Opening a Mexican Restaurant in New York, New York

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IBM Data Science Capstone

Introduction

Boasting a population of over 1.6 million people, the island of Manhattan is the most densely population place in the United States. With this many people, commerce is constant, as are its denizens' appetites. Because of its popularity as a food option, this project will seek to determine an ideal neighborhood to open a Mexican restaurant in Manhattan for a prospective restaurant owner.

The island of Manhattan is divided into 40 distinct neighborhoods, each with its own distinct identity based on the shops, restaurants, and activity within their borders. By utilizing data from Foursquare, a crowdsourced database of venues and locations, an ideal neighborhood to open a Mexican restaurant will be determined.

Data

Borough data has been provided by the NYU Spatial Data Repository. This data provides a spatial understanding of the borough borders of New York and will be used to determine in what New York neighborhood a restaurant resides.

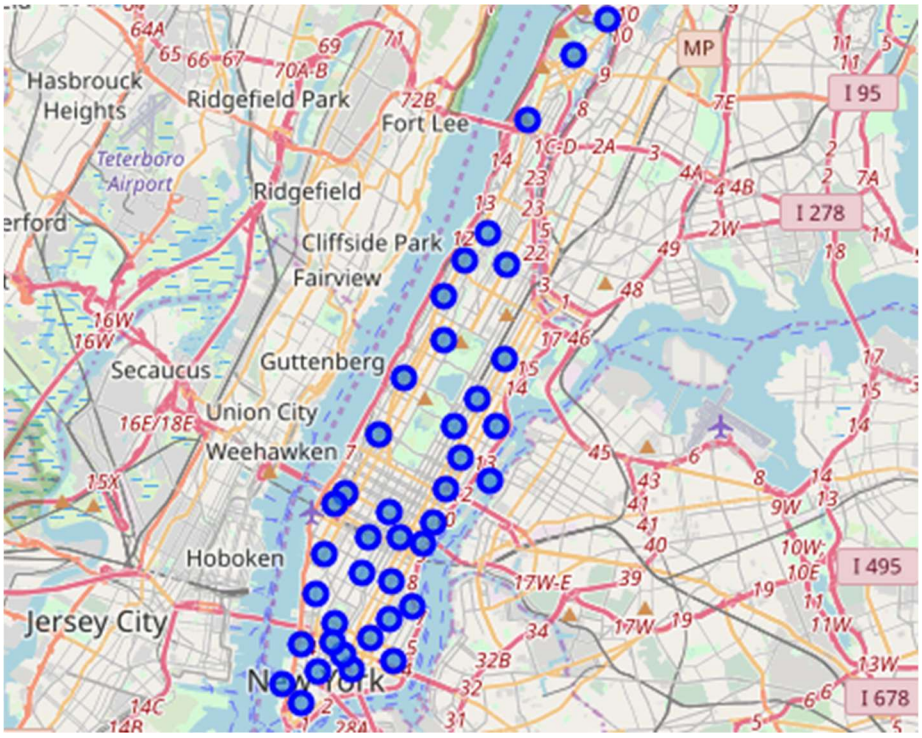
Restaurant data is generated from the Foursquare Developer Portal utilizing the Foursquare API. This data will be used to determine the frequency of Mexican restaurants in a given neighborhood as a percentage of the total number of restaurants identified by Foursquare in that neighborhood.

Methodology

Data from the NYU Spatial Data Repository contains borough information on New York City. Because most of this information was outside of Manhattan, the focus of this investigation, the data was initially prepped and scrubbed to identify the location of neighborhoods strictly within the island of Manhattan as seen in the Pandas data frame below.

	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

Utilizing this information, an initial map of Manhattan's neighborhoods was drawn up utilizing the python folium module.



The Foursquare API was accessed to pull the list of venues in Manhattan. In Foursquare's database, any location where an individual can visit and check in is considered a "venue." This data was then referenced against the NYC neighborhood data to identify the neighborhood in which each venue is located and to determine the Venue Category each venue belongs to. All non-restaurants categories were removed from this list since the investigation's scope is limited to frequencies of specific restaurant types.

