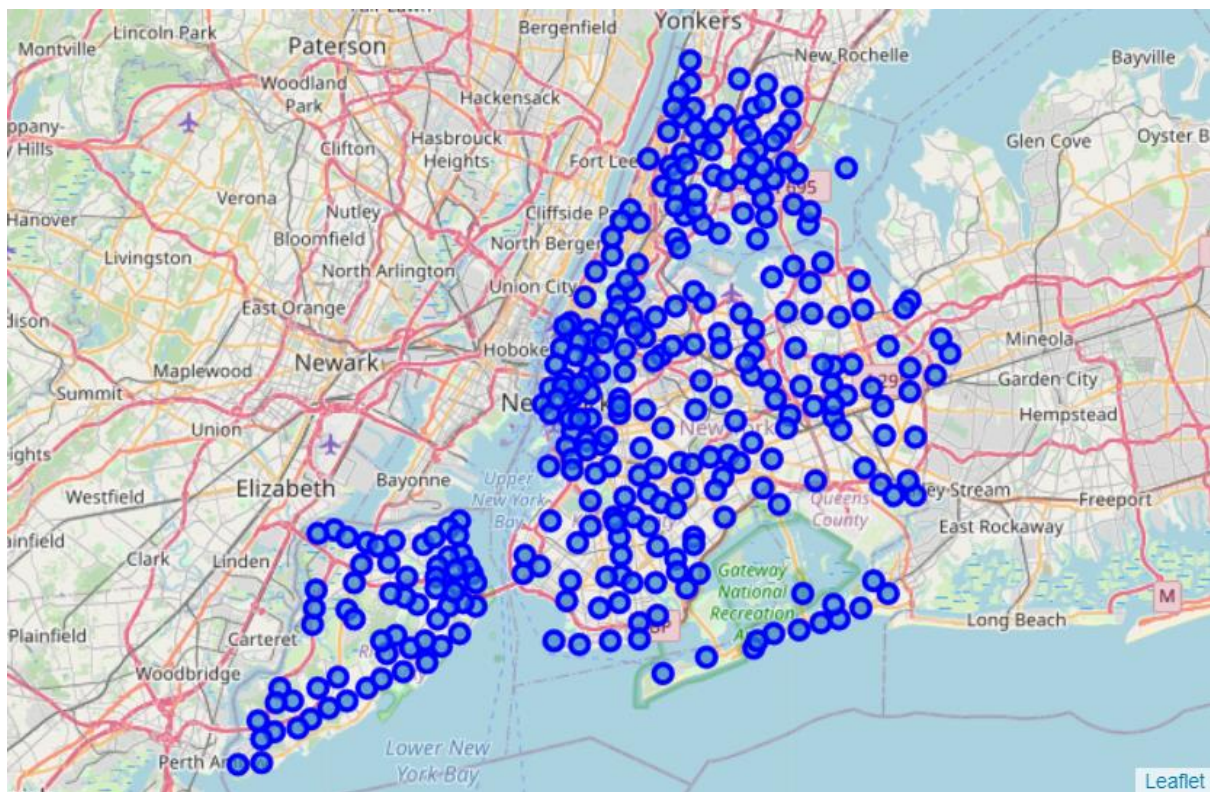


Figure2. A map of New York with neighborhoods

3.2 Data Understanding and Preparation

- To simplify the above map and segment and cluster only the neighborhoods in Manhattan and slice the original dataframe and create a new dataframe of the Manhattan data.

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

Figure3. Segmenting neighborhoods in Manhattan (top 5 rows)

