



# ANALYSIS OF MIAMI NEIGHBORHOODS: HEALTH/FITNESS VENUES

IBM APPLIED DATA SCIENCE CAPSTONE PROJECT  
JOSHUA D. HUDSON      MAY, 2020

# ANALYSIS OF MIAMI NEIGHBORHOODS: HEALTH/FITNESS VENUES

- Introduction
  - Background
  - Problem
  - Stakeholders and Interest
- Data Analysis
- Methodology of Analysis
- Results
- Discussion of Results
- Conclusion

# INTRODUCTION

## Background:

Miami, Florida is known for its great weather, beaches, nightlife, food, and multi-cultural population. Generally speaking, the residents of Miami are very active and interested in maintaining physical fitness and healthy dieting. These trends and behaviors of the population can lead to very interesting investment opportunities, provided the location is easily accessible, and the right population is served.



<https://theculturetrip.com/north-america/usa/florida/articles/a-fitness-lovers-ultimate-guide-to-miami/>

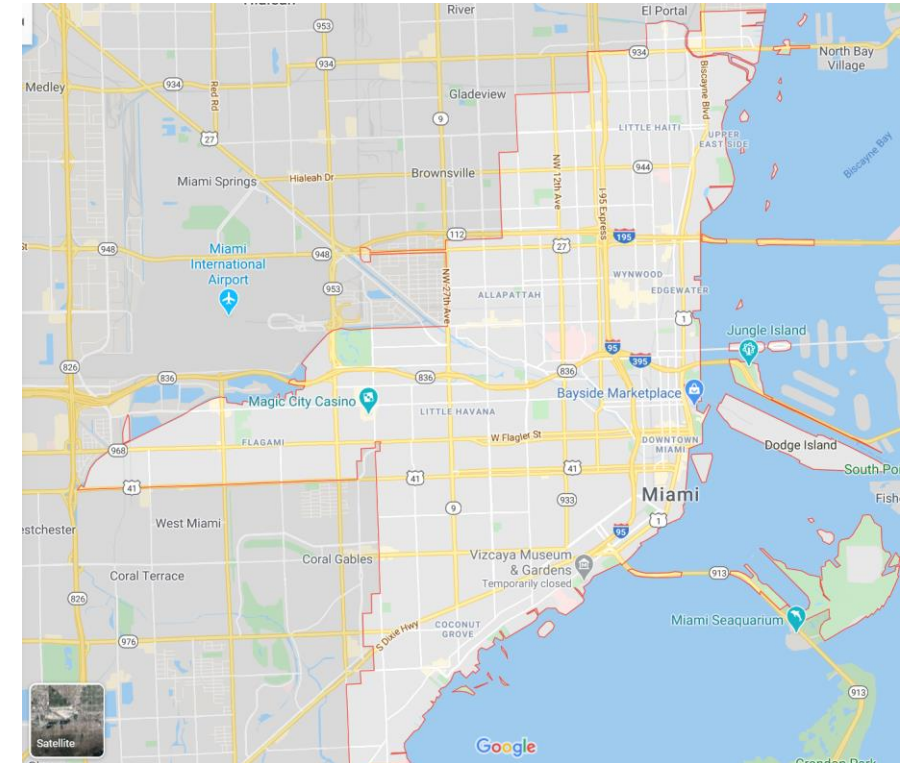


# INTRODUCTION

## Problem:

A local business investor has approached the company to analyze the main neighborhoods within the City of Miami. The investor's vision is to open a new health club/gym that is adjacent to a new health food market. The purpose is to have both venues side-by-side to serve the health club patrons with the convenience of shopping for healthy food options.

The project analysis is to consider neighborhood population density and the venue preferences of the general population in the area. Multiple neighborhoods can be clustered together if their characteristics are similar, and a project location can be determined to best serve nearby patrons and shoppers.



<https://www.google.com/maps/place/Miami,+FL/>

# INTRODUCTION

## Stakeholders and Interest:

The business investor who has developed this project may also have additional investors who would be interested if the analysis proves to be favorable for the project.



[https://img.business.com/rc/816x500/aHR0cHM6Ly93d3cuYnVzaW5lc3MuY29tL2ltYWdlcy9jb250ZW50LzVkYy8zMjg0ODdiNDM3NDYyMmY4YjQ1NzkvMC04MDAt?\\_ga=2.150439286.1742713852.1587918626-1256710182.1587918626](https://img.business.com/rc/816x500/aHR0cHM6Ly93d3cuYnVzaW5lc3MuY29tL2ltYWdlcy9jb250ZW50LzVkYy8zMjg0ODdiNDM3NDYyMmY4YjQ1NzkvMC04MDAt?_ga=2.150439286.1742713852.1587918626-1256710182.1587918626)

# DATA ANALYSIS

## Sources:

- List of Miami neighborhoods with approximate GPS coordinate locations: [https://en.wikipedia.org/wiki/List\\_of\\_neighborhoods\\_in\\_Miami](https://en.wikipedia.org/wiki/List_of_neighborhoods_in_Miami)
- Demographic and land area data for Midtown Miami: <https://www.point2homes.com/US/Neighborhood/FL/Midtown-Edgewater-Demographics.html> and <https://www.cpexecutive.com/post/midtown-opportunities-l-l-c-acquires-22-acres-of-land-in-midtown-miami/>
- Supplemental latitude/longitude coordinates were found using Google Maps where initial data was missing. [www.googlemaps.com](http://www.googlemaps.com)
- FourSquare database of venues to evaluate neighborhood characteristics and business competition (connect via API): <https://api.foursquare.com/v2/venues/> ...

