

LOOKING FOR A HOTEL

October 2019

1. Introduction

Cleveland is a cosmopolitan city, which offers residents and tourists a lot of artistic and cultural institutions, such as the extensive system of public libraries and centers such as Progressive Field, the Rock and Roll Hall of Fame, and the Playhouse Square Center. Therefore it is very important to have a varied hotel offer that provides both national and international tourists a complete and totally enjoyable visit, so that they can enjoy the entire cultural range offered by the city.

According to <https://es.wikipedia.org/wiki/Cleveland> Cleveland is the corporate headquarters of many large companies such as National City Corporation, Eaton Corporation, Forest City Enterprises, Sherwin-Williams Company, and KeyCorp. NASA maintains a facility in Cleveland, the Glenn Research Center. .

Therefore, the desire of this analysis is to find an ideal place for the location of a hotel, considering the advantages in displacement and proximity to the places of interest offered by the city. Thus, this analysis would be of interest mainly to the rulers that would attract investment to the city, and to all event organizers who need to attract people from other locations.

2. Data acquisition and cleaning

To know how the city is distributed, in terms of restaurant, services, parks, cultural centers, etc., the Cleveland Neighborhoods database taken from Kaggle is used. This base consists solely of the name of the neighborhoods and the location (latitude - longitude). With the help of the Foursquare API you will get the information of the places and their characteristics.

	Neighborhood	Latitude	Longitude
32	Woodland Hills, Cleveland	41.481389	-81.611389
31	Warehouse District, Cleveland	41.497500	-81.701667
30	University Circle	41.508611	-81.605278
29	Union-Mills Park	41.454889	-81.614389
28	Tremont, Cleveland	41.473611	-81.688611

14		The Flats	41.492000	-81.696000
27		Stockyards, Cleveland	41.483889	-81.590556
26		St. Clair-Superior	NaN	NaN
25		Old Brooklyn	41.431559	-81.702332
24		Ohio City, Cleveland	41.483611	-81.710278
23		Nottingham, Ohio	NaN	NaN
22		Nine-Twelve District	41.499444	-81.685833
21		Lee-Miles	41.440140	-81.564786
20		Kinsman, Cleveland	41.558000	-81.569000
19		Kamm's Corners	41.444286	-81.818492
18		Industrial Valley	41.483333	-81.666667
17		Hough, Cleveland	41.512334	-81.635213
16		Goodrich-Kirtland Park	41.512500	-81.663056
15		Glenville, Cleveland	41.533347	-81.616588
13		Fairfax, Cleveland	41.483889	-81.590556
12		Edgewater, Cleveland	41.431559	-81.702332
11	East 4th Street District (Cleveland)		41.498889	-81.690000
10		Downtown Cleveland	41.498889	-81.689722
9		Detroit-Shoreway	41.479062	-81.737795
8		Collinwood	41.558000	-81.569000
7		Clark-Fulton	41.666670	-81.716667
6		Central, Cleveland	41.500000	-81.666667
5		Campus Disctict	41.497778	-81.670000
4		Buckeye-Shaker	41.483889	-81.590556
3		Brooklyn Centre	41.453446	-81.699402
2		Broadway-Slavic Village	41.458056	-81.644722
1		Bellaire-Puritas, Cleveland	41.433682	-81.800140
0		Asiatown, Cleveland	41.508833	-81.680417

As can be seen in the previous table, only two neighborhoods do not have location information; these cases must be removed in order to continue.

With the help of Foursquare, the location and characteristics information for each neighborhood is completed as can be seen in the following table.