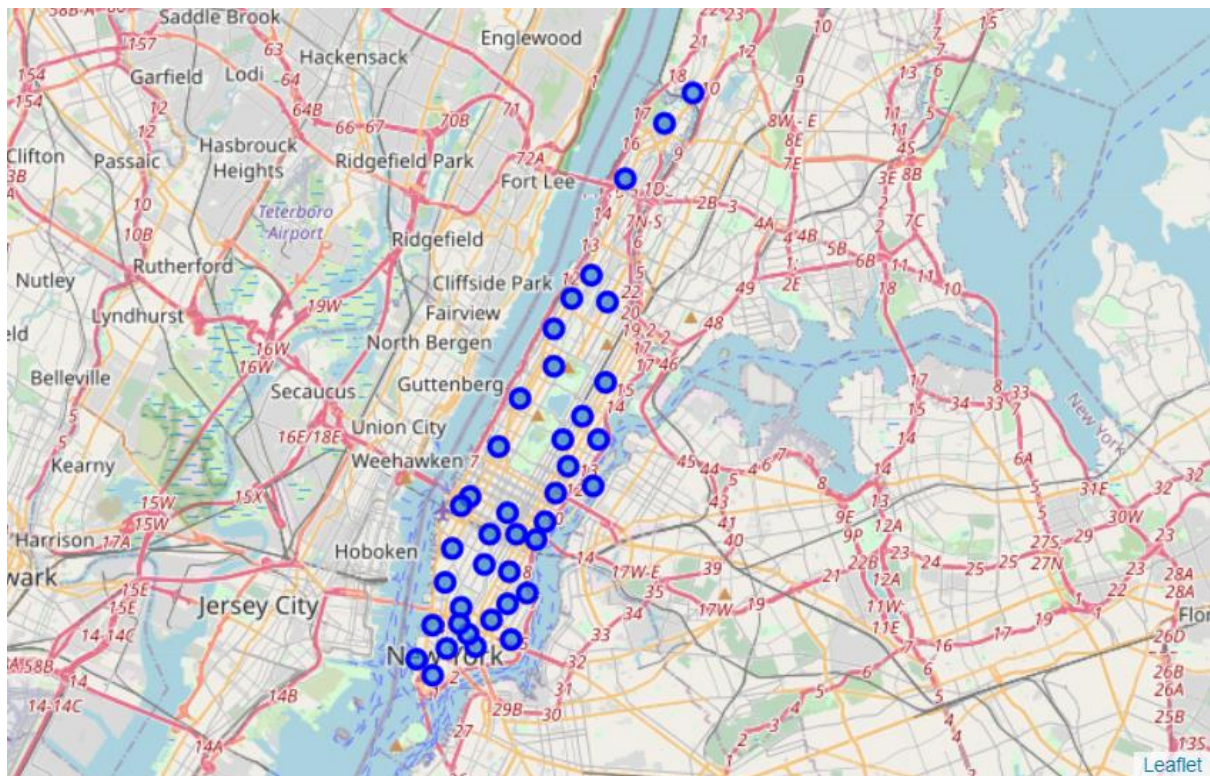


Figure4. A map of New York with neighborhoods in Manhattan

3.3 Data Modelling

1) Analyze Each Neighborhood

	Neighborhood	Accessories Store	Adult Boutique	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arepa Restaurant	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Auditorium
0	Battery Park City	0.000000	0.000000	0.00	0.000000	0.013699	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.013699	0.013699
1	Carnegie Hill	0.000000	0.000000	0.00	0.000000	0.011111	0.00	0.000000	0.011111	0.000000	0.022222	0.000000	0.000000	0.000000	0.000000
2	Central Harlem	0.000000	0.000000	0.00	0.071429	0.047619	0.00	0.000000	0.000000	0.023810	0.000000	0.000000	0.000000	0.000000	0.000000
3	Chelsea	0.000000	0.000000	0.00	0.000000	0.040000	0.00	0.000000	0.000000	0.040000	0.000000	0.010000	0.010000	0.000000	0.000000
4	Chinatown	0.000000	0.000000	0.00	0.000000	0.030000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.020000	0.000000	0.000000
5	Civic Center	0.000000	0.000000	0.00	0.000000	0.040000	0.01	0.000000	0.000000	0.000000	0.000000	0.000000	0.010000	0.010000	0.000000
6	Clinton	0.000000	0.000000	0.00	0.000000	0.040000	0.00	0.000000	0.000000	0.010000	0.000000	0.000000	0.000000	0.000000	0.000000
7	East Harlem	0.000000	0.000000	0.00	0.000000	0.000000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
8	East Village	0.000000	0.000000	0.00	0.000000	0.010000	0.00	0.000000	0.010000	0.010000	0.000000	0.010000	0.000000	0.000000	0.000000
9	Financial District	0.000000	0.000000	0.00	0.000000	0.040000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
10	Flatiron	0.000000	0.000000	0.00	0.000000	0.030000	0.00	0.000000	0.000000	0.010000	0.000000	0.010000	0.000000	0.000000	0.000000
11	Gramercy	0.000000	0.000000	0.00	0.000000	0.036585	0.00	0.000000	0.000000	0.012195	0.000000	0.000000	0.000000	0.000000	0.000000
12	Greenwich Village	0.010000	0.000000	0.00	0.000000	0.030000	0.00	0.000000	0.000000	0.010000	0.000000	0.000000	0.000000	0.000000	0.000000

Figure5. Group rows by neighborhood

2) Select each neighborhood along with the top 5 most common venues and visualize the resulting clusters