# DATA ANALYSIS

## Assumptions:

- During the time of this analysis report, significant developments have taken place with respect to the COVID-19 pandemic. Currently gyms and fitness clubs are ordered to be closed in the state of Florida. This analysis assumes gyms and fitness centers will be permitted to re-open and return to normal business in the relatively near future.
- The data sets evaluated and conclusions made are based on the venue and location data available at the time of evaluation along with common knowledge of the areas. Factors such as real estate market values, property taxes, local development regulations, etc. were not considered in this evaluation.
- In the originally imported neighborhood database from Wikipedia.com, the Health District neighborhood had no latitude and longitude coordinates. Googlemaps.com was used to estimate the approximate center of this area. The Civic Center train station was assumed to be this approximate location.
- The Midtown neighborhood (most of which is formerly known as Edgewater) was missing population and land area data, as this area was not considered a significantly populated area until redevelopment efforts in 2010 made it a thriving neighborhood. Data from the two Web sites referenced above were assumed to be appropriate for this analysis.
- Population and land area data for Venetian Islands was not provided in the Wikipedia.com table, and other various sources were extremely inconsistent. Because of this, Venetian Islands neighborhood was excluded from this analysis.

# DATA ANALYSIS

- Import and clean the Miami neighborhood data set with Latitude and Longitude coordinates
- Utilize an API request to connect to FourSquare developer tools
- Evaluate all venues in each neighborhood within 1,000 meters of the neighborhood coordinates

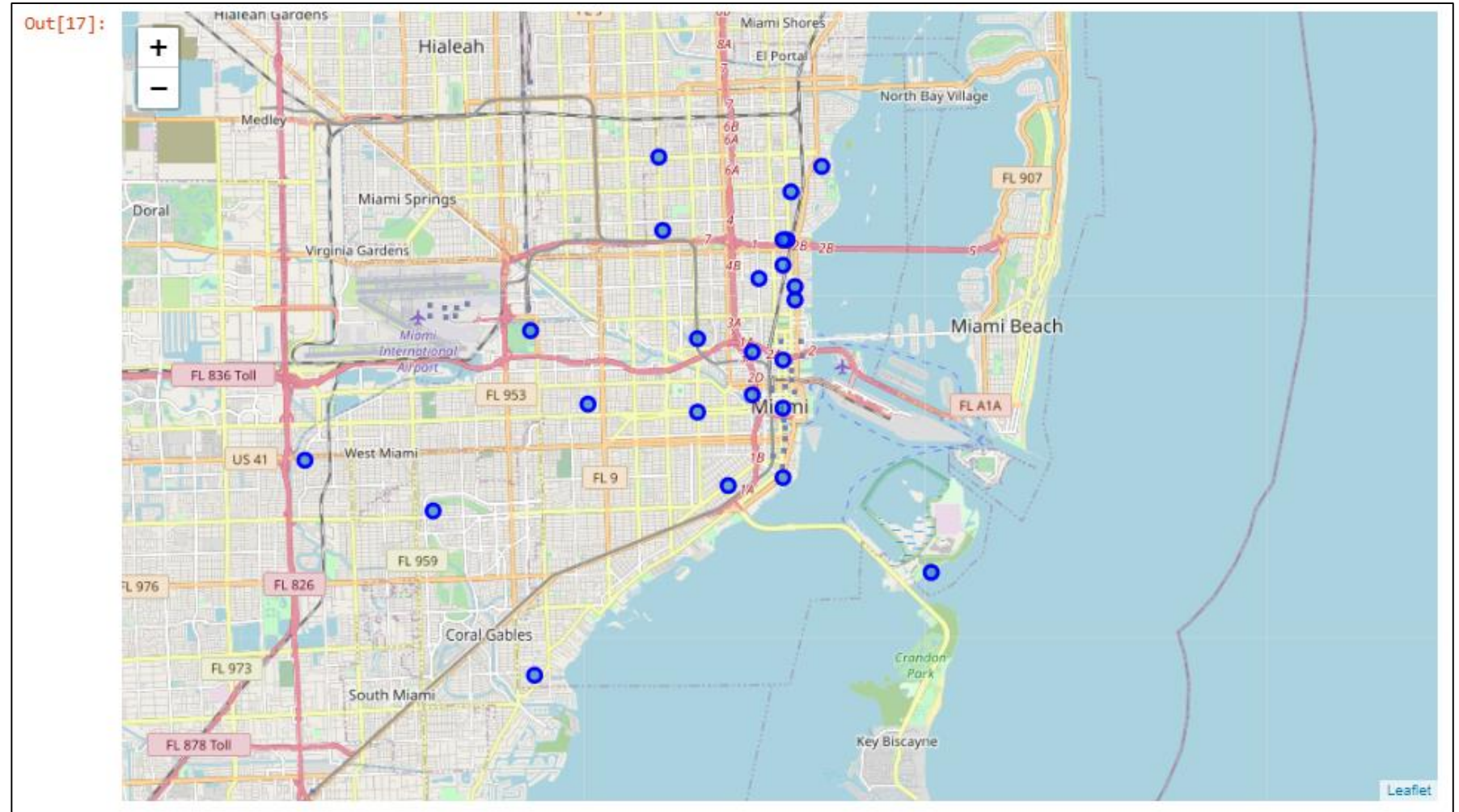
Out[11]:

	Neighborhood	Population2010	Population/Km²	Sub-neighborhoods	Latitude	Longitude
0	Allapattah	54289	4401	NaN	25.815	-80.224
1	Arts & Entertainment District	11033	7948	NaN	25.799	-80.19
2	Brickell	31759	14541	West Brickell	25.758	-80.193
3	Buena Vista	9058	3540	Buena Vista East Historic District and Design ...	25.813	-80.192
4	Coconut Grove	20076	3091	Center Grove, Northeast Coconut Grove, Southwe...	25.712	-80.257
5	Coral Way	35062	4496	Coral Gate, Golden Pines, Shenandoah, Historic...	25.75	-80.283
6	Design District	3573	3623	NaN	25.813	-80.193
7	Downtown	71000	10613	Brickell, Central Business District (CBD), Dow...	25.774	-80.193
8	Edgewater	15005	6675	NaN	25.802	-80.19
9	Flagami	50834	5665	Alameda, Grapeland Heights, and Fairlawn	25.762	-80.316
10	Grapeland Heights	14004	4130	NaN	25.792	-80.258
11	Health District	2705	2148	NaN	25.790	-80.215
12	Liberty City	19725	3733	NaN	25.832	-80.225
13	Little Haiti	29760	3840	Lemon City (aka Little River)	25.824	-80.191
14	Little Havana	76163	8423	Riverside and South River Drive Historic District	25.773	-80.215
15	Lummas Park	3027	3680	NaN	25.777	-80.201
16	Midtown	3162	13747.8	Edgewater and Wynwood	25.807	-80.193
17	Overtown	6736	3405	Spring Garden	25.787	-80.201
18	Park West	4655	3635	NaN	25.785	-80.193
19	The Roads	7327	4899	NaN	25.756	-80.207
20	Upper Eastside	12525	2513	Bay Point Estates, Bayside District, Belle Mea...	25.83	-80.183
21	Virginia Key	14	4.01146	NaN	25.736	-80.155
22	West Flagler	31407	4428	NaN	25.775	-80.243
23	Wynwood	7277	2983	Wynwood Art District and Wynwood Fashion District	25.804	-80.199

Example Data Output: General Miami Neighborhood Data from Data Sources



# DATA ANALYSIS



Data Visualization: Miami Neighborhoods using folium package

# DATA ANALYSIS

Check size and sample of venue list

```
In [20]: print(mia_venues.shape)
mia_venues.head(15)
```

(1418, 7)

Out[20]:

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Allapattah	25.815	-80.224	Club Tipico Dominicano	25.809557	-80.218593	Nightclub
1	Allapattah	25.815	-80.224	Family Dollar	25.807208	-80.223503	Discount Store
2	Allapattah	25.815	-80.224	Redbox	25.808122	-80.224456	Video Store
3	Allapattah	25.815	-80.224	Charles Hadley Pool	25.819565	-80.216753	Park
4	Allapattah	25.815	-80.224	Winn-Dixie	25.808179	-80.224911	Grocery Store
5	Allapattah	25.815	-80.224	El Presidente Supermarket	25.809744	-80.231959	Food & Drink Shop
6	Allapattah	25.815	-80.224	Fritura Dominicana	25.809588	-80.223622	Food Truck
7	Allapattah	25.815	-80.224	MDT Metrorail - Earlington Heights Station	25.812449	-80.229974	Light Rail Station
8	Allapattah	25.815	-80.224	Chimi Churri Los Primos	25.809275	-80.226073	Food Truck
9	Allapattah	25.815	-80.224	Cafeteria Amarillis Dominican Food	25.808877	-80.223655	Spanish Restaurant
10	Allapattah	25.815	-80.224	amarillis	25.808877	-80.223655	Latin American Restaurant
11	Allapattah	25.815	-80.224	Navarro Discount Pharmacy	25.819749	-80.230086	Pharmacy
12	Allapattah	25.815	-80.224	Joe's Meat Market	25.816633	-80.232063	Grocery Store
13	Allapattah	25.815	-80.224	Charles Hadley Park	25.820589	-80.218300	Park
14	Allapattah	25.815	-80.224	classys	25.815200	-80.232600	Food & Drink Shop

Sample Venue Output for Miami Neighborhoods (first 15 lines)

# DATA ANALYSIS

Transform data to one-hot encoding format to evaluate the frequency occurrence of each category.