The frequencies of each restaurant type were calculated, as previewed below:

	Neighborhood	Afghan Restaurant	African Restaurant	American Restaurant	Arepa Restaurant	Argentinian Restaurant	Asian Restaurant
0	Battery Park City	0.0	0.000000	0.010101	0.0	0.0	0.00
1	Carnegie Hill	0.0	0.000000	0.010000	0.0	0.0	0.00
2	Central Harlem	0.0	0.044444	0.044444	0.0	0.0	0.00
3	Chelsea	0.0	0.000000	0.030000	0.0	0.0	0.01
4	Chinatown	0.0	0.000000	0.040000	0.0	0.0	0.02

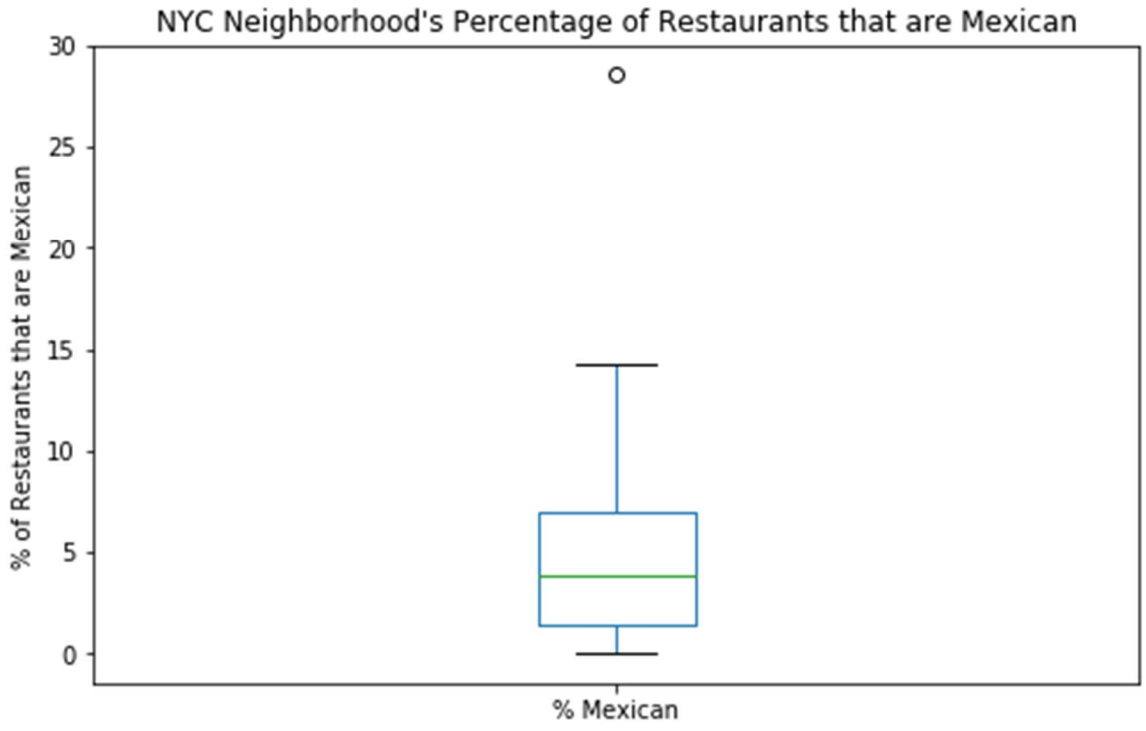
In the case of Mexican food, multiple Venue Categories may be considered Mexican restaurants. For this investigation, the Venue Categories "Burrito Place," "Mexican Restaurant," and "Taco Place" were all considered Mexican restaurants. Any restaurant not listed under these labels was

considered not a Mexican restaurant. The frequencies of Mexican restaurants against the total number of restaurants in a neighborhood was calculated as previewed below.

