

# Capstone Project Full Report

July 2021

## 1. Introduction/Business Problem

In the Yonkers city of New York, there is a lack of data as to which region populates the most restaurants. This can hurt food enthusiasts who want to settle there as well as those who prefer eating a diverse meal at restaurants, since they have no way of knowing the optimal place to settle for the most restaurants if they wish to be able to access the most amount of restaurants near their region.

## 2. Data

A description of the data:

The data would contain the restaurants located in Yonkers including the names and latitudes and longitude location of each restaurant. The data would be extracted using Foursquare API, and it would be used to solve the problem by having it modified and clustered to locate which region is optimal for having the most restaurants.

Example of the data:

	id	name	categories	referralid	hasPerk	location.address	location.lat	location.lng	location.labeledLatLngs	location.distance	...	location.state	location.country	location.formattedAddress	delivery.id
0	5f6d1b284b5d241a2cb590df	Margarita's Restaurant Lounge	[[{"id": "4bf58dd8d48988d11941735", "name": "M..."}]]	v-1626925402	False	332 South Broadway	40.922106	-73.895851	[[{"label": "display", "lat": 40.9221058, "lng": ...}]]	1392	...	NY	United States	[332 South Broadway, Yonkers, NY 10705]	NaN
1	4beaeb7ca9900f475a1f1740	Kam Fung Restaurant Chinese Food Take Out	[[{"id": "4bf58dd8d48988d11941735", "name": "C..."}]]	v-1626925402	False	112 Elm St	40.933846	-73.891800	[[{"label": "display", "lat": 40.9338452001953, "lng": ...}]]	1801	...	NY	United States	[112 Elm St, Yonkers, NY 10701]	NaN
2	4e4defcfd41b7b6ef959ea5	Silvio's Italian Restaurant	[[{"id": "4bf58dd8d48988d11941735", "name": "I..."}]]	v-1626925402	False	351 S Broadway	40.921458	-73.890273	[[{"label": "display", "lat": 40.921458, "lng": ...}]]	1421	...	NY	United States	[351 S Broadway, Yonkers, NY 10705]	2510749 <a href="https://www.se">https://www.se</a>
3	52228e4211d2ebf3cc5e70bd	Al Waha Restaurant	[[{"id": "4bf58dd8d48988d11941735", "name": "H..."}]]	v-1626925402	False	NaN	40.923159	-73.859466	[[{"label": "display", "lat": 40.92315901953162, "lng": ...}]]	1700	...	NY	United States	[Yonkers, NY]	NaN
4	4e767c6418eaf9d9f0731eac	Sals	[[{"id": "4bf58dd8d48988d11941735", "name": "V..."}]]	v-1626925402	False	209 Nepperthan	40.914675	-73.892758	[[{"label": "display", "lat": ...}]]	1889	...	NY	United States	[209 Nepperthan Ave, ...]	NaN

## 3. Methodology

- The data of the restaurants in Yonkers was collected through by using Foursquare API
- The data was modified and cleaned to fit the following processes