Each of the venue categories were sorted for each neighborhood, and the top ten most common venues were displayed.

Health-oriented venues such as gyms/fitness centers, juice bars, trails, gardens, parks, etc. appear with relative frequency among the neighborhoods.

Out[28]:

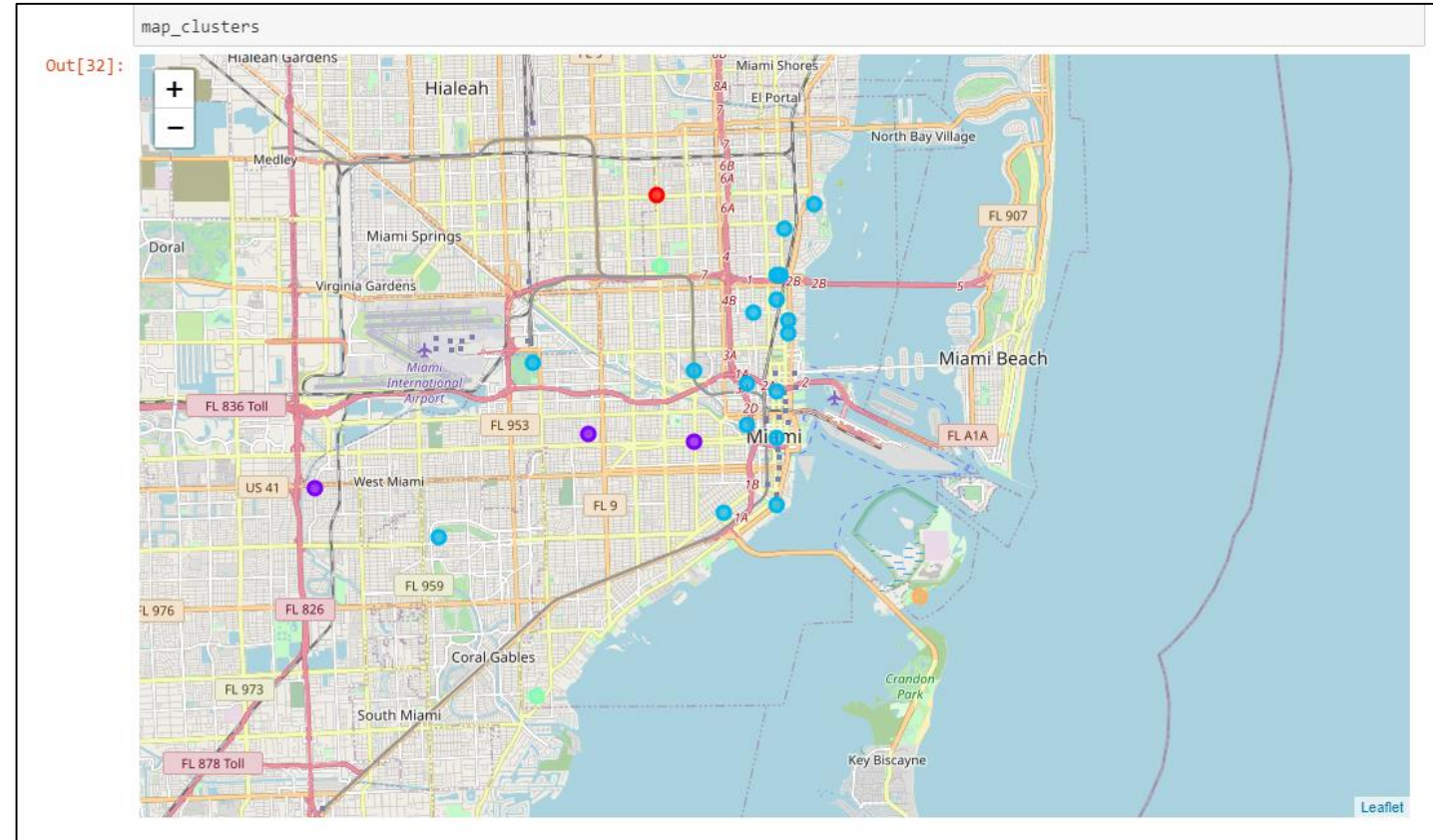
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Allapattah	Park	Food & Drink Shop	Food Truck	Grocery Store	Cosmetics Shop	Spanish Restaurant	Light Rail Station	Latin American Restaurant	Discount Store	Nightclub
1	Arts & Entertainment District	Art Gallery	Restaurant	Ice Cream Shop	Bar	Juice Bar	Gym	Food Truck	Peruvian Restaurant	Coffee Shop	Gym / Fitness Center
2	Brickell	Hotel	Pizza Place	Italian Restaurant	Yoga Studio	Middle Eastern Restaurant	Residential Building (Apartment / Condo)	Coffee Shop	Argentinian Restaurant	Gym	Latin American Restaurant
3	Buena Vista	Art Gallery	Italian Restaurant	Pizza Place	Coffee Shop	Gym	Café	Park	Furniture / Home Store	Jewelry Store	Business Service
4	Coconut Grove	Park	Playground	Trail	Garden	Boat or Ferry	Plaza	American Restaurant	Cosmetics Shop	Cuban Restaurant	Film Studio
5	Coral Way	Pizza Place	Café	Playground	Sports Bar	History Museum	Gym	Grocery Store	Golf Course	Intersection	Dive Bar
6	Design District	Italian Restaurant	Art Gallery	Coffee Shop	Pizza Place	Gym	Café	Park	Furniture / Home Store	Business Service	Pharmacy
7	Downtown	Hotel	Seafood Restaurant	Italian Restaurant	Peruvian Restaurant	Residential Building (Apartment / Condo)	Spa	Gym	Café	Cosmetics Shop	Brazilian Restaurant
8	Edgewater	Art Gallery	Ice Cream Shop	Restaurant	Coffee Shop	Pizza Place	Mexican Restaurant	Bar	Italian Restaurant	Food Truck	Gym / Fitness Center
9	Flagami	Bakery	Liquor Store	Seafood Restaurant	Latin American Restaurant	Hobby Shop	Gas Station	Department Store	Chinese Restaurant	Record Shop	Discount Store
10	Grapeland Heights	Rental Car Location	Hotel	Bus Station	Gym / Fitness Center	Airport Service	Gym	Train Station	Hotel Pool	Gas Station	Latin American Restaurant
11	Health District	Sandwich Place	Café	Convenience Store	Bakery	Fast Food Restaurant	Coffee Shop	Light Rail Station	Gourmet Shop	Mexican Restaurant	Cuban Restaurant