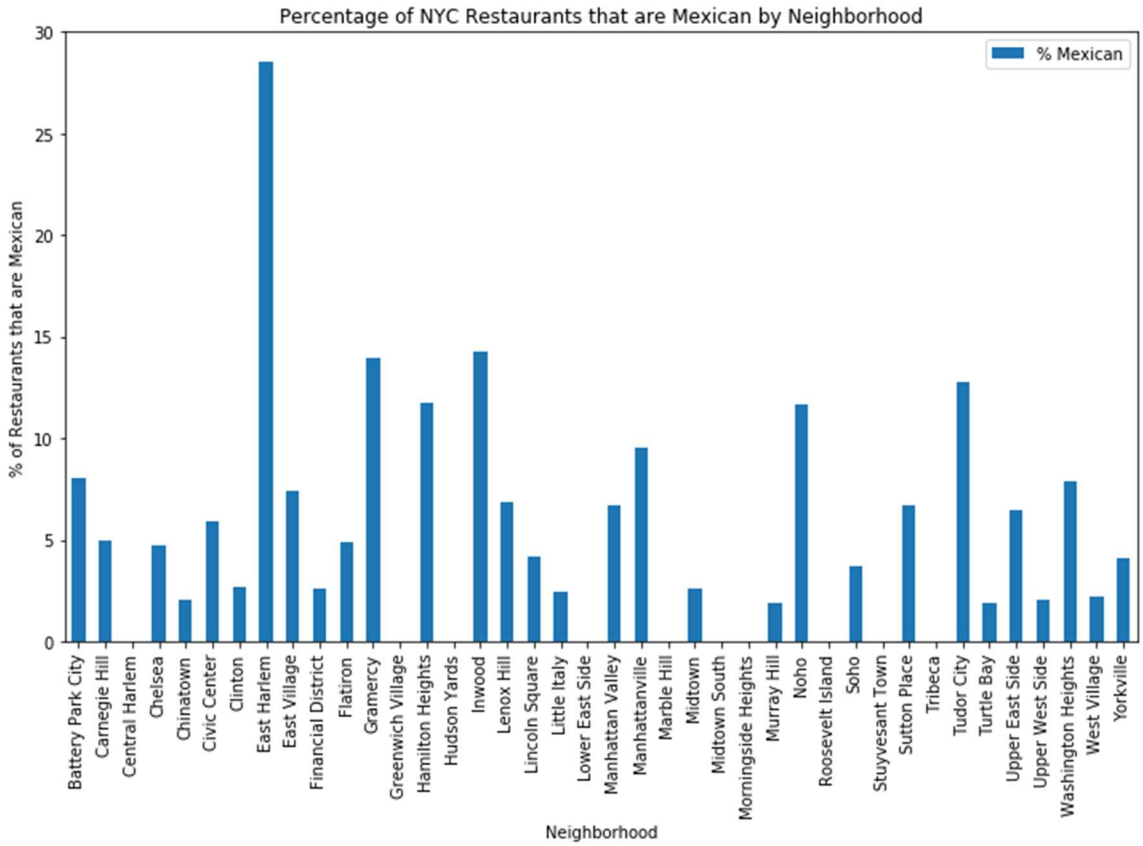
	Neighborhood	% Mexican
0	Battery Park City	8.000000
1	Carnegie Hill	5.000000
2	Central Harlem	0.000000
3	Chelsea	4.761905
4	Chinatown	2.083333

Results

The average Manhattan neighborhood has a Mexican restaurant frequency of 5.1% with a standard deviation of 5.7%, as seen in the below histogram.



