



# Locating an Ideal Neighborhood for Small Business in Atlanta, GA

Applied Data Science Capstone

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# Venue Placement for Small Businesses



Small business often struggles during their initial years (1-5yrs) due to several factors that eventually lead them to failure.



Some reasons are more common than others such as market needs, location, demography.



This analysis will try to increase the odds of business success by considering demographic factors for ideal placement of a small business from a range of options.

# The (Small) Business Problem

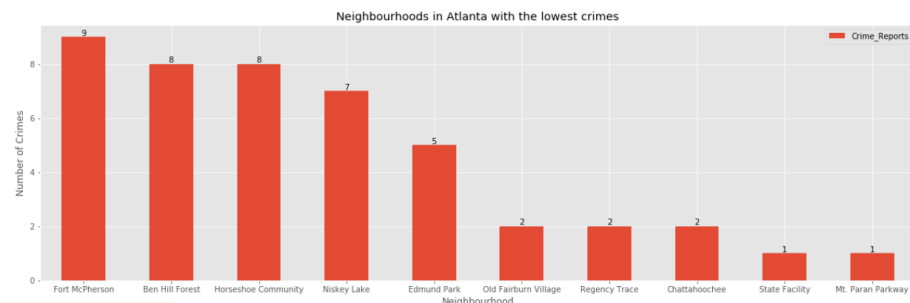
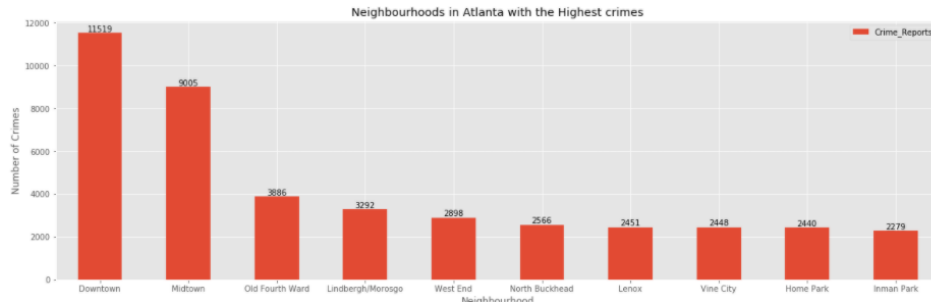
- The objective of this analysis is to find relatively safe and potentially profitable location in the city of Atlanta, GA to start a small business.
- Recommend from common venues such as restaurants, sports bar, coffee shops, saloon or a spa will be explored.
- Analysis will use city data such as crime reports, demographics and location data from foursquare API.
- Analysis concludes with providing insights into an ideal neighborhood to start a small business.

# Data Acquisition and Cleaning

- Following data sources were used for the analysis:
  - Atlanta city crime data to identify safe locations
  - GIS data from Atlanta Department of City Planning to obtain geographical information
  - Census data from City of Atlanta to get neighborhood demographics such as median income, population and median home values by (Neighborhood planning units) NPU.
  - Finding most common and least common venues in proximity of an ideal location using Foursquare API.