Sample Venue Rankings for Each Neighborhood

# METHODOLOGY OF ANALYSIS

Review clusters of neighborhoods to find similar characteristics among small groups. If multiple neighborhoods share similar venue rankings, it may be advantageous to locate the new fitness center/health food store in a central location to potentially service more than one neighborhood.

K-means clustering methods were utilized, targeting five clusters if possible.



Map of Neighborhood Clusters



# METHODOLOGY OF ANALYSIS

Clusters were then evaluated individually to identify distinguishing characteristics.

Cluster 2

In [36]:

Cluster2=mia\_merged.loc[mia\_merged['Cluster Labels'] == 1, mia\_merged.columns[[0] + list(range(1, mia\_merged.shape[1]))]]

Cluster2

Out[36]:

	Neighborhood	Population2010	Population/Km²	Sub-neighborhoods	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	
9	Flagami	50834	5665	Alameda, Grapeland Heights, and Fairlawn	25.762	-80.316	1	Liquor Store	Bakery	Seafood Restaurant	Cuban Restaurant	Re St
14	Little Havana	76163	8423	Riverside and South River Drive Historic District	25.773	-80.215	1	Cuban Restaurant	Smoke Shop	Latin American Restaurant	Pharmacy	M Re
22	West Flagler	31407	4428	NaN	25.775	-80.243	1	Latin American Restaurant	Pharmacy	Pizza Place	Asian Restaurant	Bz

Sample of Neighborhood Cluster Data Output



# METHODOLOGY OF ANALYSIS

Clusters were then evaluated based on geographic centroid, total population, and population density.

Out[38]:

	Cluster 2
Latitude	25.773
Longitude	-80.243
Population2010	158404.000
Population/Km <sup>2</sup>	6172.000

