



## IBM Data Science Professional Certificate Capstone Project

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### **The Battle of the Neighborhoods (Week 2)**

An Exploration of the City of New Orleans to determine a possible location for a tea house that would serve the local yoga community

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## Introduction

This report details the work performed to satisfy the requirements for the 'IBM Data Science Professional Certificate' Capstone project.

The project Client wishes to open a specific type of tea shop in New Orleans that will provide traditional teas in a space which promotes and supports positive community engagement and wellbeing. In this regard, he would like to locate his tea house in an area close to a yoga studio and wants to know where this location might be. Ideally, the location should also have limited competition from other beverage venues.

## Data

The locations of the neighborhoods in New Orleans, as defined by their respective latitudes and longitudes, were scrapped from the following Wikipedia page using a python based Jupyter notebook:

[https://en.wikipedia.org/wiki/Neighborhoods\\_in\\_New\\_Orleans](https://en.wikipedia.org/wiki/Neighborhoods_in_New_Orleans)

An example of the location data is shown in Table 1:

	Neighborhood	Longitude	Latitude
0	U.S. NAVAL BASE	-90.026093	29.946085
1	ALGIERS POINT	-90.051606	29.952462
2	WHITNEY	-90.042357	29.947200
3	AUDUBON	-90.121450	29.932994
4	OLD AURORA	-90.000000	29.924440

Table 1: First 5 rows of the New Orleans neighborhood location data

The New Orleans location data was used in conjunction with the Foursquare Labs Inc. location API to locate venues and venue categories in each neighborhood. Table 2 shows the first 5 rows of this data.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	U.S. NAVAL BASE	29.946085	-90.026093	The Mighty Mississippi	29.949695	-90.023710	Boat or Ferry
1	ALGIERS POINT	29.952462	-90.051606	Tout de Suite Café	29.952121	-90.051090	Café
2	ALGIERS POINT	29.952462	-90.051606	Congregation Coffee Roasters	29.951918	-90.053395	Coffee Shop
3	ALGIERS POINT	29.952462	-90.051606	The Crown & Anchor	29.951416	-90.054220	Bar
4	ALGIERS POINT	29.952462	-90.051606	Levee @ Algiers Point	29.951760	-90.048747	Scenic Lookout

Table 2: Example of venues and venue Categories from Foursquare Labs Inc. using New Orleans neighborhood latitudes and longitudes

## Methodology

The following steps summarize the methodology used in this analysis to determine locations in New Orleans that might be suitable for the Client's tea house for the local yoga community.

1. Using the Wikipedia location data to create a map of New Orleans that shows each neighborhood. See Figure 1.
2. Use Foursquare to find venues and associated venue categories in each neighborhood. See Table 2 for an example of the resulting data.
3. Apply 'onehotencoding' to the yoga studio and beverage venue categories to establish frequency of each venue category is in each neighborhood. See Table 3
4. Show how many yoga studios and beverage venues are in each neighborhood. Refer to Table 4 for the first five rows of this data.
5. Cluster the neighborhoods using the K-Means method and show the clusters superimposed on a map of New Orleans. See Figure 2.
6. Present plots that show which clusters and neighborhoods have both yoga studios and beverage venues
7. Using these plots determine which neighborhood has the highest number of yoga studios per beverage venue. This neighborhood may be a candidate for the Client's tea house.

