Getting New Orleans restaurant establishments back on track.   By Ilze Akerbergs

Introduction/Business Problem

New Orleans is known for its wonderful restaurant establishments that dot throughout the city. Yet with the recent tragedy from hurricane Katrina and now the pandemic that has made the restaurant business suffer and struggle, New Orleans needs a little help with getting New Orleans' eating establishments back on its feet. This essay will go through a couple of ideas on how to help New Orleans get through this latest troubling issue. The startup company Help New Orleans is looking to do just that for New Orleans eating establishments.

One way is to look at the various neighborhoods in New Orleans and pinpoint neighborhoods that already have a lot of restaurant activity. Since the COVID crisis, these restaurants have suffered, since people were reluctant to dine in and to visit these restaurants. These neighborhoods could profit from having a local delivery place in its midst, that could expedite carry out orders and soliciting and coaxing people to order food from these restaurants to eat at home.

Another way is to pinpoint neighborhoods that could use another eating establishment, since it did not have many restaurants or eating joints where people could go eat. The company Help New Orleans would then work to find some chef entrepreneurs that could establish an appropriate eating place for these neighborhoods.

Thus, solving these problems in these two ways would help restaurants that already exist to use the services of a delivery service, and for areas with few eating places, the idea is to help local residents by establishing appropriate eating businesses nearby, and as a result, also help entrepreneur chefs to find suitable areas to establish a restaurant. Thus, this could target the local New Orleans residents, and the eating businesses as well.

Data for solving New Orleans problems

The data I will be using will come from Foursquare API location data. I will be requesting the data through the API, exploring the venues that it comes up with and comparing the different areas by what kinds of venues they have. The data would include various venues such as parks, eating joints, ethnic restaurants, shopping areas, etc. This would give a good idea as to which neighborhoods have a large restaurant presence, and which areas may be lacking eating joints, and could benefit from Help New Orleans provide this neighborhood with an appropriate entrepreneur chef that is looking for a place that could benefit from an eating business.

Here is a sample of preliminary data that I scraped from a wikipedia page, which had a list of New Orleans neighborhoods.

Neighborhood	Longitude	Latitude
U.S. NAVAL BASE	-90.02609253	29.94608469
ALGIERS POINT	-90.0516057	29.95246187
WHITNEY	-90.04235744	29.94720026
AUDUBON	-90.12145042	29.93299437
OLD AURORA	-90	29.92444011
B. W. COOPER	-90.09175301	29.95177397
BAYOU ST. JOHN	-90.08651733	29.97607064
BEHRMAN	-90.02643585	29.9348167
BLACK PEARL	-90.13488293	29.93589521
BROADMOOR	-90.10381222	29.9465681

From this information, I could then go to Foursquare API and fetch the venue information for each of New Orleans' neighborhoods.

Here is a sample of what Foursquare API results come back for a certain neighborhood called Algiers Point.

```
{'meta': {'code': 200, 'requestId':
'6007606ed4ffb81a7ce4a815'},
 'response': {'suggestedFilters': {'header': 'Tap to
show:',
    'filters': [{'name': 'Open now', 'key': 'openNow'},
    {'name': '$-$$$$', 'key': 'price'}]},
  'headerLocation': 'Algiers Point',
  'headerFullLocation': 'Algiers Point, New Orleans',
  'headerLocationGranularity': 'neighborhood',
  'totalResults': 25,
  'suggestedBounds': {'ne': {'lat': 29.956961874500006,
    'lng': -90.04642172567442},
    'sw': {'lat': 29.947961865499995, 'lng':
-90.05678967432557}},
```

    'groups': [{'type': 'Recommended Places',
     'name': 'recommended',
     'items': [{'reasons': {'count': 0,
        'items': [{'summary': 'This spot is popular',
         'type': 'general',
         'reasonName': 'globalInteractionReason'}]},
      'venue': {'id': '4ba101aaf964a5204a8e37e3',
       'name': 'Tout de Suite Café',
       'location': {'address': '347 Verret St',
        'crossStreet': 'Alix',
        'lat': 29.95212113610269,
        'lng': -90.05108964349343,
        'labeledLatLngs': [{'label': 'display',
         'lat': 29.95212113610269,
         'lng': -90.05108964349343},
        {'label': 'entrance', 'lat': 29.952167, 'lng':
-90.051072}],
        'distance': 62,
        'postalCode': '70114',
        'cc': 'US',
        'city': 'New Orleans',
        'state': 'LA',
        'country': 'United States',
        'formattedAddress': ['347 Verret St (Alix)',
         'New Orleans, LA 70114',
         'United States']},
       'categories': [{'id':
'4bf58dd8d48988d16d941735',
        'name': 'Café',
        'pluralName': 'Cafés',
        'shortName': 'Café',
        'icon': {'prefix': 'https://ss3.4sqi.net/img/
categories_v2/food/cafe_',
        'suffix': '.png'},
        'primary': True}],
       'photos': {'count': 0, 'groups': []}},
      'referralId': 'e-0-4ba101aaf964a5204a8e37e3-0'},
     {'reasons': {'count': 0,

From information like this, a methodology can be set up to try to solve the business problem of helping New Orleans' eating establishments and the local residents who would like to use the eating services.