Sample of Neighborhood Cluster Location and Population Summary

# RESULTS

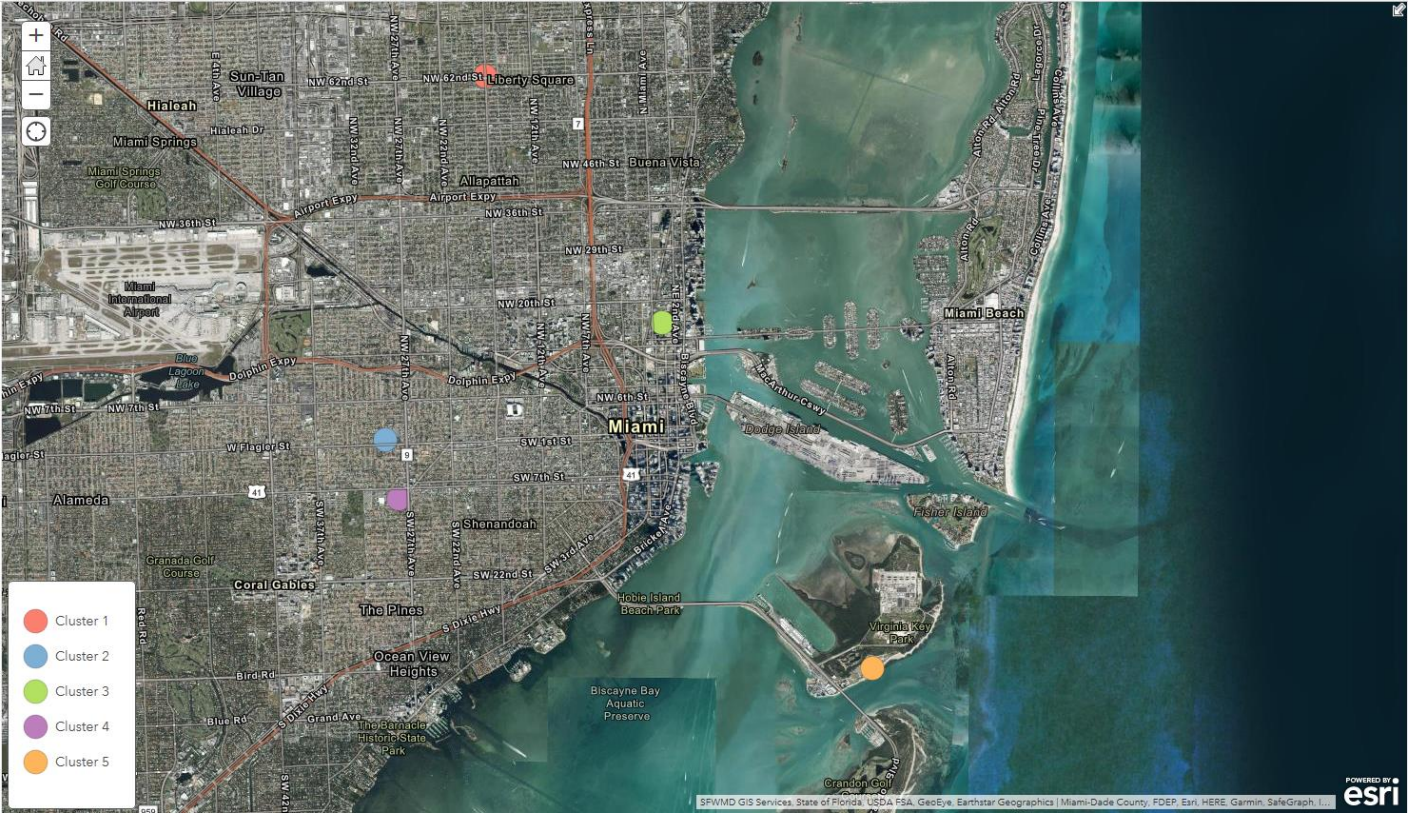
Results from this analysis were noted to change over time, and it should be expected the results will continue to change as time goes on. It should not be expected that the data set evaluated would be the same as if it were collected and evaluated at any time in the future. This is likely due to the “live” nature of the data utilized from Foursquare and the API connection. As Foursquare users input data, the data intended for this analysis could potentially be affected. Data analyzed in this report was generated May 7, 2020.

By utilizing k-means clustering methods to create the neighborhood clusters, there is an introduction of the iterative process in determining the clusters that is not perfect. The k-means clustering algorithm uses a random initial placement of cluster centroids and converges when its algorithm does not change the centroid location. This method is widely used in the computer science field but does not guarantee to find the optimum.

# RESULTS

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
No. of Neighborhoods	1	3	16	2	1
Latitude	25.832	25.773	25.792	25.764	25.736
Longitude	-80.225	-80.243	-80.193	-80.241	-80.155
Population	19,725	158,404	267,668	74,365	14
Population/km <sup>2</sup>	3,733	6,172	5,671	3,746	4
Approx. Area (km <sup>2</sup> )	5.3	25.7	47.2	19.9	3.5

Summary of Cluster Centroid Locations and Populations



# DISCUSSION OF RESULTS – CLUSTER 1

Cluster 1

In [33]: Cluster1=mia\_merged.loc[mia\_merged['Cluster Labels'] == 0, mia\_merged.columns[[0] + list(range(1, mia\_merged.shape[1]))]]

Cluster1

Out[33]:

	Neighborhood	Population2010	Population/Km²	Sub-neighborhoods	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	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
12	Liberty City	19725	3733	NaN	25.832	-80.225	0	Home Service	Fried Chicken Joint	Sandwich Place	Discount Store	Seafood Restaurant	Donut Shop	Food	Gym / Fitness Center	Film Studio	Farmers Market

- Cluster 1 has only one neighborhood, Liberty City
- Known for having high crime rates and relatively unsafe conditions
- Noted the area is experiencing a redevelopment effort to improve infrastructure, crime prevention, transportation, and overall appearance
- Despite having gym/fitness center in the top 10 venues, it is unlikely the Liberty City area will be selected as a potential location until redevelopment efforts have made significant process and can be verified.