# Crime Reports by Neighborhood

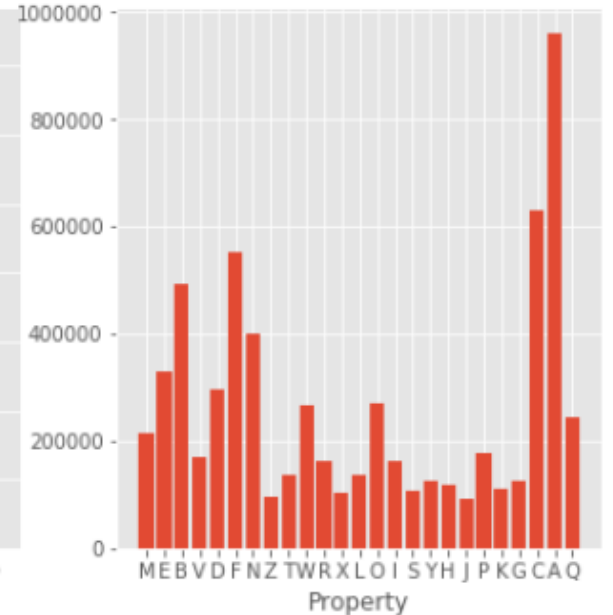
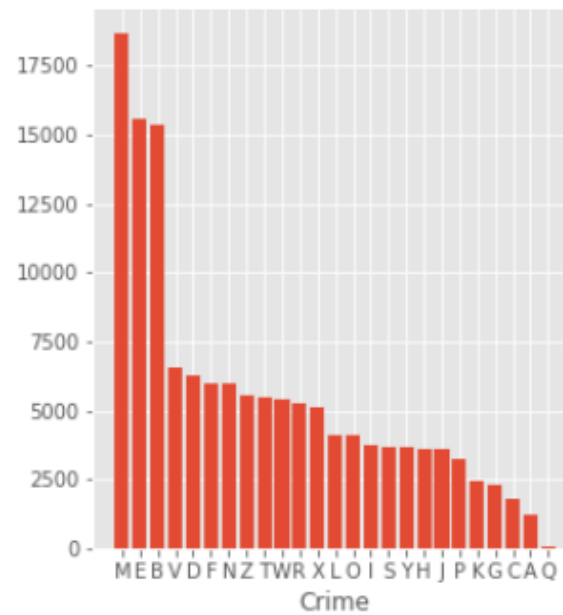
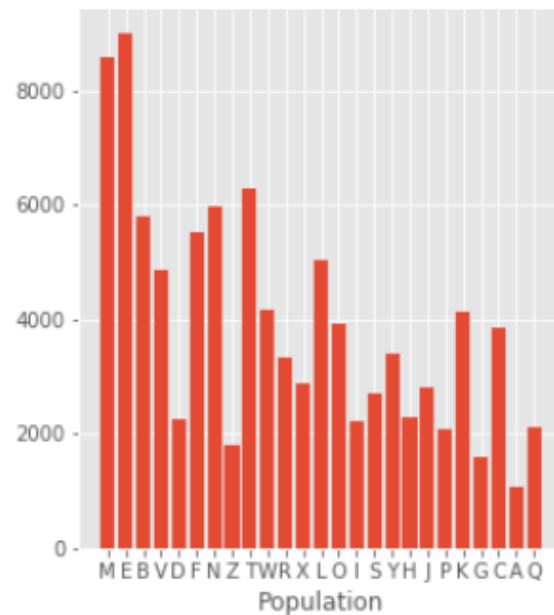
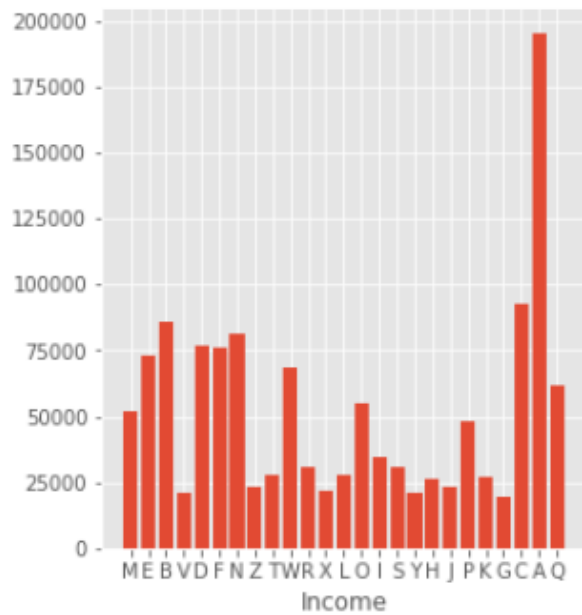
- Analyzing crime reports in Atlanta for last 3 years.
- Neighborhoods with highest and lowest crimes
- Provides insights into relative crime rates among Atlanta's neighborhood.



# Demographics

- Importing census data to analyze and visualize demographic information

choosing ideal neighborhood



# Modelling

- Using data descriptions to understand the nature of the dataset.
- Apply a criteria to narrow down the neighborhoods that can bring more success to small businesses.

