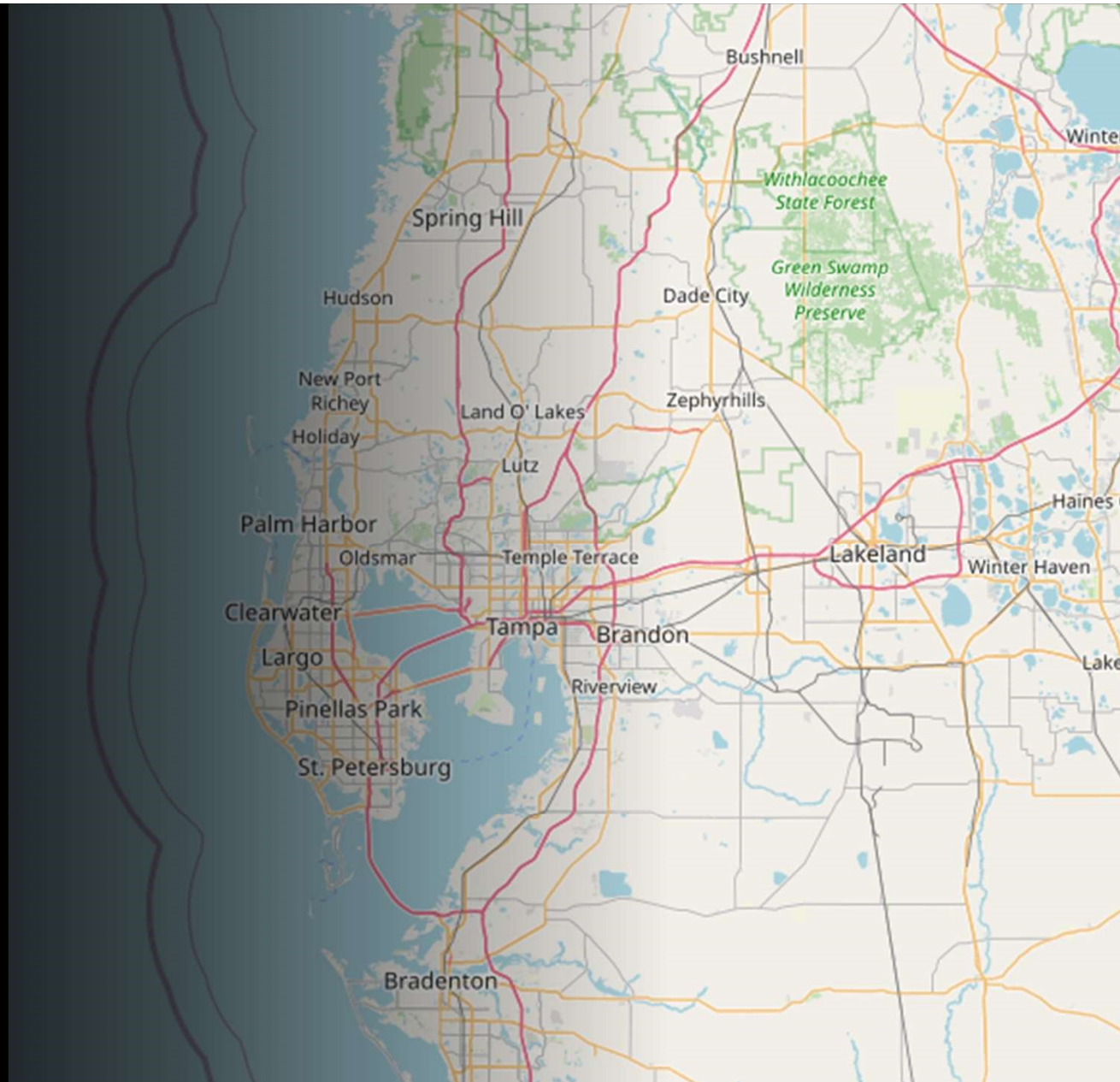# Coursera Capstone
IBM Applied Data Science Capstone

Opening a Restaurant in Tampa (Florida)

By: V.K

July 2020

Table of Content

Business Problem

- Tampa is the 48th most-populous city in the U.S. and the third-largest city in Florida after Miami and Jacksonville. The population of the Tampa Bay MSA is estimated at 3,142,663 people as of 2018.