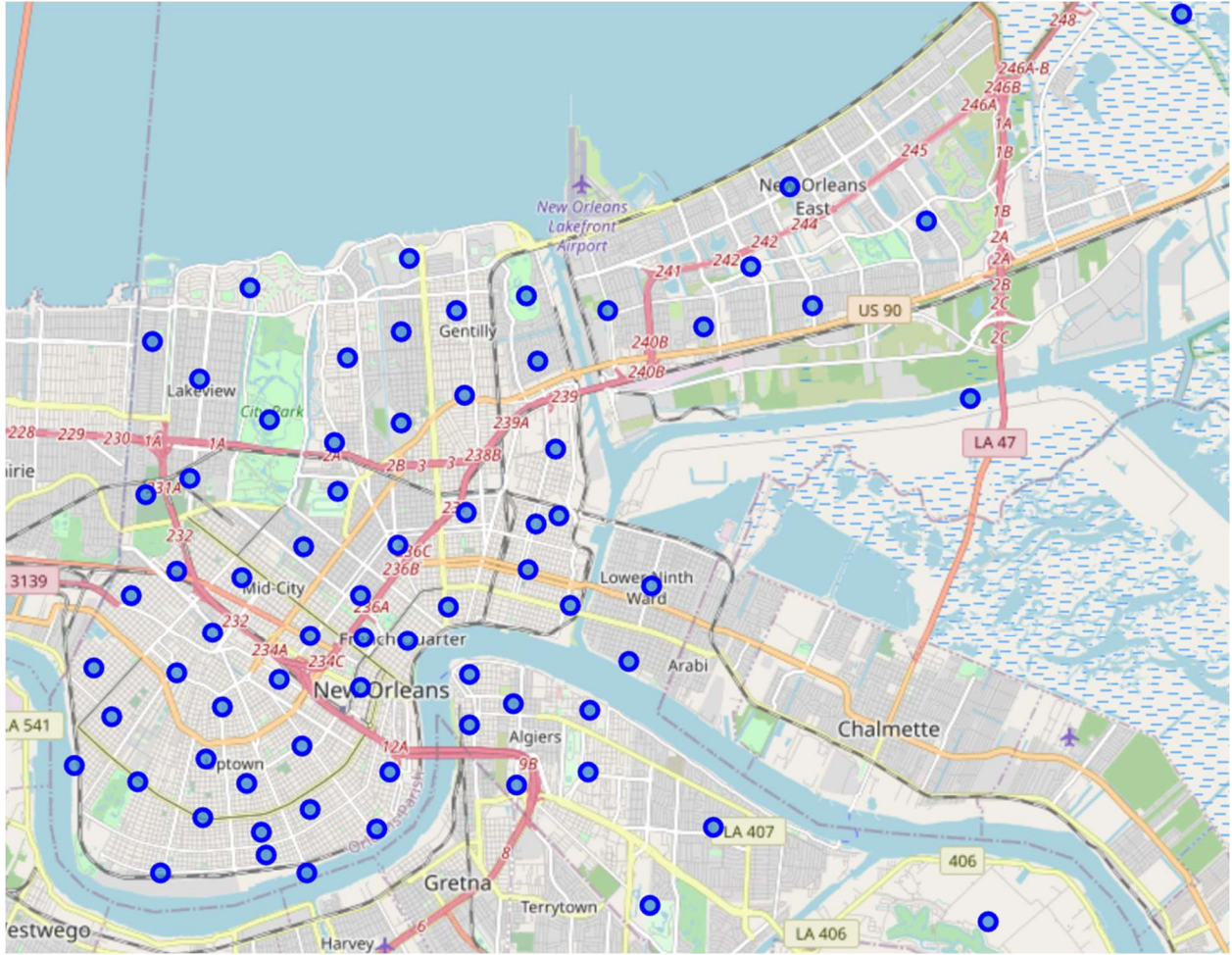


Figure 1: Map of New Orleans and associated neighborhoods

	Neighborhood	Yoga Studio	Café	Coffee Shop	Juice Bar	Smoothie Shop
0	ALGIERS POINT	0.0	0.045455	0.045455	0.0	0.000000
1	AUDUBON	0.0	0.000000	0.142857	0.0	0.142857
2	B. W. COOPER	0.0	0.000000	0.000000	0.0	0.000000
3	BAYOU ST. JOHN	0.0	0.000000	0.000000	0.0	0.000000
4	BLACK PEARL	0.0	0.000000	0.000000	0.0	0.000000

Table 3: Example of 'onehotencoding' of yoga and beverage venue in each neighborhood



