

Capstone Project - The Battle of Neighborhoods

Selecting Neighborhoods in Hillsborough County, Florida for a new
restaurant chain

Introduction

- Hillsborough county in Florida is home to Tampa and many other unincorporated towns. The area, in addition to drawing tourists is rapidly growing, not just with retirees but younger families coming for the job opportunities as well as the mild weather and recreational opportunities. These people moving to the area generally love to eat out frequently and enjoy the parks and outdoor recreational activities the area has to offer. Any new business venture or expansion needs to be analyzed carefully. The insights derived from analysis will give good understanding of the business environment which help in strategically targeting the market. This will help in reduction of risk. And the Return

Business Problem

- The tourist industry as well as the influx of people moving to areas of the county creates numerous opportunities for restaurants to locate there. The large area of the county also creates the challenge of determining what the best locations for a new business will be. This project will create a model to help a restaurant company decide where to locate a new restaurant(s) to maximize the opportunity for success.

Data Selection

- We will use the zip codes contained within Hillsborough County to break the large area into neighborhoods. The web site zip-codes.com (<https://www.zip-codes.com/>) is used to provide the zip code list, city name and population for each area in the county. The website Foursquare (<https://es.foursquare.com/>) will be used to gather existing venue information for in each of the neighborhoods. Information on businesses will be obtained from Foursquare.
- The data obtained will allow identification of neighborhoods that are good candidates for a new restaurant location. A K-means clustering algorithm will then be used to group neighborhoods that are similar

Data Selection

- Next, we also used Google Map API to find their geographic coordinates of the the zip codes within Hillsborough County, Florida

	ZIP Code	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	33510	27.95198	-82.32002	Ulta Beauty	27.941689	-82.322067	Cosmetics Shop
1	33510	27.95198	-82.32002	Ice Sports Forum	27.948889	-82.330073	Skating Rink
2	33510	27.95198	-82.32002	Anthony's Coal Fired Pizza	27.938068	-82.315844	Pizza Place
3	33510	27.95198	-82.32002	Kobe Japanese Steakhouse - Brandon	27.939480	-82.321710	Japanese Restaurant
4	33510	27.95198	-82.32002	Wawa	27.938434	-82.310696	Convenience Store
5	33510	27.95198	-82.32002	Barnes & Noble	27.939262	-82.324779	Bookstore
6	33510	27.95198	-82.32002	Craft Beer Cellar Brandon	27.937067	-82.315972	Beer Store
7	33510	27.95198	-82.32002	PDQ	27.936530	-82.319334	Fried Chicken Joint
8	33510	27.95198	-82.32002	Ross Dress for Less	27.937923	-82.323671	Clothing Store
9	33510	27.95198	-82.32002	Ploy Thai	27.937183	-82.316008	Thai Restaurant

Table 2: Data frame containing geographic coordinates of our zip codes

Methodology

- Addresses are converted into their equivalent latitude and longitude values.
- Foursquare API is used to explore the zip codes in Hillsborough County, Florida
- Explore the neighborhoods to get current venue categories in each neighborhood.
- Utilize the K-mean clustering method to group neighborhoods that have similar characteristics.

Methodology

	ZIP Code	Neighborhood	Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	33510		27.95198	-82.32002	Ulta Beauty	27.941689	-82.322067	Cosmetics Shop
1	33510		27.95198	-82.32002	Ice Sports Forum	27.948889	-82.330073	Skating Rink
2	33510		27.95198	-82.32002	Anthony's Coal Fired Pizza	27.938068	-82.315844	Pizza Place
3	33510		27.95198	-82.32002	Kobe Japanese Steakhouse - Brandon	27.939480	-82.321710	Japanese Restaurant
4	33510		27.95198	-82.32002	Wawa	27.938434	-82.310696	Convenience Store
5	33510		27.95198	-82.32002	Barnes & Noble	27.939262	-82.324779	Bookstore
6	33510		27.95198	-82.32002	Craft Beer Cellar Brandon	27.937067	-82.315972	Beer Store
7	33510		27.95198	-82.32002	PDQ	27.936530	-82.319334	Fried Chicken Joint
8	33510		27.95198	-82.32002	Ross Dress for Less	27.937923	-82.323671	Clothing Store
9	33510		27.95198	-82.32002	Ploy Thai	27.937183	-82.316008	Thai Restaurant