# DISCUSSION OF RESULTS – CLUSTER 2

Cluster 2

In [36]: Cluster2=mia\_merged.loc[mia\_merged['Cluster Labels'] == 1, mia\_merged.columns[[0] + list(range(1, mia\_merged.shape[1]))]]

Cluster2

Out[36]:

	Neighborhood	Population2010	Population/Km²	Sub-neighborhoods	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	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
9	Flagami	50834	5665	Alameda, Grapeland Heights, and Fairlawn	25.762	-80.316	1	Liquor Store	Bakery	Seafood Restaurant	Cuban Restaurant	Record Shop	Fast Food Restaurant	Spanish Restaurant	Food Truck	Latin American Restaurant	Other Repair Shop
14	Little Havana	76163	8423	Riverside and South River Drive Historic District	25.773	-80.215	1	Cuban Restaurant	Smoke Shop	Latin American Restaurant	Pharmacy	Mexican Restaurant	Pizza Place	Spanish Restaurant	Park	Fast Food Restaurant	Ice Cream Shop
22	West Flagler	31407	4428	NaN	25.775	-80.243	1	Latin American Restaurant	Pharmacy	Pizza Place	Asian Restaurant	Bakery	Concert Hall	Gas Station	Plaza	Comfort Food Restaurant	Coffee Shop

- Cluster 2 is made of three neighborhoods: Flagami, Little Havana, and West Flagler
- It does not appear gyms, fitness centers, or health food stores rank very highly
- The three neighborhoods appear to favor restaurants very heavily, not health-oriented venues
- Given this data and general knowledge of the area, it is unlikely this Cluster will be the selected location of the new venue, despite having the largest population density of the Clusters.



# DISCUSSION OF RESULTS – CLUSTER 3

```
In [39]: Cluster3=mia_merged.loc[mia_merged['Cluster Labels'] == 2, mia_merged.columns[[0] + list(range(1, mia_merged.shape[1]))]]
Cluster3
```

Out[39]:

	Neighborhood	Population2010	Population/Km²	Sub-neighborhoods	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	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue	
1	Arts & Entertainment District	11033	7948		NaN	25.799	-80.190	2	Art Gallery	Restaurant	Ice Cream Shop	Juice Bar	Bar	Coffee Shop	Gym	Gym / Fitness Center	Food Truck	Peruvian Restaurant
2	Brickell	31759	14541	West Brickell	25.758	-80.193	2	Hotel	Italian Restaurant	Yoga Studio	Argentinian Restaurant	Middle Eastern Restaurant	Pizza Place	Japanese Restaurant	Grocery Store	Steakhouse	Shopping Mall	
3	Buena Vista	9058	3540	Buena Vista East Historic District and Design ...	25.813	-80.192	2	Art Gallery	Italian Restaurant	Coffee Shop	Park	Pizza Place	Café	Gym	Furniture / Home Store	Jewelry Store	Bakery	
5	Coral Way	35062	4496	Coral Gate, Golden Pines, Shenandoah, Historic...	25.750	-80.283	2	Café	Park	Historic Site	Intersection	Seafood Restaurant	Burger Joint	Martial Arts Dojo	Pharmacy	Spanish Restaurant	Dive Bar	
6	Design District	3573	3623		NaN	25.813	-80.193	2	Art Gallery	Coffee Shop	Italian Restaurant	Park	Pizza Place	Café	Gym	Furniture / Home Store	Jewelry Store	Shopping Mall
7	Downtown	71000	10613	Brickell, Central Business District (CBD), Dow...	25.774	-80.193	2	Hotel	Seafood Restaurant	Italian Restaurant	Cocktail Bar	Residential Building (Apartment / Condo)	Gym	Cosmetics Shop	Peruvian Restaurant	Restaurant	Shopping Mall	
8	Edgewater	15005	6675		NaN	25.802	-80.190	2	Art Gallery	Ice Cream Shop	Coffee Shop	Restaurant	Food Truck	Bar	Pizza Place	Gym / Fitness Center	Mexican Restaurant	Peruvian Restaurant
10	Grapeland Heights	14004	4130		NaN	25.792	-80.258	2	Rental Car Location	Hotel	Hotel Pool	Bus Station	Airport Service	Gym / Fitness Center	Gym	Train Station	Gas Station	Marijuana Dispensary
11	Health District	2705	2148		NaN	25.790	-80.215	2	Sandwich Place	Convenience Store	Bakery	Café	Fast Food Restaurant	Light Rail Station	Coffee Shop	Mexican Restaurant	Food & Drink Shop	Latin American Restaurant
13	Little Haiti	29760	3840	Lemon City (aka Little River)	25.824	-80.191	2	Gym	Pizza Place	Sushi Restaurant	Italian Restaurant	Event Space	Pharmacy	Caribbean Restaurant	Café	Shopping Mall	Grocery Store	
15	Lummus Park	3027	3680		NaN	25.777	-80.201	2	Seafood Restaurant	Theater	Hotel	Fish Market	Park	Pizza Place	Soccer Field	Sandwich Place	Salon / Barbershop	Restaurant
16	Midtown	3162	13747	Edgewater and Wynwood	25.807	-80.193	2	Art Gallery	Ice Cream Shop	Restaurant	Coffee Shop	Boutique	Pizza Place	Bar	Italian Restaurant	Café	Gym / Fitness Center	
17	Overtown	6736	3405	Spring Garden	25.787	-80.201	2	Nightclub	Gym	Hotel	Poke Place	Movie Theater	Southern / Soul Food Restaurant	Soccer Field	Restaurant	Café	Coffee Shop	
18	Park West	4655	3635		NaN	25.785	-80.193	2	Café	Bar	Art Gallery	American Restaurant	Nightclub	Theater	Seafood Restaurant	Coffee Shop	Lounge	Cocktail Bar
19	The Roads	7327	4899		NaN	25.756	-80.207	2	Hotel	Latin American Restaurant	Yoga Studio	Park	Italian Restaurant	Middle Eastern Restaurant	Gym	Photography Studio	Sushi Restaurant	Pilates Studio
20	Upper Eastside	12525	2513	Bay Point Estates, Bayside District, Belle Mea...	25.830	-80.183	2	Gym	American Restaurant	Art Gallery	Italian Restaurant	Park	Event Space	Coffee Shop	Sushi Restaurant	Gas Station	Pub	
23	Wynwood	7277	2983	Wynwood Art District and Wynwood Fashion District	25.804	-80.199	2	Art Gallery	Restaurant	Ice Cream Shop	Bar	Coffee Shop	Brewery	Food Truck	Gym	Gym / Fitness Center	New American Restaurant	