	Neighborhood	Yoga Studio	Café	Coffee Shop	Juice Bar	Smoothie Shop
0	ALGIERS POINT	0	1	1	0	0
1	AUDUBON	0	0	1	0	1
2	B. W. COOPER	0	0	0	0	0
3	BAYOU ST. JOHN	0	0	0	0	0
4	BLACK PEARL	0	0	0	0	0

Table 4: Example showing number of yoga studios and beverage venues in a given neighborhood

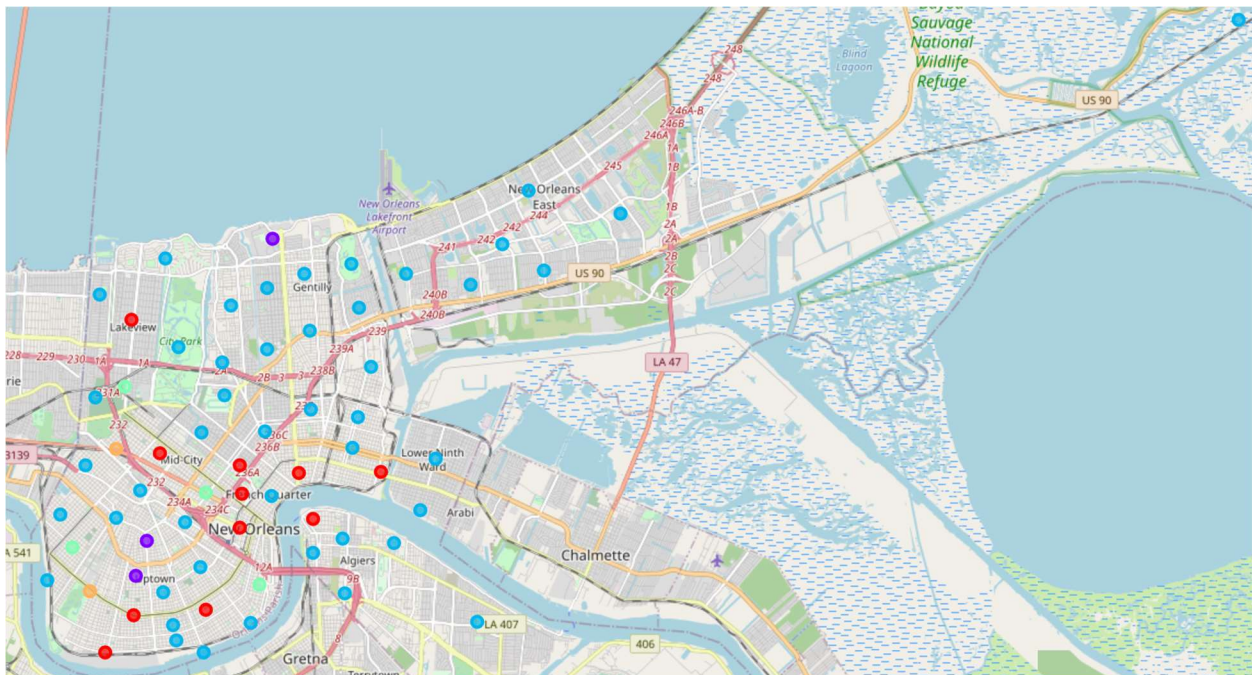


Figure 2: Map of New Orleans showing the K-Means Clusters (5 clusters)

## Discussion and Results

A total of (5) clusters were determined using K-Means. Refer to Figure 2. The Clusters are as follows:

Cluster 0 – Red

Cluster 1 - Purple

Cluster 2 – Blue

Cluster 3 - Green

Cluster 4 – Orange

The total number of yoga studios and total number of beverage venue categories in each Cluster were determined, see Table 5. Cluster 2 contains (4) yoga studios which is the most of any of the Clusters. Cluster 3 and Cluster 4 do not have any yoga studios and so are discounted from further consideration for locating the Client's tea house. Both Cluster 0 and Cluster 1 have (1) yoga studio each.