Methodology

- Then group the neighborhoods into clusters using K-means clustering algorithm to complete this task. And also, the Folium library to visualize the neighborhoods in Hillsborough County and its emerging clusters

	ZIP Code	Classification	City	Population	Latitude	Longitude	Cluster Labels	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
0	33510	General	Brandon	27610	27.951980	-82.320020	3	Pizza Place	Furniture / Home Store	Fast Food Restaurant	Burger Joint	Cosmetics Shop	American Restaurant	
1	33511	General	Brandon	52003	27.912380	-82.319210	3	Burger Joint	Department Store	Clothing Store	Japanese Restaurant	Grocery Store	Steakhouse	Conv
2	33527	General	Dover	15203	27.992640	-82.216890	4	Gas Station	Convenience Store	Sandwich Place	Soccer Field	Farmers Market	Intersection	Fe Re
3	33534	General	Gibsonton	12839	27.835040	-82.378110	4	Gas Station	Donut Shop	Baseball Field	Convenience Store	Bar	Discount Store	Vide
4	33547	General	Lithia	19813	27.838770	-82.174450	4	Fast Food Restaurant	Park	Video Store	Convenience Store	Wings Joint	Pharmacy	! Re
5	33548	General	Lutz	5807	28.135350	-82.478070	3	Pizza Place	American Restaurant	Grocery Store	Sandwich Place	Gym / Fitness Center	Donut Shop	Re
6	33549	General	Lutz	16132	28.087500	-82.439040	3	Sandwich Place	Grocery Store	Bar	College Cafeteria	Bubble Tea Shop	Convenience Store	Re
7	33556	General	Odessa	22015	28.144590	-82.597920	4	Convenience Store	Sandwich Place	Farm	Donut Shop	Trail	Gym	
8	33558	General	Lutz	20064	28.135230	-82.542760	4	Golf Course	Sandwich Place	Furniture / Home Store	Gym / Fitness Center	Pizza Place	Grocery Store	Gas
9	33559	General	Lutz	15427	28.129043	-82.422766	4	Gym	Grocery Store	Sandwich Place	Pet Store	Discount Store	Italian Restaurant	

Results

- Using K-mean to group neighbors with similar characteristics

Cluster 0

	ZIP Code	Longitude	Cluster Labels	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	33563	-82.128920	0	Fast Food Restaurant	Gas Station	Discount Store	Sandwich Place	Pizza Place	BBQ Joint	Grocery Store	Donut Shop	Mexican Restaurant	Gym / Fitness Center
11	33565	-82.121480	0	Fast Food Restaurant	BBQ Joint	Gas Station	Intersection	Sandwich Place	Discount Store	Pizza Place	Park	Italian Restaurant	Pharmacy
12	33566	-82.140700	0	Fast Food Restaurant	Discount Store	Pizza Place	Gas Station	Sandwich Place	Mexican Restaurant	Grocery Store	BBQ Joint	Convenience Store	Donut Shop
17	33573	-82.362070	0	Grocery Store	Gas Station	Fast Food Restaurant	Discount Store	Golf Course	American Restaurant	Sandwich Place	Food	Fried Chicken Joint	Big Box Store
20	33584	-82.301090	0	Gas Station	Pizza Place	Fast Food Restaurant	Discount Store	Hotel	Pharmacy	Sandwich Place	Grocery Store	Video Store	Convenience Store
22	33594	-82.227430	0	Pizza Place	Grocery Store	Pharmacy	Fast Food Restaurant	American Restaurant	Sandwich Place	Mobile Phone Shop	Salon / Barbershop	Indian Restaurant	Tex-Mex Restaurant
37	33615	-82.581720	0	Fast Food Restaurant	Pizza Place	Coffee Shop	Trail	Gas Station	Bar	Grocery Store	Pharmacy	Diner	Chinese Restaurant
38	33616	-82.525890	0	Grocery Store	Pizza Place	Pharmacy	Sandwich Place	Gym	Nail Salon	Restaurant	Gas Station	Scenic Lookout	American Restaurant
41	33619	-82.380415	0	Convenience Store	Discount Store	Gas Station	Sandwich Place	Pizza Place	Video Store	Grocery Store	Donut Shop	Chinese Restaurant	Pharmacy