Out[199]:

	vecis	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
671	Woodland Hills, Cleveland	41.481389	-81.611389	Mr Hero	41.481874	-81.606177	Sandwich Place
672	Woodland Hills, Cleveland	41.481389	-81.611389	Rainbow Shops	41.482331	-81.606159	Women's Store

673	Woodland Hills, Cleveland	41.481389	-81.611389	Little Caesars - Buckeye Plaza	41.481844	-81.605934	Pizza Place
674	Woodland Hills, Cleveland	41.481389	-81.611389	A Taste Of Soul	41.482464	-81.616901	Restaurant
675	Woodland Hills, Cleveland	41.481389	-81.611389	VILLA	41.482597	-81.605726	Clothing Store

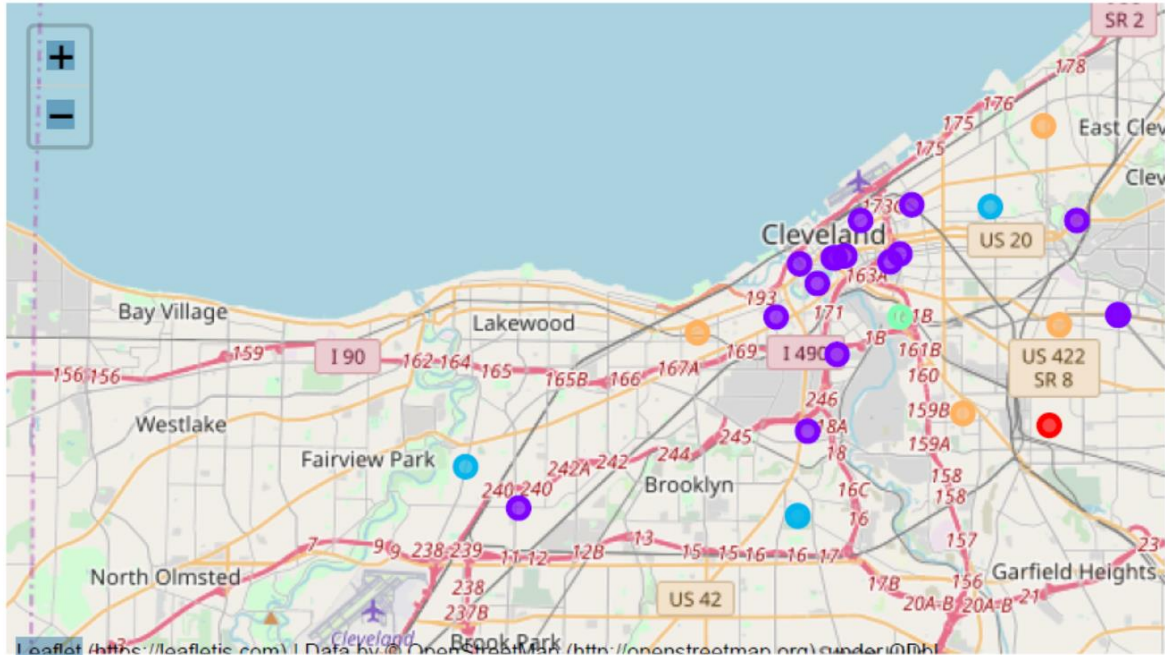
Once it has been grouped for all neighborhoods and the categories are obtained, the top 10 of the most common ones are taken, according to as shown in the following table.

vecis	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	Asiatown, Cleveland	Rental Car Location	Credit Union	Gay Bar	Sandwich Place	Night Market	Nightclub	Chinese Restaurant	Recording Studio	Coffee Shop	Print Shop
1	Bellaire-Puritas, Cleveland	Hotel	Pizza Place	Diner	New American Restaurant	Chinese Restaurant	Rental Car Location	Gas Station	Bar	Bank	Grocery Store
2	Broadway-Slavic Village	Pizza Place	Restaurant	Pharmacy	Fast Food Restaurant	Ice Cream Shop	Polish Restaurant	Grocery Store	Eastern European Restaurant	Sandwich Place	Food & Drink Shop
3	Brooklyn Centre	Pizza Place	Diner	Chinese Restaurant	Rental Service	Gas Station	Bar	Fast Food Restaurant	Mobile Phone Shop	Intersection	Art Gallery
4	Buckeye-Shaker	American Restaurant	Light Rail Station	Hungarian Restaurant	Diner	Sandwich Place	Breakfast Spot	Burger Joint	Clothing Store	Plaza	Coffee Shop

3. Methodology

It is necessary to know how the different categories of entertainment that the city offers are distributed, in each of its neighborhoods, for this purpose the Foursquare is used and thus it is already known which are the most popular. This information is grouped by means of K_means so that those areas that have similar categories are in the same group.