	Crime_Reports	2017_Pop	Median_Age	Income	Median_Home_Value	2010_Pop	2000_Pop	Acres	Sq miles	population_density
<b>count</b>	25.000000	25.000000	25.000000	25.000000	25.000000	25.000000	25.000000	25.000000	25.000000	25.000000
<b>mean</b>	5547.240000	19487.480000	35.244000	51998.040000	259364.240000	16800.960000	16697.000000	3500.475600	5.469493	3907.889040
<b>std</b>	4474.543164	13062.988894	4.540382	38429.533908	208604.790911	10020.895197	7866.354826	1804.460484	2.819470	2072.295660
<b>min</b>	87.000000	3522.000000	24.700000	19185.000000	90516.000000	1770.000000	1024.000000	846.170000	1.322141	1068.095225
<b>25%</b>	3565.000000	12212.000000	32.200000	26147.000000	124171.000000	11111.000000	11997.000000	2204.430000	3.444422	2249.874716
<b>50%</b>	4121.000000	15385.000000	36.400000	34658.000000	168387.000000	14198.000000	15825.000000	3448.140000	5.387719	3387.704533
<b>75%</b>	5947.000000	21310.000000	38.000000	72766.000000	296014.000000	18122.000000	20095.000000	4089.690000	6.390141	5044.092795
<b>max</b>	18677.000000	59094.000000	46.200000	195259.000000	961111.000000	47292.000000	38645.000000	7317.400000	11.433438	8993.708629

# Narrow Down Criteria

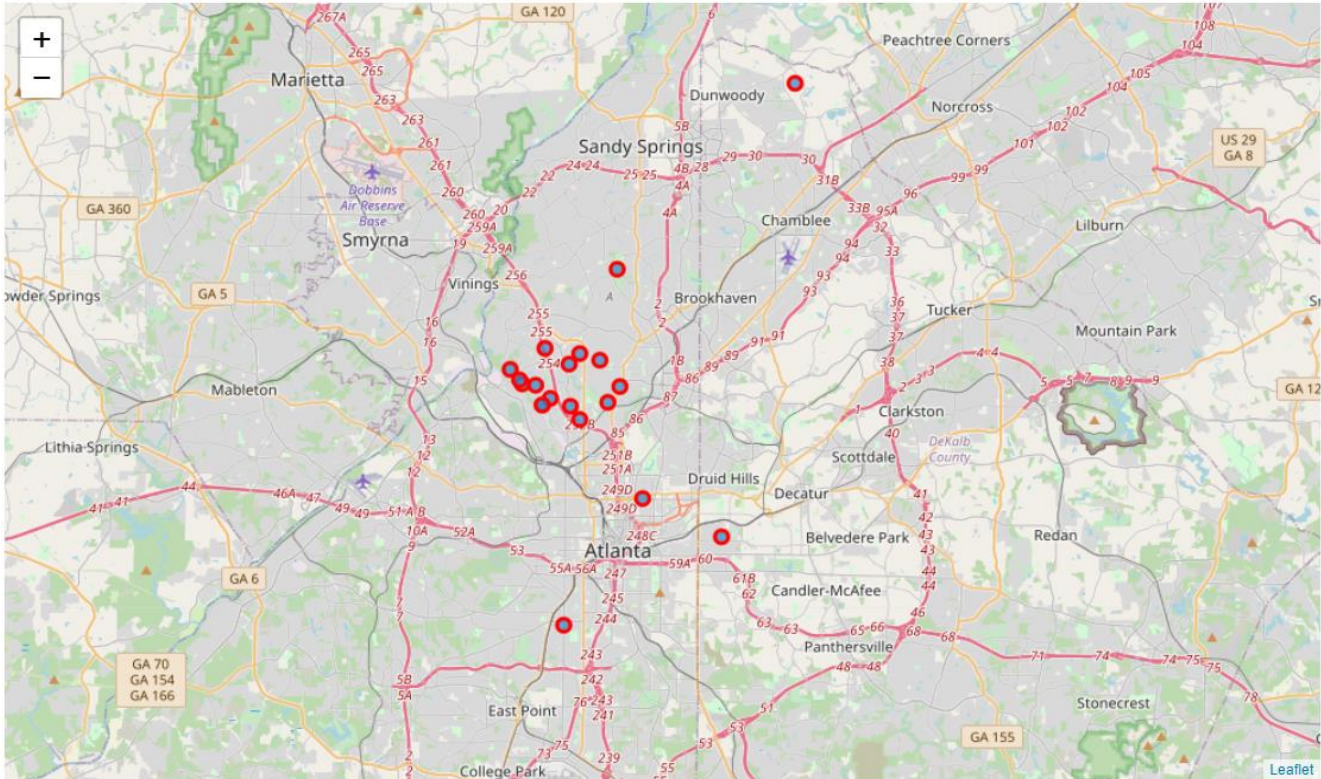
- Once required datasets were imported, merging and then sorting the data set with the following criteria
  - Median income >\$65000/yr
  - Population density > 3000/sq-mile
  - Crime Reports for the last 3 yrs. <6000