Result

Cluster 1

	ZIP Code	Longitude	Cluster Labels	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	33563	-82.128920	0	Fast Food Restaurant	Gas Station	Discount Store	Sandwich Place	Pizza Place	BBQ Joint	Grocery Store	Donut Shop	Mexican Restaurant	Gym / Fitness Center
11	33565	-82.121480	0	Fast Food Restaurant	BBQ Joint	Gas Station	Intersection	Sandwich Place	Discount Store	Pizza Place	Park	Italian Restaurant	Pharmacy
12	33566	-82.140700	0	Fast Food Restaurant	Discount Store	Pizza Place	Gas Station	Sandwich Place	Mexican Restaurant	Grocery Store	BBQ Joint	Convenience Store	Donut Shop
17	33573	-82.362070	0	Grocery Store	Gas Station	Fast Food Restaurant	Discount Store	Golf Course	American Restaurant	Sandwich Place	Food	Fried Chicken Joint	Big Box Store
20	33584	-82.301090	0	Gas Station	Pizza Place	Fast Food Restaurant	Discount Store	Hotel	Pharmacy	Sandwich Place	Grocery Store	Video Store	Convenience Store
22	33594	-82.227430	0	Pizza Place	Grocery Store	Pharmacy	Fast Food Restaurant	American Restaurant	Sandwich Place	Mobile Phone Shop	Salon / Barbershop	Indian Restaurant	Tex-Mex Restaurant
37	33615	-82.581720	0	Fast Food Restaurant	Pizza Place	Coffee Shop	Trail	Gas Station	Bar	Grocery Store	Pharmacy	Diner	Chinese Restaurant
38	33616	-82.525890	0	Grocery Store	Pizza Place	Pharmacy	Sandwich Place	Gym	Nail Salon	Restaurant	Gas Station	Scenic Lookout	American Restaurant
41	33619	-82.380415	0	Convenience Store	Discount Store	Gas Station	Sandwich Place	Pizza Place	Video Store	Grocery Store	Donut Shop	Chinese Restaurant	Pharmacy

Result

- Cluster 2

	ZIP Code	Longitude	Cluster Labels	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
27	33604	-82.44351	2	Theme Park	Zoo	Theme Park Ride / Attraction	Bar	Ice Cream Shop	Zoo Exhibit	Convenience Store	Diner	Restaurant	Fast Food Restaurant
34	33612	-82.43868	2	Theme Park Ride / Attraction	Zoo	Theme Park	Coffee Shop	Bar	Sandwich Place	Convenience Store	Bubble Tea Shop	Deli / Bodega	Playground
35	33613	-82.41690	2	Coffee Shop	Sandwich Place	Fast Food Restaurant	College Cafeteria	Theme Park	Bubble Tea Shop	Grocery Store	American Restaurant	Mexican Restaurant	Restaurant
39	33617	-82.40051	2	Theme Park	Theme Park Ride / Attraction	Zoo	Hookah Bar	Grocery Store	Mexican Restaurant	Fast Food Restaurant	Restaurant	Park	Convenience Store
42	33620	-82.41003	2	Theme Park	Theme Park Ride / Attraction	Coffee Shop	Zoo	Fast Food Restaurant	Sandwich Place	College Cafeteria	Bagel Shop	Italian Restaurant	Restaurant
51	33637	-82.37233	2	Theme Park	Convenience Store	Hookah Bar	Coffee Shop	Mexican Restaurant	Fast Food Restaurant	Zoo	Park	Restaurant	Grocery Store