- A recently released report analyzed 236 cities across the U.S., including the 150 most populous, to determine the 50 best cities to open a restaurant.

- Bid on Equipment named Tampa the No. 13 best city to open a restaurant, using the key factors of annual restaurant sales per capita, competition and market saturation (restaurants per capita), workforce (the number of restaurant industry workers per capita) and medium income in each city

- Let suppose, an investor has enough time and moneys, as well as a passion to open the best eating spot in Tampa. What type of restaurant would it be? What would be the best location for it?

- Target audience: investors, entrepreneurs, and chefs interest in opening a restaurant in Tampa, who may require objective advice regarding what type exactly it should be opened.
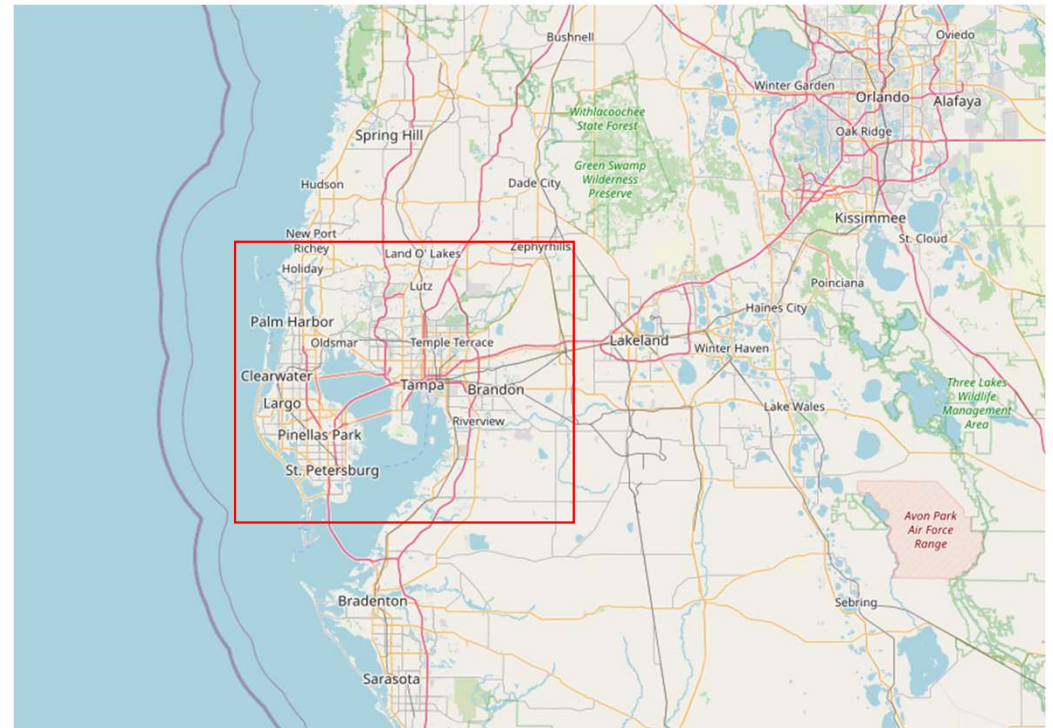
Data