NPU	Crime_Reports	Major neighborhoods	Region	2017_Pop	Median_Age	Income	Median_Home_Value	Acres	Sq miles	population_density	
5	F	5976	Virginia- Highland/ Morningside/Lenox Park	Northeast / East	33198.0	33.5	76277.0	554154.0	3842.11	6.003297	5529.961401
6	N	5947	Inman Park/ Candler Park/ Poncey- Highland/ Rey...	Northeast / East	20561.0	35.3	81614.0	401754.0	2204.43	3.444422	5969.361694
9	W	5383	Grant Park/ East Atlanta/ Ormewood Park/ Bente...	Northeast / East	22655.0	36.4	68598.0	266044.0	3488.54	5.450844	4156.237280
22	C	1763	Collier Hills/Peachtree Battle/Arden/Habersham...	Buckhead	23236.0	38.0	92615.0	630175.0	3873.74	6.052719	3838.936015





	Neighborhood	NPU	Latitude	Longitude
0	Brandon	C	33.829827	-84.415484
1	Ridgewood Heights	C	33.827883	-84.445763
2	Fernleaf	C	33.821157	-84.439727
3	Westminster/Milmar	C	33.836506	-84.427529
4	Arden/Habersham	C	33.717013	-84.418103
5	Woodfield	C	33.951066	-84.299632
6	Springlake	C	33.811694	-84.414768
7	Channing Valley	C	33.806033	-84.409749
8	Collier Hills	C	33.812103	-84.429471
9	Colonial Homes	C	33.813283	-84.395535
10	Westover Plantation	C	33.823161	-84.441040
11	Cross Creek	C	33.815133	-84.425245
12	Castlewood	C	33.834735	-84.409932
13	Argonne Forest	C	33.771908	-84.377724
14	Wyngate	C	33.831412	-84.399595
15	Peachtree Battle Alliance	C	33.820079	-84.389349
16	Memorial Park	C	33.871215	-84.391038
17	Wildwood (NPU-C)	C	33.590902	-84.493133
18	Collier Hills North	C	33.812103	-84.429471
19	Hanover West	C	33.820580	-84.432473
20	Wesley Battle	C	33.755388	-84.337313