Result

Cluster 3

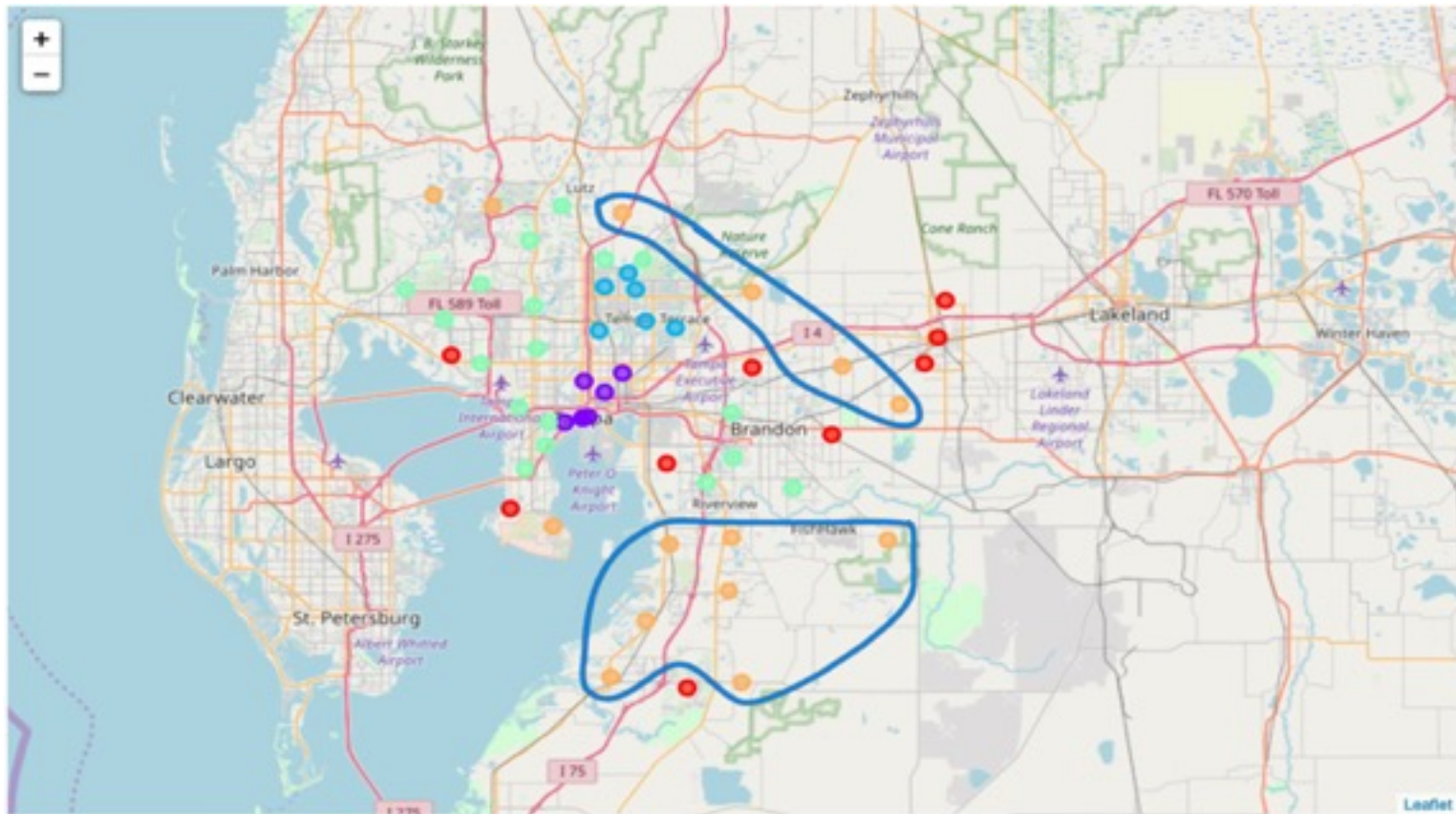
	ZIP Code	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	33510	-82.32002	3	Pizza Place	Furniture / Home Store	Fast Food Restaurant	Burger Joint	Cosmetics Shop	American Restaurant	Clothing Store	Bakery	Mexican Restaurant	Coffee Shop
1	33511	-82.31921	3	Burger Joint	Department Store	Clothing Store	Japanese Restaurant	Grocery Store	Steakhouse	Convenience Store	Cosmetics Shop	Pizza Place	Thai Restaurant
5	33548	-82.47807	3	Pizza Place	American Restaurant	Grocery Store	Sandwich Place	Gym / Fitness Center	Donut Shop	Chinese Restaurant	Pharmacy	Bank	Smoothie Shop
6	33549	-82.43904	3	Sandwich Place	Grocery Store	Bar	College Cafeteria	Bubble Tea Shop	Convenience Store	Sushi Restaurant	Fast Food Restaurant	Taco Place	Donut Shop
18	33578	-82.34449	3	American Restaurant	Grocery Store	Fast Food Restaurant	Burger Joint	Coffee Shop	Bar	Hardware Store	Breakfast Spot	Gym / Fitness Center	Pizza Place
23	33596	-82.26273	3	Pizza Place	Pharmacy	American Restaurant	Gym	Mexican Restaurant	Sushi Restaurant	Grocery Store	Ice Cream Shop	Sandwich Place	Mobile Phone Shop
30	33607	-82.51787	3	American Restaurant	Seafood Restaurant	Italian Restaurant	Steakhouse	Hotel	Cosmetics Shop	Mexican Restaurant	Fast Food Restaurant	Grocery Store	Lingerie Store