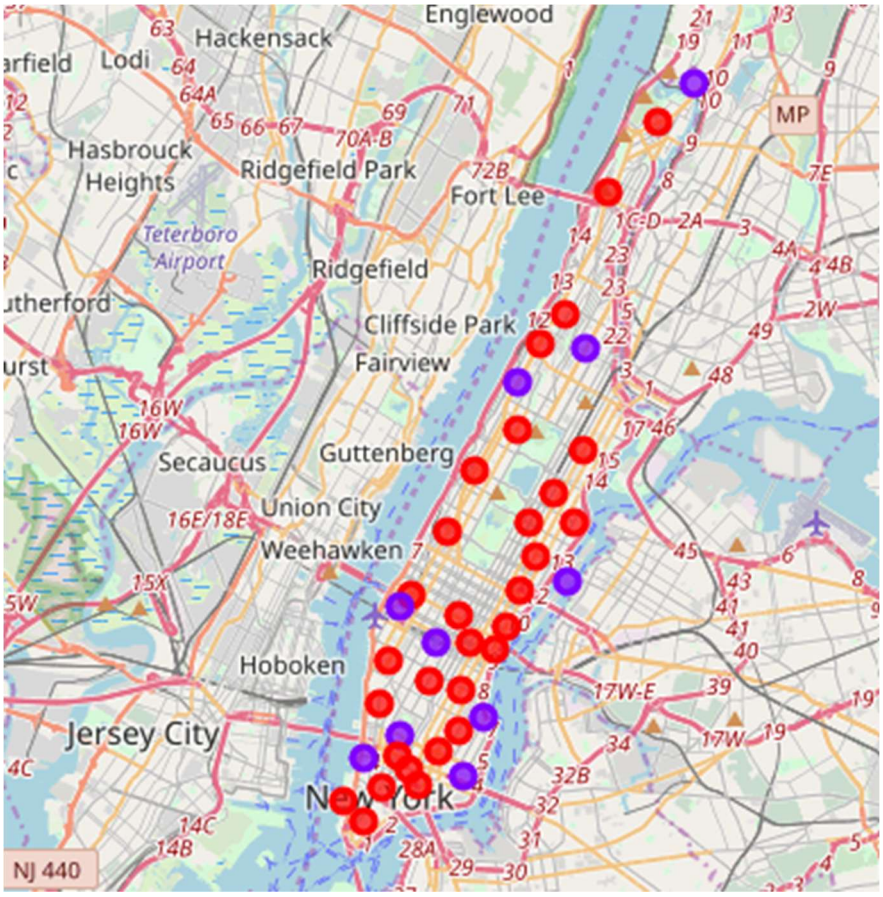
Values of this percentage ranged from 0% to 29% of a neighborhood's restaurants being Mexican. The below bar graph shows this broken down by neighborhood.



The below table shows the neighborhoods of Manhattan that have zero Mexican restaurants in the Foursquare database.

Neighborhood	% Mexican
Central Harlem	0.0
Greenwich Village	0.0
Hudson Yards	0.0
Lower East Side	0.0
Marble Hill	0.0
Midtown South	0.0
Morningside Heights	0.0
Roosevelt Island	0.0
Stuyvesant Town	0.0
Tribeca	0.0

Neighborhoods are again mapped out using folium, with those containing zero Mexican restaurants labeled in blue.



Discussion

As seen in the results, the distribution of Mexican restaurants in New York is roughly so that most neighborhoods have between 1.3% and 7.0% of their restaurants listed as Mexican in the Foursquare database. However, 10 of the 40 neighborhoods haven't a single Mexican restaurant in them.

Conclusion

A prospective restauranteur looking to open a new Mexican restaurant in New York must consider many factors when making their decision on where to locate their establishment. Local demographics, prospective tourism, and traffic congestion can all determine if a business will succeed or fail. Given this study, though, the neighborhoods of Central Harlem, Greenwich Village, Hudson Yards, the Lower East Side, Marble Hill, Midtown South, Morningside Heights,

Roosevelt Island, Stuyvesant Town, and Tribeca may all be neighborhoods worthy of investigation given that they haven't any Mexican restaurants there currently.