Methodology

The main foundational data was the Wikipedia web page's listing of New Orleans neighborhoods (https://en.wikipedia.org/wiki/Neighborhoods_in_New_Orleans). I put this in a pandas dataframe, resulting in a total of 72 neighborhoods, along with each latitude and longitude. After installing geopy geocoders and Folium, I found out the coordinates of New Orleans and created a map of New Orleans with Folium, along with a marker for each of the neighborhoods.

Then I called the Foursquare API in order to explore venues that are within 500 meters of each of the neighborhoods. After that, I requested the URL via GET for one of the neighborhoods to see a sample of the type of XML and the type of information and venues that the API would provide. Then I extracted the category of the venue into a list of names that could easily be replicated into a pandas dataframe, including each venue's latitude and longitude and type of venue.

Then, after putting all of the above-mentioned functions into one big function, I explored all of the neighborhoods in New Orleans. This resulted in a total row number of 899 venues in all of the neighborhoods and 200 unique kinds of venue categories.

Upon accomplishing these total dataframe, I could then analyze each separate neighborhood by venues that were near the neighborhood, and then quantize this information by calculating the frequency of each venue in each neighborhood. This resulted in a dataframe that divided up by frequency the most common venues in each of the neighborhoods - divided up from 1st most common to 10th most common.

From this information, we could then cluster the neighborhoods into similar types of venues. Through some experimentation, I decided that dividing into 7 clusters gives us the best results. I created the cluster labels for the dataframe, changed the datatype of this column from float to integer, since the map would not recognize decimals for labels, and dropped the rows that came up with no venue information from the API, returning a result of NaN. This resulted in 66 neighborhoods. Creating a map through Folium, we see the resulting clustering of the neighborhoods into 7 clusters.

Results

The results of this methodology created 7 separate clusters of similar-type neighborhoods with similar venues.

Examining the individual clusters¶

Cluster 0

#Cluster 0 -- Rural - delta/swamp area of New Orleans.
Clothing, women's store, shopping most common. Not much
residential perhaps. More visitors. Food trucks most
common eating. Could use another restaurant - perhaps
organic/local to match rural.

	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
29	LAKE CATHERINE	Clothing Store	Women's Store	Farmers Market	Garden	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop

Recommendation for cluster 0 — an organic/local
restaurant to match the rural/urban setting.

	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
35	LITTLE WOODS	Pharmacy	Seafood Restaurant	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food	Flower Shop
42	McDONOGH	Dance Studio	Art Gallery	River	Playground	Seafood Restaurant	Women's Store	Farmers Market	Fried Chicken Joint	French Restaurant	Food Truck
52	ST. ANTHONY	Playground	Trail	Women's Store	Farmers Market	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop

Recommendation for cluster 1 — A different ethnic restaurant not intrinsic to the area.

Cluster 2 (first 9 neighborhoods shown)

#Cluster 2 -- Big midtown cluster with out-of-town tourists. Many restaurants, scenic places, bars, music venues. Mix of residential and tourist. Could use a delivery company here to handle overflow of eating demands.

	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	ALGIERS POINT	Bar	Boat or Ferry	Park	Pizza Place	New American Restaurant	Café	Food & Drink Shop	Scenic Lookout	Coffee Shop	Historic Site
1	AUDUBON	Coffee Shop	Concert Hall	Plaza	Smoothie Shop	Outdoors & Recreation	Park	Scenic Lookout	Sandwich Place	College Arts Building	Dessert Shop
2	B. W. COOPER	Recreation Center	Boxing Gym	Food Truck	Gym / Fitness Center	Home Service	Fast Food Restaurant	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Court

3	BAYOU ST. JOHN	Park	Convenience Store	Gas Station	Food Truck	Playground	Other Great Outdoors	Sandwich Place	Lounge	Furniture / Home Store	Women's Store
4	BLACK PEARL	Farmers Market	Food Truck	Grocery Store	Plaza	Scenic Lookout	Women's Store	Fried Chicken Joint	French Restaurant	Food Court	Food & Drink Shop
5	BROADMOOR	Music Venue	Taco Place	Coffee Shop	Food Truck	Recreation Center	Hotel Bar	Ethiopian Restaurant	French Restaurant	Ice Cream Shop	Food Court
6	BYWATER	Music Venue	Discount Store	Caribbean Restaurant	Seafood Restaurant	Coffee Shop	Park	Vegetarian / Vegan Restaurant	Hotel	Indie Theater	Antique Shop
7	CENTRAL BUSINESS DISTRICT	Hotel	Hotel Bar	Bar	Café	Coffee Shop	Restaurant	Cocktail Bar	Juice Bar	Seafood Restaurant	Shipping Store

Recommendation for cluster 2 — A food delivery company to handle overflow of tourist/residential food whims.