31	33609	-82.49129	3	Mexican Restaurant	Coffee Shop	American Restaurant	Italian Restaurant	Grocery Store	Restaurant	Sandwich Place	Scenic Lookout	BBQ Joint	Park
33	33611	-82.51317	3	Grocery Store	Scenic Lookout	Restaurant	Italian Restaurant	Bar	Pizza Place	Gym / Fitness Center	Spa	Ice Cream Shop	Breakfast Spot
36	33614	-82.50210	3	American Restaurant	Latin American Restaurant	Zoo Exhibit	Asian Restaurant	Diner	Pharmacy	Coffee Shop	South American Restaurant	Spanish Restaurant	Bar
40	33618	-82.50415	3	Breakfast Spot	Coffee Shop	Deli / Bodega	Burger Joint	BBQ Joint	Pizza Place	Steakhouse	Cosmetics Shop	Spa	Mexican Restaurant
44	33624	-82.50882	3	Grocery Store	Restaurant	Pizza Place	Golf Course	Ice Cream Shop	Sandwich Place	Pharmacy	Cosmetics Shop	Breakfast Spot	American Restaurant
45	33625	-82.55393	3	Italian Restaurant	Grocery Store	Sushi Restaurant	Pizza Place	Pharmacy	BBQ Joint	Burger Joint	Clothing Store	Fast Food Restaurant	Steakhouse
46	33626	-82.62413	3	Sushi Restaurant	Gym	American Restaurant	Grocery Store	Spa	Pizza Place	Coffee Shop	Fast Food Restaurant	Sandwich Place	Steakhouse
47	33629	-82.49349	3	Grocery Store	Mexican Restaurant	Italian Restaurant	Scenic Lookout	Sandwich Place	Dessert Shop	Gym / Fitness Center	Restaurant	Bakery	Sushi Restaurant