Cluster Labels	Yoga Studio	Café	Coffee Shop	Juice Bar	Smoothie Shop
0	0	1	9	22	2
1	1	1	1	6	1
2	2	4	4	3	2
3	3	0	9	7	0
4	4	0	0	1	0

Table 5: Total number of yoga studios and total of each beverage venue category in each Cluster

A bar chart was created showing the number of yoga studios and beverage venues in each Cluster, see Figure 3.

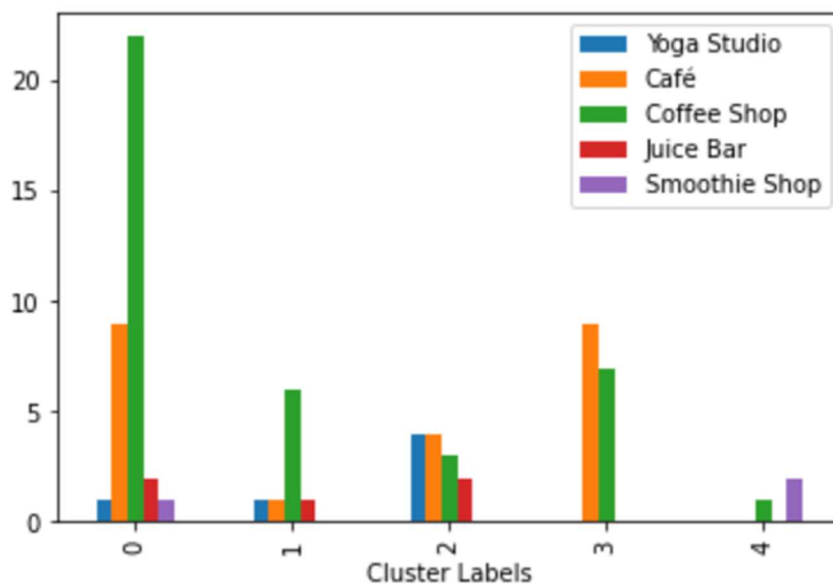


Figure 3: Bar chart showing the number of yoga studios and beverage venues in each Cluster

Cluster 2 with (4) yoga studios and a relatively limited selection of beverage venues seems a likely candidate for the Client's tea house. However, upon review of Figure 2 it is apparent that Cluster 2 (blue) is spread throughout New Orleans such that it does not provide sufficient local resolution to suggest a location for the tea house.

Since there are only a total of (6) yoga studios, as determined with the Foursquare Labs Inc. location API, it is easy to narrow down to the specific neighborhoods where the studios are situated. See Figure 4. The neighborhoods containing yoga studios are shown. Of the (72) neighborhoods in New Orleans, only (5) have yoga studios. The neighborhood Leonidas has the most with (2) studios, the other neighborhoods with studios each have (1).

The neighborhood with the largest ratio of yoga studios to beverage venues is a possible candidate for the Client's tea house as that neighborhood's yoga studios are the most underserved by beverage venues. This ratio is represented by the brown 'Studio to Venue' bar in Figure 4. The neighborhood Leonidas has the largest 'Studio to Venue' ratio with a value of 2.

