



# Analysis of Baltimore's Social Venues

For prospective business owners

# Analysis of Venues

- By analyzing the current venues by geological location within the city of Baltimore, a future business owner can see where their business might fit into the city based on success of similar operations
- The separation of popular venues by neighborhood/location will assist with the analysis

# Data Acquisition and Cleaning

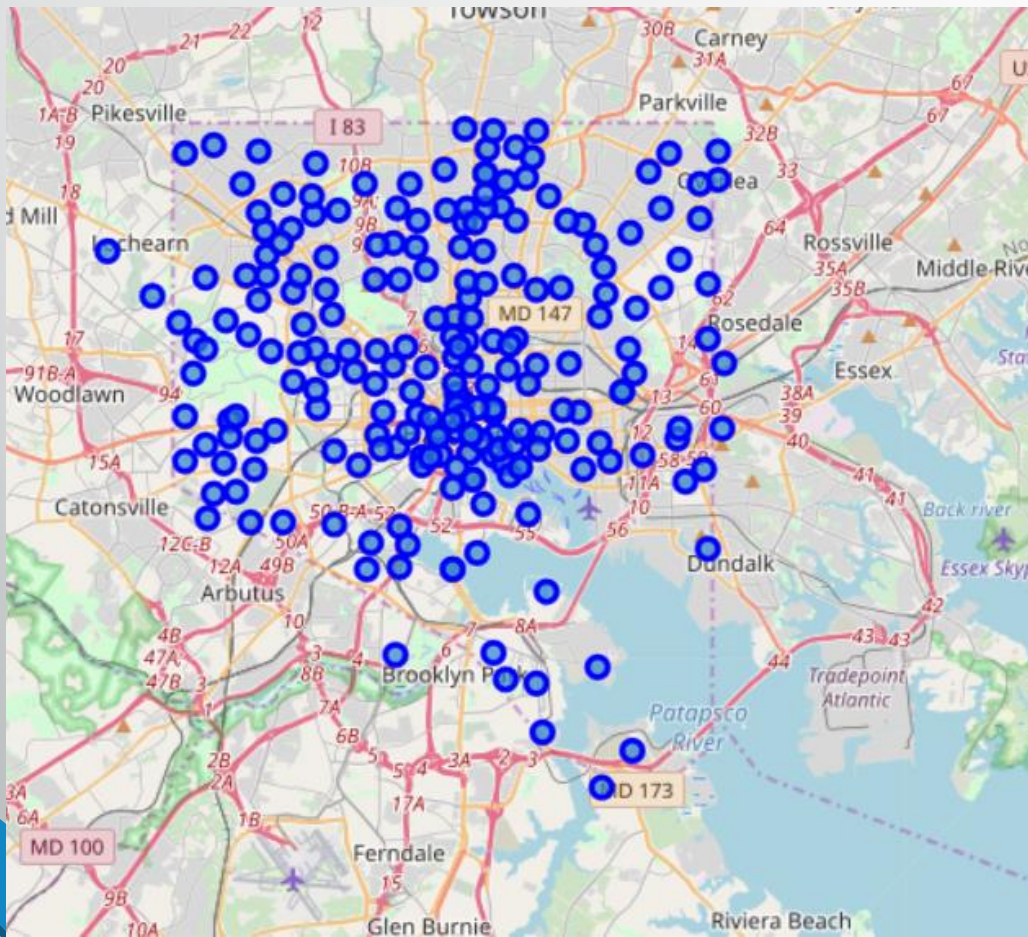
- List of Baltimore neighborhoods was collected from Wikipedia
- List of zip codes was collected from [public.opendatasoft.com](http://public.opendatasoft.com)
  - Originally included all states, but filtered down to MD only
- Foursquare API was used for the trending and popular venues
- Used [geolocator.geocode](http://geolocator.geocode) to add the latitude and longitude of each neighborhood. Added Baltimore into the address as the neighborhoods were not unique and originally brought back lat/long outside of Baltimore City

# Final Dataframe

- The final dataframe consisted of the neighborhood name, location in respective to Baltimore City, Latitude, and Longitude