Result

Cluster 4

	ZIP Code	Longitude	Cluster Labels	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
2	33527	-82.216890	4	Gas Station	Convenience Store	Sandwich Place	Soccer Field	Farmers Market	Intersection	Fast Food Restaurant	Farm	Beer Garden	General Entertainment
3	33534	-82.378110	4	Gas Station	Donut Shop	Baseball Field	Convenience Store	Bar	Discount Store	Video Store	Fried Chicken Joint	Beer Garden	Light Rail Station
4	33547	-82.174450	4	Fast Food Restaurant	Park	Video Store	Convenience Store	Wings Joint	Pharmacy	Seafood Restaurant	Sports Club	Boxing Gym	Mobile Phone Shop
7	33556	-82.597920	4	Convenience Store	Sandwich Place	Farm	Donut Shop	Trail	Gym	Gym / Fitness Center	Grocery Store	American Restaurant	Dessert Shop
8	33558	-82.542760	4	Golf Course	Sandwich Place	Furniture / Home Store	Gym / Fitness Center	Pizza Place	Grocery Store	Gas Station	Church	Beer Garden	Supplement Shop
9	33559	-82.422766	4	Gym	Grocery Store	Sandwich Place	Pet Store	Discount Store	Italian Restaurant	Bank	Chinese Restaurant	Salon / Barbershop	Asian Restaurant
13	33567	-82.163790	4	Clothing Store	Intersection	Gas Station	Gym	Golf Course	Soccer Field	Pet Store	Park	Pizza Place	Convenience Store
14	33569	-82.320110	4	Gas Station	Convenience Store	Donut Shop	Fast Food Restaurant	American Restaurant	Video Store	Grocery Store	Bar	Big Box Store	Café
15	33570	-82.432960	4	American Restaurant	Fast Food Restaurant	Grocery Store	Seafood Restaurant	Sandwich Place	Discount Store	Breakfast Spot	Rest Area	Food & Drink Shop	Mexican Restaurant
16	33572	-82.400000	4	Grocery Store	Pizza Place	American Restaurant	Construction & Landscaping	Donut Shop	Restaurant	Fast Food Restaurant	Scenic Lookout	Gym / Fitness Center	Spa
19	33579	-82.323260	4	Convenience Store	Pizza Place	Sandwich Place	Video Store	Mexican Restaurant	Grocery Store	Fast Food Restaurant	Fried Chicken Joint	Donut Shop	Gas Station
21	33592	-82.300740	4	Trail	Gas Station	Park	Grocery Store	Flea Market	Liquor Store	Beach	Harbor / Marina	Soccer Field	Playground
24	33598	-82.311300	4	Gas Station	Grocery Store	Pharmacy	Discount Store	Mexican Restaurant	Golf Course	Bank	Convenience Store	Café	Big Box Store
43	33621	-82.487080	4	Park	Sandwich Place	Liquor Store	Boat or Ferry	Pharmacy	Airport Terminal	Thai Restaurant	Gym	Grocery Store	Motel

Result



Based on dataframe analysis above Cluster 4 (outer suburban Tampa areas) would be the best places to open a new restaurant chain locations.

Discussion

- This analysis is performed on a very limited set of data. For the purpose of this learning exercise that may be ok. Additional data such as historic population growth, income, and maybe some traffic congestion data would allow us to produce a more complete result.
- The mid-town Tampa area, represented by cluster 1, appears pretty well saturated with all types of venues creating a lot of competition and therefore, risk.
- The outlying areas represented by cluster 0 are spread across a large distance. This distance would make the logistics of delivery more expensive. With the rapid growth of the area, this could be potential for future expansion.
- Cluster 2 is concentrated around the theme parks in the county. This is mainly tourist areas, hotels/motels and other temporary lodging. If someone wanted to focus on tourists, that would be an area to consider but this company wants a more consistent and growing client base so this

Conclusion

- Although all of the goals of this project were met there is definitely room for further improvement and development as noted. However, the goals of the project were met and, with some more work, could easily be developed into a fully fledged application that could support the opening a business idea in an unknown location.