# DISCUSSION OF RESULTS – CLUSTER 3

- Cluster 3 is by far the largest of the clusters in land area and overall population
- Made of 16 neighborhoods and is home to nearly 268,000 residents
- Land area is more than 47 km<sup>2</sup> and is spread throughout various areas of the city
- A neighborhood such as Midtown is a great area of Miami with a relatively large population density and a young, vibrant atmosphere
- Individually, Midtown would certainly be considered; however, Cluster 3 as a whole covers too much area to be able to evaluate a particular location.

# DISCUSSION OF RESULTS – CLUSTER 4

Cluster 4

In [42]: Cluster4=mia\_merged.loc[mia\_merged['Cluster Labels'] == 3, mia\_merged.columns[[0] + list(range(1, mia\_merged.shape[1]))]]  
Cluster4

Out[42]:

	Neighborhood	Population2010	Population/Km²	Sub-neighborhoods	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	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Allapattah	54289	4401	NaN	25.815	-80.224	3	Food & Drink Shop	Park	Cosmetics Shop	Home Service	Bakery	Video Store	Pizza Place	Spanish Restaurant	Grocery Store	Discount Store
4	Coconut Grove	20076	3091	Center Grove, Northeast Coconut Grove, Southwe...	25.712	-80.257	3	Park	American Restaurant	Garden	Trail	Cosmetics Shop	Boat or Ferry	Playground	Plaza	Donut Shop	Fish Market

- Allapattah and Coconut Grove make up Cluster 4
- Of the two neighborhoods, Coconut Grove appears to have a more health-oriented venue preference with a park, garden, trail, playground, and fish market
- Fantastic view of the water, a marina, and a very vibrant and active population
- Mix of commercial and residential development
- Allapattah is not a very desirable location for a business in the city, and its geographic location in relation to Coconut Grove raises questions as to why these neighborhoods were clustered together.

# DISCUSSION OF RESULTS – CLUSTER 5

Cluster 5

In [45]: Cluster5=mia\_merged.loc[mia\_merged['Cluster Labels'] == 4, mia\_merged.columns[[0] + list(range(1, mia\_merged.shape[1]))]]  
Cluster5

Out[45]:

	Neighborhood	Population2010	Population/Km²	Sub-neighborhoods	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	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
21	Virginia Key	14	4	NaN	25.736	-80.155	4	Food	Dive Bar	Moving Target	Park	Cafeteria	Deli / Bodega	Electronics Store	Flea Market	Cupcake Shop	Fish Market

- Cluster 5 is only the Virginia Key neighborhood
- Known mostly for its parks, and only a very small population on the island to serve
- Virginia Key will not be considered as a potential location of the proposed venue.

# CONCLUSION

Evaluated in their entirety, the clusters offer valuable data, but do not lead one to determine where is the best location for the new gym and health food venue.

Individual neighborhoods appeared to be very attractive, namely Midtown and Coconut Grove. Both areas have very active and vibrant atmospheres with shops, restaurants, and a healthy mix of commercial and residential developments. Midtown is a more urban-style neighborhood, while Coconut Grove is more eccentric with older buildings and a view of Biscayne Bay.

Given that Coconut Grove has a much larger population and more health-focused venues and amenities than those of Midtown, it is concluded that the Coconut Grove neighborhood should be the most strongly considered as the location of the proposed gym and health food venue, solely based on the data evaluated and common knowledge of the area.