- Data Requirements for this project:
    - PostalCode information (i.e. name, coordinates, populations).
    - Venue information (i.e. name, category, coordinates)
- Data Sources for this project:
    - Foursquare.com
    - US ZIP Code data. https://simplemaps.com/data/us-zips
    - Tampa City Data. https://www.tampagov.net/
- Data Processing for this project:
    - Data Cleaning is required
    - Data needs to be in a structured format

|	PostalCode	Country	State	County	Latitude	Longitude	Population	Households per ZIP Code	Average House Value	Average Income Per Household	Male Population	Female Population	Male Median Age	Female Median Age	Unemployment Rate
0	33602	United States	Florida	Hillsborough	27.961	-82.460	17412	6004	272000	67945	6092	5423	35.8	34.5	12.1%
1	33603	United States	Florida	Hillsborough	27.985	-82.463	20303	7721	147600	40078	9421	9679	35.4	37.5	12.1%
2	33604	United States	Florida	Hillsborough	28.017	-82.458	38971	13944	118400	37316	17443	18042	35.6	37.0	12.1%
3	33605	United States	Florida	Hillsborough	27.967	-82.433	18689	6481	84500	26121	8469	8604	34.6	35.8	12.1%
4	33606	United States	Florida	Hillsborough	27.948	-82.458	18271	7517	452900	74855	8632	9114	32.1	29.4	12.1%

Methodology

- Data Scrapping Technique internet page
  - To scrap the postalcode data from US ZIP code page

- Using Forsquare API, collect the top 100 restaurants and their Categories for each location withing a 500 meter radius.

- Group collected restaurants by location and by taking the mean of the frequency of occured of each type, preparing them for clustering.

- Cluster restaurants by k-means algorithm analyze 10 most common restauirant in each cluster

- Visualize cluster on the map, thus showing the best location for opening the chosen restaurant.
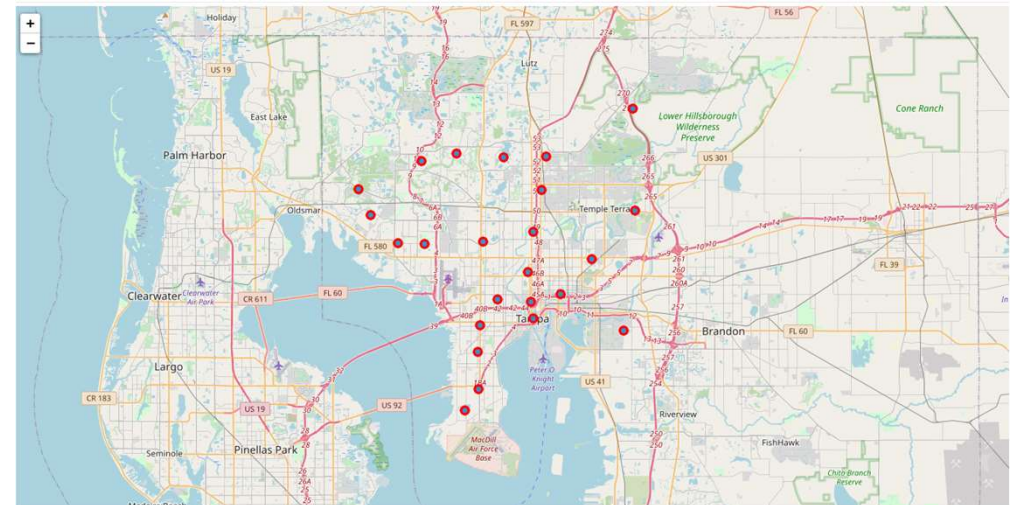
Exploring Tampa Neighborhoods

- Using US ZIP code we collected all of Tampa's neighborhoods.

- Using geospatial libraries and Scraping ZIP codes we added geographical coordinates.