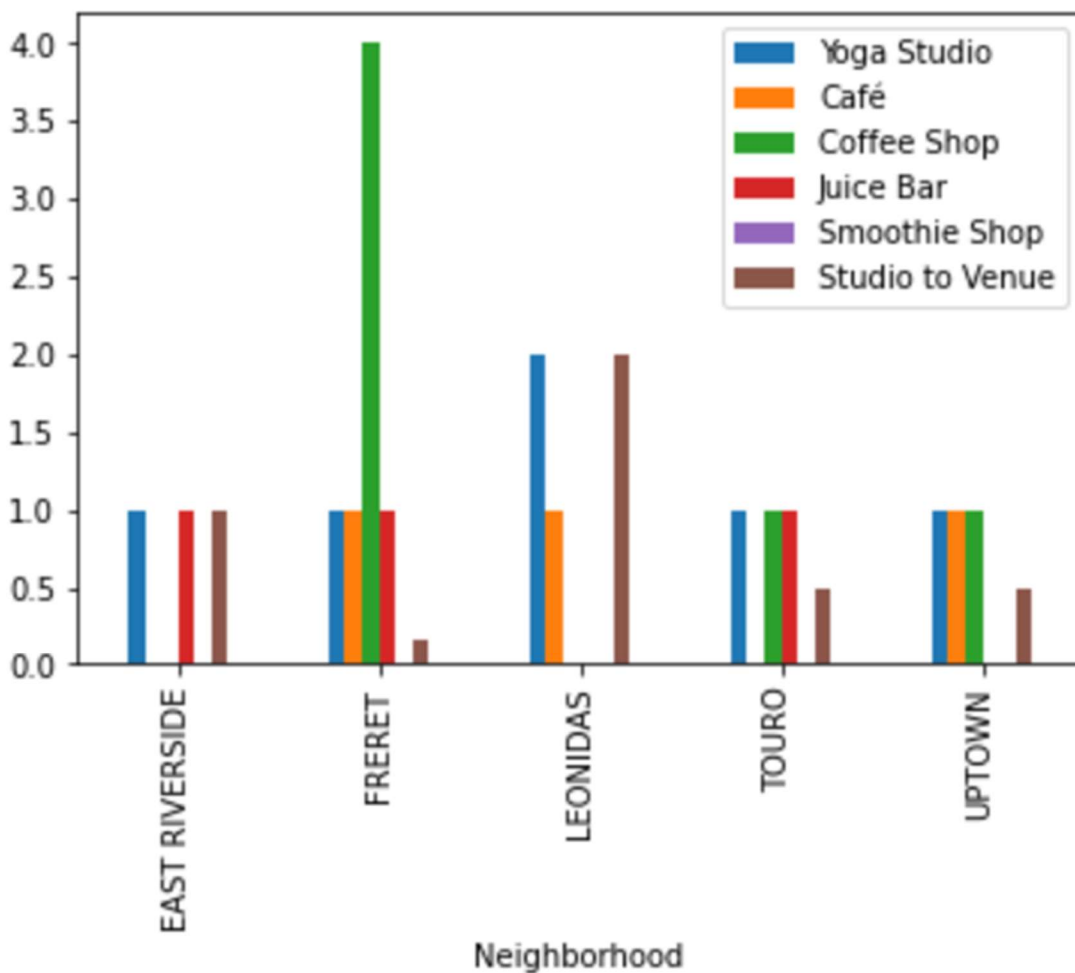


Figure 4: Location of the yoga studios and beverage venues in New Orleans neighborhoods



From the analysis performed in this project, the Leonidas neighborhood is suggested to explore further. One recommendation is to determine proximity of the (2) Leonidas yoga studios and possibly situate the Clients tea house equidistant to each or as close to this scenario as possible. This could mean being able to serve both yoga studios, thus positively increasing community wellbeing and impact even more, along with potentially even greater increases to the Client's business revenues.

## Conclusion

The project Client wishes to open a specific type of tea shop in New Orleans that will provide traditional teas in a space which promotes and supports social communities interested in mind and body wellness.

An analysis was performed using the locations of neighborhoods in New Orleans along with Foursquare venue location information to determine which of the neighborhoods contained yoga studios and how many beverage venues were in each of those neighborhoods. There are only (6) yoga studios in New Orleans at present and (2) of those studios are in the Leonidas neighborhood. The ratio of studios to venues is also highest in Leonidas suggesting the Client's tea house would have less competition there. Additional work should be done to determine proximity of the (2) Leonidas yoga studios and possibly situate the Clients tea house equidistant to each or as close to this scenario as possible. This could mean being able to serve both yoga studios, thus positively increasing community wellbeing and impact even more, along with potentially even greater increases to the Client's business revenues.