Cluster 3

#Cluster 3 -- Part cluster in center midtown, and part out at the big lake. Recreation area, tourists plus local Sunday visitors. Could use a different ethnic restaurant to complement what exists. Would be plenty of demand I think.

	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
8	CENTRAL CITY	Park	Cajun / Creole Restaurant	Fried Chicken Joint	Grocery Store	Seafood Restaurant	Garden	French Restaurant	Food Truck	Food Court	Food & Drink Shop
9	CITY PARK	Baseball Field	Trail	Tennis Court	Park	Women's Store	Fast Food Restaurant	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck
31	LAKESHORE - LAKE VISTA	Park	Food	Harbor / Marina	Women's Store	Fast Food Restaurant	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Court

40	MILAN	Wine Shop	Theater	Dive Bar	Park	Women's Store	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
48	PONT CHAR TRAIN PARK	Park	Women's Store	Fast Food Restaurant	Garden	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop
54	ST. CLAUDE	Plaza	Park	Women's Store	Farmers Market	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop

Recommendation for cluster 3 — Addition of another different ethnic restaurant to complement what exists.

Cluster 4
#Cluster 4 -- Lone Desire area on outskirts of New Orleans. Perhaps lower class residents, because lots of fast food, food trucks. Maybe needs a couple of affordable family restaurants.

	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
10	DESIRE AREA	Skate Park	Women's Store	Fast Food Restaurant	Garden	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop

Recommendation for cluster 4 — Could use an affordable family restaurant.

Cluster 5

#Cluster 5 -- Lone neighborhood on east side of New Orleans, near the highway to out of town. Probably residential, lower middle class. Gas station main venue -- for transient traffic. Could use a family restaurant.

	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
50	READ BLVD WEST	Gas Station	Women's Store	Garden	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food

Recommendation for Cluster 5 — Could use a family restaurant.

	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
62	WEST END	Historic Site	Playground	Event Space	Furniture / Home Store	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop	Food

Recommendation for cluster 6 — Could use another local or cajun restaurant.

Discussion

Such are the results of my study. The recommendations here are subjective, after analyzing the various clusters of neighborhoods and what makes each different from the other. A more studious analysis of the separate neighborhoods and their characteristics would shed more light onto what each neighborhood would need, food-wise.

Cluster 2 was by far the most populated, since it represented midtown, an area that attracts many tourists, and that has a rich amount of bars, restaurants, music venues. That area needed a food delivery place that could organize the delivery of various orders among the many eating places. I don't think they needed another restaurant.

Clusters 0, 4, 5, 6 contained only one neighborhood, and were interspersed on the fringes of the city, mostly near parks, lakes, or more rural residential neighborhoods. These could benefit from a family restaurant, or simply a local or cajun restaurant.

Clusters 1 and 3 were a mixture of urban/residential/visitor areas, that I though could benefit from a different ethnic restaurant to complement what they already had.

All in all, it was the French restaurant that was the most common of all of the ethnic restaurants. There was no cluster of neighborhoods that lacked one or more French restaurants.

A further analysis that could be done is to cluster just the neighborhoods returned in cluster 2, which are neighborhoods in central New Orleans. It is possible perhaps to get a more detailed analysis of the needs of central area of New Orleans.

There is also the matter of the six neighborhoods that Foursquare API returned as NaN. On further analysis of these 6 neighborhoods, I created a dataframe with those neighborhoods and plotted them on the map. It looks like those neighborhoods were all located around the delta where the dams broke during Hurricane Katrina. Thus, this lack of results is a testimonial to the damage and destruction done by the hurricane, leaving these neighborhoods virtually destroyed with no venue data available.

	Neighborhood	Longitude	Latitude
0	Behrman	-90.026436	29.934817
1	Village de Lest	-89.901123	30.073254
2	Viavant - Venetian Isles	-89.945755	30.003112
3	Tall Timbers - Brechtel	-90.013390	29.910305
4	Florida Dev	-90.032530	29.981702
5	Lower Ninth Ward	-90.013046	29.968914

Conclusions

In this study, I analyzed the various neighborhoods in New Orleans to see if any of them may benefit from another restaurant of any type, or from a food delivery company. I explored each neighborhood through Foursquare API to find what venues each neighborhood has the most of. Then I clustered them all into 7 clusters. The resulting recommendations I concluded from these results, and submitted them as recommendations to the specific Help New Orleans non-profit company, so that they could contract any recommended restaurant or food service to help alleviate the lack of restaurants or food delivery system.