- With some cleaning and wrangling, we obtained 24 locations in Tampa.
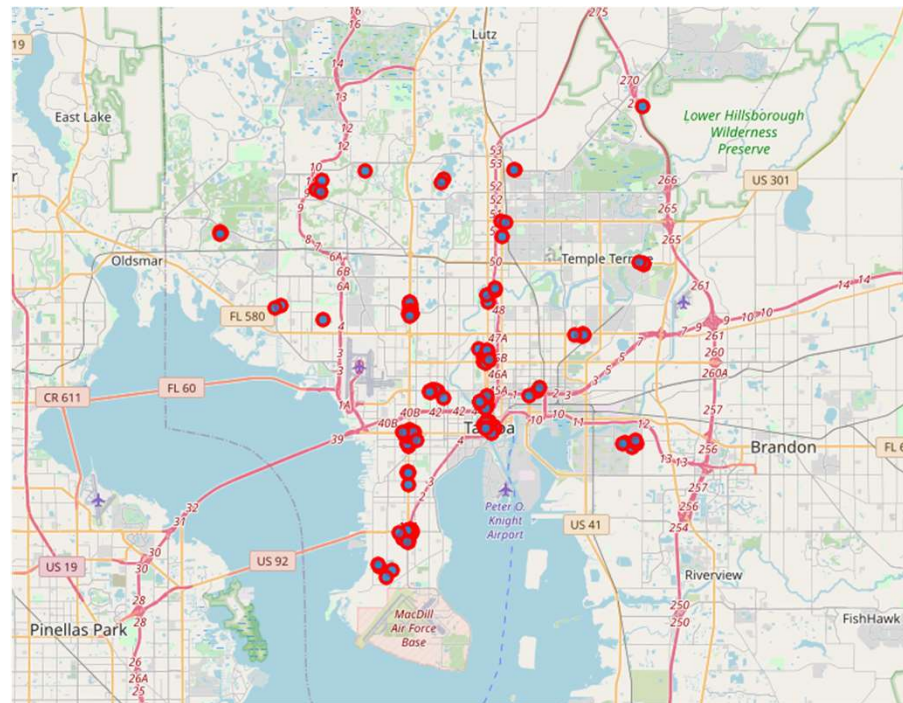
Exploring Tampa Restaurants

- We utilized the Foursquare API to get the top 100 restaurants in each neighborhood.

- Thus we obtaineid 2173 restaurants of 112 individual types.

- We applied one-hot encoding and grouped themp by taking the mean of the frequency of occurrence of each tyoe.

- Then we clustered restaurants using the K-means algorithm based on their types similarity. The k-means is an unsupervised machine learning algorithm for clustering unlabeled data.

Result

- Cluster 1 red, cluster 2 blue, cluster 3 purple and cluster 4 orange
- Clustering Similar Neighborhoods
  - Grouping based on common venues