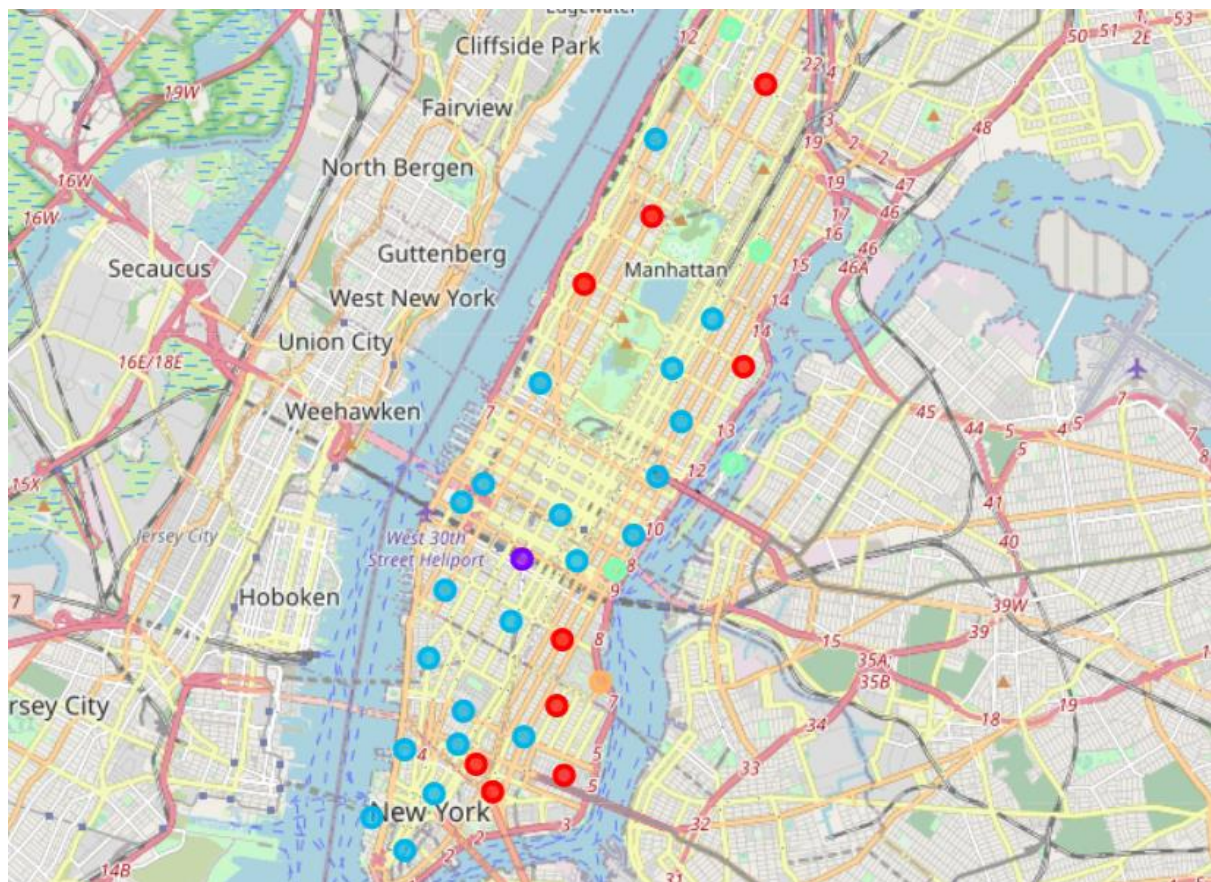


Figure6. A map of clusters (top5)

3.4 Evaluation and Deployment

List of top 10 recommended locations for bakery in New York

	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	Marble Hill	Discount Store	Coffee Shop	Sandwich Place	Gym	Yoga Studio	Tennis Stadium	Deli / Bodega	Department Store	Pharmacy	Diner
8	Upper East Side	Exhibit	Coffee Shop	Gym / Fitness Center	Bakery	Italian Restaurant	American Restaurant	Yoga Studio	Spa	French Restaurant	Pizza Place
10	Lenox Hill	Italian Restaurant	Sushi Restaurant	Pizza Place	Coffee Shop	Cocktail Bar	Burger Joint	Gym	Gym / Fitness Center	Café	Salon / Barbershop
13	Lincoln Square	Café	Plaza	Performing Arts Venue	Theater	Concert Hall	French Restaurant	Italian Restaurant	Gym / Fitness Center	Bakery	Wine Shop
14	Clinton	Italian Restaurant	Gym / Fitness Center	Theater	Coffee Shop	American Restaurant	Cocktail Bar	Gym	Hotel	Spa	Wine Shop
15	Midtown	Hotel	Theater	Sporting Goods Shop	Bakery	Coffee Shop	Clothing Store	Steakhouse	Bookstore	American Restaurant	Mediterranean Restaurant
16	Murray Hill	Coffee Shop	Hotel	Japanese Restaurant	Bar	Sandwich Place	Gym / Fitness Center	American Restaurant	Burger Joint	Spa	Cuban Restaurant
17	Chelsea	Coffee Shop	Bakery	American Restaurant	Art Gallery	Hotel	Ice Cream Shop	French Restaurant	Italian Restaurant	Seafood Restaurant	Café
18	Greenwich Village	Italian Restaurant	Clothing Store	Sushi Restaurant	Indian Restaurant	Café	American Restaurant	Gym	Dessert Shop	Coffee Shop	Gourmet Shop
21	Tribeca	Park	Italian Restaurant	American Restaurant	Wine Bar	Spa	Coffee Shop	Café	Greek Restaurant	Poke Place	Bakery

Figure7. List of top 10 recommended neighborhood

4. Result

Rank	Neighborhood
1	Marble Hill
2	Upper East Side
3	Lenox Hill
4	Lincoln Square
4	Clinton

5. Colclusion

In this report, using the explore function, the k-means clustering algorithm and the Folium library to get an optimal location to open a vegan bakery.

Marble Hill is the most recommended neighborhoods to open a new vegan bakery. There are common venues like discount stores, coffee shops and sandwich places but not bakeries. Moreover the result shows there is a chance to attract customers interested in healthy vegan foods through sports facilities like gym, yoga studio and tennis stadium.