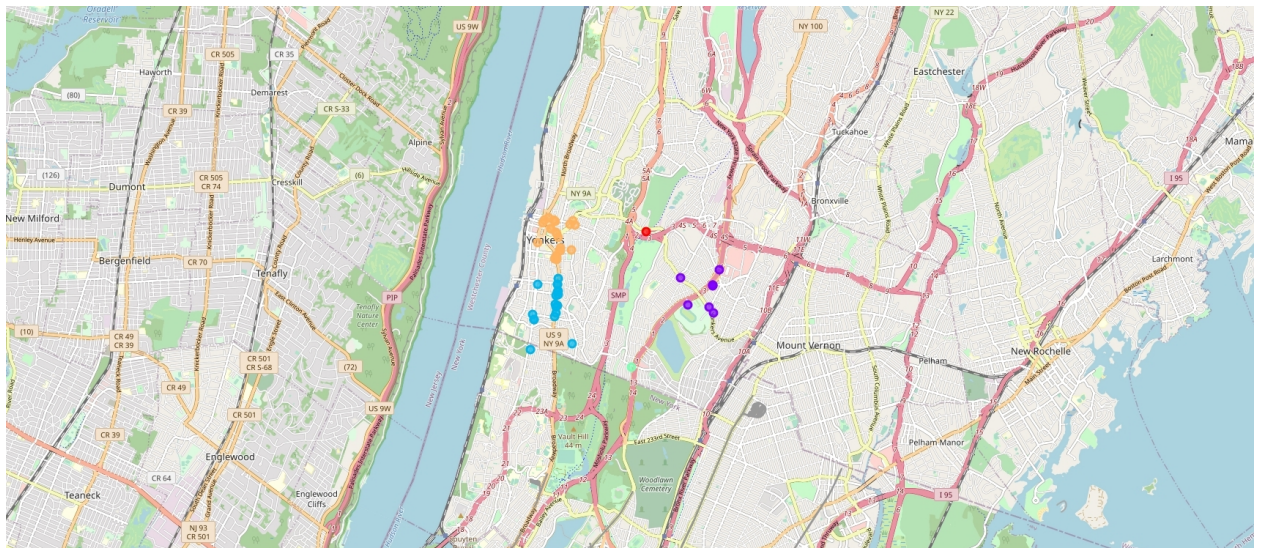
- The machine learning algorithm used was K Means clustering in order to group the data to locate each cluster in the area
- The optimal area, or area with the highest amount of restaurants, was determined and located
- The data was plotted with matplotlib to visualize the data
- The data was mapped using folium to visualize the data

#### 4. Results

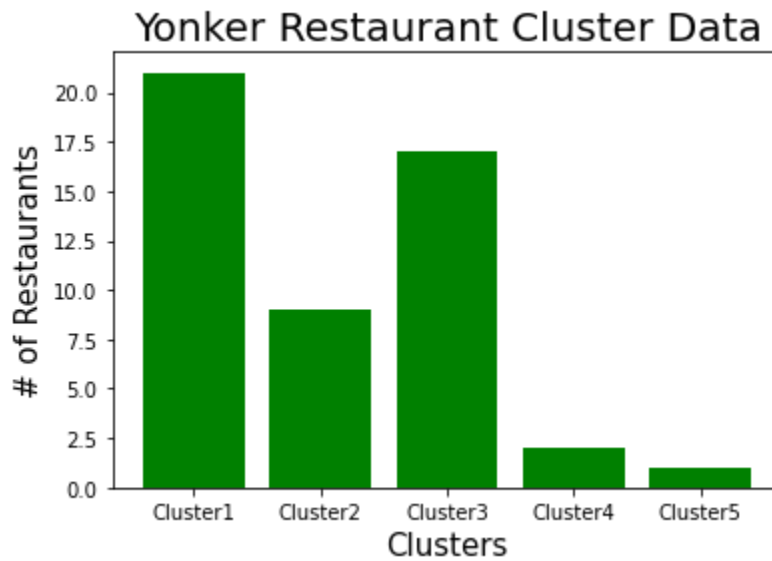
1. Cluster 1 had the restaurants

2. Cluster 1 had 21 restaurants

3. The locations of cluster 1 were from (40.927764963320655, -73.90048221372605) to (40.9351692199707, -73.89179992675781)



The map visualizing the restaurant locations throughout Yonker



This is a map visualizing the data for each cluster

## 5. Discussion

Cluster 1 is the most optimal place of residence for food enthusiasts and the like, and it is between (40.927764963320655, -73.90048221372605) to (40.9351692199707, -73.89179992675781). This area has 21 restaurants.

## 6. Conclusion

The answer to which area should be the most optimal place of residence for food enthusiasts is from (40.927764963320655, -73.90048221372605) to (40.9351692199707, -73.89179992675781). The findings of this project may be used to better the lives of those who wish to reside in this area who are also interested in restaurants. It can also be used to better understand the advantages and disadvantages of living in different areas within this region.