	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	Audubon Park	American Restaurant	Thai Restaurant	Spa	Cuban Restaurant	Fast Food Restaurant	Shipping Store	Flower Shop	Pizza Place	Seafood Restaurant	Burger Joint
1	Ballast Point	Mexican Restaurant	Pizza Place	Mobile Phone Shop	Fast Food Restaurant	Coffee Shop	Restaurant	Salon / Barbershop	Sandwich Place	Scenic Lookout	Chinese Restaurant
2	Bayshore Beautiful	American Restaurant	Juice Bar	Pizza Place	Pet Store	Other Nightlife	Sandwich Place	Gym	Fish Market	Deli / Bodega	Discount Store
3	Carver City-Lincoln Gardens	Shoe Store	Pharmacy	Flower Shop	Food	Fruit & Vegetable Store	Mexican Restaurant	Tea Room	Breakfast Spot	Discount Store	Video Store
4	Citrus Park	Rock Club	Scenic Lookout	Home Service	Construction & Landscaping	Farm	Flower Shop	Cycle Studio	Deli / Bodega	Discount Store	Donut Shop
5	College Hill	Construction & Landscaping	Trail	BBQ Joint	Electronics Store	Wine Bar	Food Court	Discount Store	Donut Shop	Eastern European Restaurant	Farm
6	Dixie Farms	American Restaurant	Comic Shop	Playground	Photography Studio	Miscellaneous Shop	Food	Discount Store	Donut Shop	Eastern European Restaurant	Electronics Store
7	Drew Park	Furniture / Home Store	Pizza Place	Donut Shop	Ice Cream Shop	Food Truck	Deli / Bodega	Pharmacy	Smoke Shop	Fast Food Restaurant	Spanish Restaurant
8	East Tampa	Sandwich Place	Pharmacy	Fast Food Restaurant	Insurance Office	Cycle Studio	Deli / Bodega	Discount Store	Donut Shop	Eastern European Restaurant	Electronics Store
9	Eastern Heights	Home Service	Hotel	Discount Store	Furniture / Home Store	Wine Bar	Food	Deli / Bodega	Donut Shop	Eastern European Restaurant	Electronics Store
10	Forest Hills	Convenience Store	Flea Market	Food Court	Deli / Bodega	Discount Store	Donut Shop	Eastern European Restaurant	Electronics Store	Farm	Fast Food Restaurant
11	Forest at Countryway	Furniture / Home Store	Wine Bar	Food Court	Deli / Bodega	Discount Store	Donut Shop	Eastern European Restaurant	Electronics Store	Farm	Fast Food Restaurant
12	Gandy-Sun Bay South	Soccer Field	Deli / Bodega	Athletics & Sports	Theater	Wine Bar	Food	Discount Store	Donut Shop	Eastern European Restaurant	Electronics Store
13	Greater Carrollwood	Mobile Phone Shop	Boat or Ferry	Wine Bar	Food Truck	Discount Store	Donut Shop	Eastern European Restaurant	Electronics Store	Farm	Fast Food Restaurant
14	Greater Northdale	Bus Station	Wine Bar	Cuban Restaurant	Deli / Bodega	Discount Store	Donut Shop	Eastern European Restaurant	Electronics Store	Farm	Fast Food Restaurant
15	Harbour Island	Coffee Shop	New American Restaurant	Wine Bar	Steakhouse	Ice Cream Shop	Latin American Restaurant	Market	Food Court	Park	Ramen Restaurant
16	Historic Hyde Park North	Coffee Shop	Pizza Place	Bar	American Restaurant	Bookstore	Café	Scenic Lookout	Cuban Restaurant	Park	Movie Theater
17	Hunters Green	Trail	Wine Bar	Food Court	Deli / Bodega	Discount Store	Donut Shop	Eastern European Restaurant	Electronics Store	Farm	Fast Food Restaurant
18	Lowry Park Central	Intersection	Brewery	Japanese Restaurant	Bike Shop	Pharmacy	Coffee Shop	Burger Joint	Southern / Soul Food Restaurant	Sporting Goods Shop	Playground
19	Northwest Park	Sandwich Place	Intersection	Cycle Studio	Deli / Bodega	Discount Store	Donut Shop	Eastern European Restaurant	Electronics Store	Farm	Fast Food Restaurant
20	River Grove	Ice Cream Shop	Speakeasy	Scenic Lookout	Pizza Place	Food	Gym / Fitness Center	Gym	Hotel	Deli / Bodega	Discount Store
21	Tampa Palms	Mexican Restaurant	Middle Eastern Restaurant	Sports Bar	Pizza Place	Golf Course	Bar	Flea Market	Fish Market	Fast Food Restaurant	Farm
22	Westchester of Hillsborough	American Restaurant	Golf Course	Food Court	Deli / Bodega	Discount Store	Donut Shop	Eastern European Restaurant	Electronics Store	Farm	Fast Food Restaurant