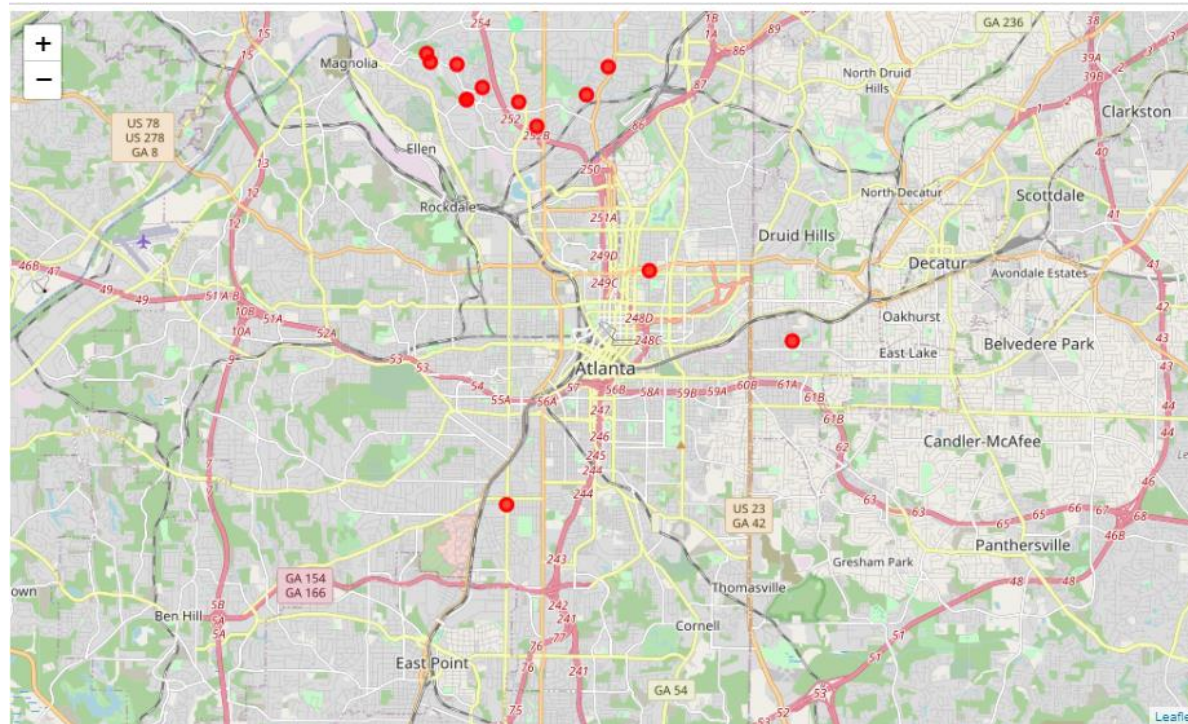
# Most Common Venues

Gather most common venues in NPU C With the data available from foursquare API.

	Cluster Label	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	0	Arden/Habersham	Juice Bar	Scenic Lookout	Food Truck	Gastropub	Cupcake Shop	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant
1	0	Argonne Forest	Southern / Soul Food Restaurant	Breakfast Spot	Donut Shop	Cuban Restaurant	Racetrack	Cosmetics Shop	Ice Cream Shop	Fast Food Restaurant	Park	Clothing Store
2	3	Brandon	Ice Cream Shop	Yoga Studio	Gastropub	Cupcake Shop	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant	Financial or Legal Service
3	0	Castlewood	Wine Shop	Dog Run	Gym	Ski Trail	Boat or Ferry	Yoga Studio	Gas Station	Cupcake Shop	Department Store	Doctor's Office
4	0	Channing Valley	Food Truck	Sandwich Place	Mexican Restaurant	Department Store	Pizza Place	Chinese Restaurant	Clothing Store	Coffee Shop	Pub	Cosmetics Shop
5	0	Collier Hills	Italian Restaurant	Taco Place	Sandwich Place	Pizza Place	Chinese Restaurant	Cajun / Creole Restaurant	Smoke Shop	Burger Joint	Cupcake Shop	Gas Station
6	0	Collier Hills North	Italian Restaurant	Taco Place	Sandwich Place	Pizza Place	Chinese Restaurant	Cajun / Creole Restaurant	Smoke Shop	Burger Joint	Cupcake Shop	Gas Station
7	0	Colonial Homes	Pizza Place	Yoga Studio	Shipping Store	Rental Car Location	Pool	Pharmacy	Lounge	Japanese Restaurant	Gym	Grocery Store
8	0	Cross Creek	Italian Restaurant	Burger Joint	Pizza Place	Smoke Shop	Chinese Restaurant	Gas Station	Taco Place	Sandwich Place	Cajun / Creole Restaurant	Outdoors & Recreation
9	0	Fernleaf	College Track	Dog Run	Pool	Speakeasy	Yoga Studio	Gas Station	Department Store	Doctor's Office	Donut Shop	Fast Food Restaurant
10	0	Hanover West	College Track	Wine Bar	Gym / Fitness Center	Gym	Shop & Service	General Travel	Brewery	Fried Chicken Joint	Cupcake Shop	Department Store
11	0	Memorial Park	Park	Theater	Basketball Court	Recreation Center	Gym / Fitness Center	Gym	Golf Course	Tennis Court	Baseball Field	Financial or Legal Service
12	0	Peachtree Battle Alliance	American Restaurant	Pharmacy	Mexican Restaurant	Mediterranean Restaurant	Shopping Plaza	Salon / Barbershop	New American Restaurant	Women's Store	Italian Restaurant	Ice Cream Shop
13	0	Springlake	Pet Store	Salon / Barbershop	Sandwich Place	Massage Studio	Pizza Place	American Restaurant	Breakfast Spot	Post Office	Pub	Gym / Fitness Center
14	0	Wesley Battle	Recreation Center	Construction & Landscaping	Automotive Shop	Gym	Grocery Store	Candy Store	Park	Gas Station	Department Store	Doctor's Office
15	4	Westminster/Milmar	Jewelry Store	Beer Garden	Gay Bar	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant	Financial or Legal Service	Food Truck
16	0	Westover Plantation	Outdoors & Recreation	Pool	Baseball Field	Gay Bar	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant	Financial or Legal Service
17	2	Wildwood (NPU-C)	Rental Car Location	Pool	Cuban Restaurant	Cupcake Shop	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant	Financial or Legal Service
18	1	Woodfield	Campground	Yoga Studio	Cuban Restaurant	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant	Financial or Legal Service	Food Truck