5 clusters were created and distributed according to the following map:



Each cluster has specific characteristics which will be analyzed to define what would be the right place for the location of a hotel.

Cluster 0, identified in red, are localities located mainly in the city, away from the coastal zone, and in general in residential areas with some small commercial sites such as drugstore, pizzerias, barber shops, typical of residential places.

Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Lee-Miles	41.440.140	-81.564.786	0	Mobile Phone Shop	Food	Cupcake Shop	Dance Studio	Deli / Bodega
Union-Mills Park	41.454.889	-81.614.389	0	Food	Salon / Barbershop	Donut Shop	Fast Food Restaurant	Farmers Market

Cluster 1; It is the one that was composed of the largest number of neighborhoods and therefore also has the largest number of categories offered such as restaurants, shopping centers, galleries, bars, among others.

Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Asiatown, Cleveland	41.508.833	-81.680.417	1	Rental Car Location	Credit Union	Gay Bar	Sandwich Place	Night Market

Bellaire-Puritas, Cleveland	41.433.682	-81.800.140	1	Hotel	Pizza Place	Diner	New American Restaurant	Chinese Restaurant
Brooklyn Centre	41.453.446	-81.699.402	1	Pizza Place	Diner	Chinese Restaurant	Rental Service	Gas Station
Buckeye-Shaker	41.483.889	-81.590.556	1	American Restaurant	Light Rail Station	Hungarian Restaurant	Diner	Sandwich Place
Campus Distict	41.497.778	-81.670.000	1	Optical Shop	American Restaurant	Fast Food Restaurant	Intersection	Camera Store

Cluster 2; It is the cluster that is most dispersed within the city, with some commercial points and some fast food restaurants, others.

Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Clark-Fulton	41.666.670	-81.716.667	2	NaN	NaN	NaN	NaN	NaN
Collinwood	41.558.000	-81.569.000	2	Pizza Place	Convenience Store	Discount Store	Food	Bar
Edgewater, Cleveland	41.431.559	-81.702.332	2	Food	Event Service	Convenience Store	Bus Stop	Electronics Store
Hough, Cleveland	41.512.334	-81.635.213	2	NaN	NaN	NaN	NaN	NaN
Kamm's Corners	41.444.286	-81.818.492	2	Convenience Store	Pizza Place	Ice Cream Shop	Pet Store	Café

Cluster 3 has as its main category The Light Rail Sation, and a few small businesses such as a jewelry store and a donut shop.

Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Industrial Valley	41.483.333	-81.666.667	3	Pier	Light Rail Station	Jewelry Store	Yoga Studio	Donut Shop

Cluster 4 is mainly composed of restaurants and fast food stores such as pizzerias and sandwich

Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Broadway-Slavic Village	41.458.056	-81.644.722	4	Pizza Place	Restaurant	Pharmacy	Fast Food Restaurant	Ice Cream Shop

Detroit-Shoreway	41.479.062	-81.737.795	4	Pizza Place	Food & Drink Shop	Deli / Bodega	Bus Stop	Sandwich Place
Glenville, Cleveland	41.533.347	-81.616.588	4	Pizza Place	Historic Site	Sandwich Place	BBQ Joint	Dive Bar
Woodland Hills, Cleveland	41.481.389	-81.611.389	4	Sandwich Place	Pizza Place	Restaurant	Women's Store	Clothing Store

4. Conclusions and discussion

Una vez analizados los diferentes clusters creados, se puede notar que efectivamente hay algunos lugares que no ofrecen comodidad o cercanía a la mayoría de los sitios de interés para los visitantes que busquen hospedaje. Como es el caso del cluster 3, que solo tiene cerca la estación del tren. El cluster 0 y el 4, está compuesto al parecer por zonas residenciales que cuentan con unos pocos negocios comerciales y algunos sitios para comer. Incluso el cluster 2 presenta este comportamiento similar, además de estar regado por toda la ciudad, Mientras el cluster 1, está concentrado en lugares populares y de gran afluencia de comercios y restaurantes.