Discussion

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
Audubon Park	Thai Restaurant	Shipping Store	Cuban Restaurant	American Restaurant	Other Repair Shop	Salon / Barbershop	Burger Joint	Café	Gym
Ballast Point	Mexican Restaurant	Pizza Place	Mobile Phone Shop	Restaurant	Cosmetics Shop	Coffee Shop	Chinese Restaurant	Salon / Barbershop	Sandwich Place
ayshore Beautiful	American Restaurant	Sandwich Place	Juice Bar	Pizza Place	Other Nightlife	Food	Deli / Bodega	Discount Store	Donut Shop
-Lincoln Gardens	Tea Room	Pharmacy	Breakfast Spot	Fruit & Vegetable Store	Mexican Restaurant	Shoe Store	Flower Shop	Discount Store	Video Store
Citrus Park	Scenic Lookout	Farm	Rock Club	Wine Bar	Food Court	Cycle Studio	Deli / Bodega	Discount Store	Donut Shop
College Hill	Trail	Wine Bar	Fried Chicken Joint	Deli / Bodega	Discount Store	Donut Shop	Farm	Fast Food Restaurant	Fish Market
Dixie Farms	Video Store	Photography Studio	Business Service	Miscellaneous Shop	Wine Bar	Food Truck	Discount Store	Donut Shop	Farm
Drew Park	Donut Shop	Pizza Place	Fast Food Restaurant	Ice Cream Shop	Furniture / Home Store	Deli / Bodega	Pharmacy	Fish Market	Motorcycle Shop
East Tampa	Sandwich Place	Fast Food Restaurant	Pharmacy	Food Court	Cycle Studio	Deli / Bodega	Discount Store	Donut Shop	Farm
Eastern Heights	Hotel	Discount Store	Furniture / Home Store	Food	Wine Bar	Food Truck	Deli / Bodega	Donut Shop	Farm
Forest Hills	Convenience Store	Indian Restaurant	Food Truck	Deli / Bodega	Discount Store	Donut Shop	Farm	Fast Food Restaurant	Fish Market
dy-Sun Bay South	Soccer Field	Deli / Bodega	Home Service	Pool	Theater	Athletics & Sports	Wine Bar	Food Court	Discount Store
ater Carrollwood	Boat or Ferry	Wine Bar	Deli / Bodega	Discount Store	Donut Shop	Farm	Fast Food Restaurant	Fish Market	Flea Market
Harbour Island	Coffee Shop	Park	New American Restaurant	Wine Bar	Market	Ramen Restaurant	Brewery	Food Court	Steakhouse
Hyde Park North	Coffee Shop	Bar	Pizza Place	Hotel	Asian Restaurant	Sports Bar	Café	Restaurant	Park
Hunters Green	Trail	Wine Bar	Fried Chicken Joint	Deli / Bodega	Discount Store	Donut Shop	Farm	Fast Food Restaurant	Fish Market
owry Park Central	Intersection	Brewery	Japanese Restaurant	Bike Shop	Coffee Shop	Burger Joint	Southern / Soul Food Restaurant	Sporting Goods Shop	Playground
Northwest Park	Sandwich Place	Food Truck	Cycle Studio	Deli / Bodega	Discount Store	Donut Shop	Farm	Fast Food Restaurant	Fish Market
River Grove	Ice Cream Shop	Skating Rink	Pizza Place	Food	Food Court	Deli / Bodega	Discount Store	Donut Shop	Farm
Tampa Palms	Sports Bar	Nature Preserve	Pizza Place	Golf Course	Mexican Restaurant	Bar	Middle Eastern Restaurant	Discount Store	Donut Shop
r of Hillsborough	American Restaurant	Home Service	Gym Pool	Golf Course	Food Court	Deli / Bodega	Discount Store	Donut Shop	Farm

Conclusion

- In this report we established a methodology to determine what the most promising type of restaurant is, and where it should be opened.

- This type of analysis can be applied to any city of your choice that has available geospatial information-

- Result Review:
  - First cluster looks to offer the best business expansion opportunity.
  - Audubon park neighborhood in the first cluster looks to meet the key business criteria wherepy it will offer the highest demand (i.e. high population) and lowest competition (i.e. lower supply).

Conclusion

- Recommendation Summary:
  - Region: First Cluster
  - Neighborhood: Audubon park
- In this report we established a metology to determine what the most promising type of restaurant is, and where it should be opened.
- This type of analysis can be applied to any city of your choice that has available geospatial information.
- This type of analysis can be applied to anyt type of venue (shopping, etc).) that is available in Forsquare dateabase.
- Thank You:
  - Appreciation Notes from Data Science Team for this project.