# Clustering with K-Means

- Used K-Means Clustering in NPU C for venues in the area.
- Using K=5, 5 clusters were created with most common venues found in the area.
- Map shows venues clustered across NPU C





# Results

## Cluster 1

	NPU	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	C	College Track	Dog Run	Pool	Speakeasy	Yoga Studio	Gas Station	Department Store	Doctor's Office	Donut Shop	Fast Food Restaurant
4	C	Juice Bar	Scenic Lookout	Food Truck	Gastropub	Cupcake Shop	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant
6	C	Pet Store	Salon / Barbershop	Sandwich Place	Massage Studio	Pizza Place	American Restaurant	Breakfast Spot	Post Office	Pub	Gym / Fitness Center
7	C	Food Truck	Sandwich Place	Mexican Restaurant	Department Store	Pizza Place	Chinese Restaurant	Clothing Store	Coffee Shop	Pub	Cosmetics Shop
8	C	Italian Restaurant	Taco Place	Sandwich Place	Pizza Place	Chinese Restaurant	Cajun / Creole Restaurant	Smoke Shop	Burger Joint	Cupcake Shop	Gas Station
9	C	Pizza Place	Yoga Studio	Shipping Store	Rental Car Location	Pool	Pharmacy	Lounge	Japanese Restaurant	Gym	Grocery Store
10	C	Outdoors & Recreation	Pool	Baseball Field	Gay Bar	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant	Financial or Legal Service
11	C	Italian Restaurant	Burger Joint	Pizza Place	Smoke Shop	Chinese Restaurant	Gas Station	Taco Place	Sandwich Place	Cajun / Creole Restaurant	Outdoors & Recreation
12	C	Wine Shop	Dog Run	Gym	Ski Trail	Boat or Ferry	Yoga Studio	Gas Station	Cupcake Shop	Department Store	Doctor's Office
13	C	Southern / Soul Food Restaurant	Breakfast Spot	Donut Shop	Cuban Restaurant	Racetrack	Cosmetics Shop	Ice Cream Shop	Fast Food Restaurant	Park	Clothing Store
15	C	American Restaurant	Pharmacy	Mexican Restaurant	Mediterranean Restaurant	Shopping Plaza	Salon / Barbershop	New American Restaurant	Women's Store	Italian Restaurant	Ice Cream Shop
16	C	Park	Theater	Basketball Court	Recreation Center	Gym / Fitness Center	Gym	Golf Course	Tennis Court	Baseball Field	Financial or Legal Service
18	C	Italian Restaurant	Taco Place	Sandwich Place	Pizza Place	Chinese Restaurant	Cajun / Creole Restaurant	Smoke Shop	Burger Joint	Cupcake Shop	Gas Station
19	C	College Track	Wine Bar	Gym / Fitness Center	Gym	Shop & Service	General Travel	Brewery	Fried Chicken Joint	Cupcake Shop	Department Store
20	C	Recreation Center	Construction & Landscaping	Automotive Shop	Gym	Grocery Store	Candy Store	Park	Gas Station	Department Store	Doctor's Office

# Results

## Cluster 2

	NPU	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
5	C	Campground	Yoga Studio	Cuban Restaurant	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant	Financial or Legal Service	Food Truck

## Cluster 3

	NPU	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
17	C	Rental Car Location	Pool	Cuban Restaurant	Cupcake Shop	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant	Financial or Legal Service

## Cluster 4

	NPU	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	C	Ice Cream Shop	Yoga Studio	Gastropub	Cupcake Shop	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant	Financial or Legal Service

## Cluster 5

	NPU	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
3	C	Jewelry Store	Beer Garden	Gay Bar	Department Store	Doctor's Office	Dog Run	Donut Shop	Fast Food Restaurant	Financial or Legal Service	Food Truck

## Conclusion & Future Work

- Through the analysis, insights were offered into the city of Atlanta.
- Small entrepreneurs can use the analysis to find a safe and profitable location that suits them the most.
- K-means clustering was used to find the common venues in each neighborhood.
- Several small businesses options are available, one can pick the least common venues.
- The analysis can be further extended to explore demographics to cater to a specific group e.g. pick a Sports bar vs Premium Spa