	Neighborhood	Location	Latitude	Longitude
0	Abell	North	39.326139	-76.611737
1	Allendale	West	39.291687	-76.676942
2	Arcadia	Northeast	39.334056	-76.566500
3	Arlington	Northwest	39.348692	-76.682666
4	Armistead Gardens	Northeast	39.306646	-76.556279
...	...	...	...	...
216	Woodring	Northeast	39.363819	-76.544286
217	Wyman Park	North	39.333540	-76.626371
218	Wyndhurst	North	39.355871	-76.631357
219	Yale Heights	Southwest	39.275706	-76.689895
220	York Road	Northeast	39.346172	-76.609618
221 rows × 4 columns				

# Neighborhoods Analyzed within Baltimore City



Northeast	31
Southeast	23
West	18
Southwest	26
Central	18
Northwest	27
North	44
East	16
South	18

dtype: int64

# Foursquare API Results in DataFrame

- Foursquare API was able to bring back 3879 venues throughout Baltimore City

(3879, 7)

	Location	Neighborhood	Latitude	Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	North		39.326139	-76.611737	32nd Street Farmer's Market	39.327362	-76.610851	Farmers Market
1	North		39.326139	-76.611737	Pete's Grille	39.327064	-76.609593	Breakfast Spot
2	North		39.326139	-76.611737	The Book Thing	39.325253	-76.610272	Bookstore
3	North		39.326139	-76.611737	Normal's Books & Records	39.326012	-76.609903	Record Shop
4	North		39.326139	-76.611737	Peabody Heights Brewery	39.324744	-76.610819	Brewery

# Mean of the Frequency of Occurrence of each Venue

	Location	ATM	Adult Boutique	Afghan Restaurant	African Restaurant	Airport	American Restaurant	Antique Shop	Aquarium	Argentinian Restaurant	...	Vietnamese Restaurant	Volleyball Court
0	Central	0.000000	0.000000	0.008000	0.002667	0.000000	0.029333	0.00000	0.010667	0.000000	...	0.008000	0.000000
1	East	0.000000	0.000000	0.000000	0.000000	0.000000	0.051724	0.00000	0.000000	0.000000	...	0.005747	0.000000
2	North	0.005176	0.001035	0.001035	0.000000	0.000000	0.033126	0.00207	0.000000	0.000000	...	0.002070	0.000000
3	Northeast	0.004202	0.000000	0.000000	0.000000	0.000000	0.037815	0.00000	0.016807	0.000000	...	0.000000	0.000000
4	Northwest	0.000000	0.000000	0.000000	0.000000	0.000000	0.052632	0.00000	0.000000	0.000000	...	0.000000	0.000000
5	South	0.000000	0.000000	0.000000	0.000000	0.000000	0.019943	0.00000	0.000000	0.000000	...	0.000000	0.005698
6	Southeast	0.001224	0.000000	0.000000	0.000000	0.001224	0.035496	0.00000	0.000000	0.004896	...	0.002448	0.000000
7	Southwest	0.000000	0.000000	0.003226	0.003226	0.000000	0.035484	0.00000	0.000000	0.000000	...	0.006452	0.000000
8	West	0.011236	0.000000	0.005618	0.005618	0.000000	0.056180	0.00000	0.000000	0.000000	...	0.011236	0.000000

9 rows × 291 columns



# Top Venues by Frequency and Location

## ----Central----

	venue	freq
0	Sandwich Place	0.05
1	Hotel	0.04
2	Coffee Shop	0.04
3	Convenience Store	0.03
4	American Restaurant	0.03
5	Theater	0.03
6	Lounge	0.02
7	Bar	0.02
8	Indian Restaurant	0.02
9	Café	0.02

## ----East----

	venue	freq
0	American Restaurant	0.05
1	Convenience Store	0.04
2	Coffee Shop	0.04
3	Bus Stop	0.03
4	Theater	0.03
5	Fast Food Restaurant	0.03
6	Chinese Restaurant	0.03
7	Sandwich Place	0.03
8	Shoe Store	0.02
9	Park	0.02

## ----North----

	venue	freq
0	Pizza Place	0.04
1	Coffee Shop	0.04
2	Bar	0.04
3	American Restaurant	0.03
4	Sandwich Place	0.03
5	Pharmacy	0.03
6	Liquor Store	0.02
7	Chinese Restaurant	0.02
8	Bus Stop	0.02
9	Convenience Store	0.02

## ----Northeast----

	venue	freq
0	Italian Restaurant	0.06
1	American Restaurant	0.04
2	Convenience Store	0.04
3	Bar	0.03
4	Fried Chicken Joint	0.03
5	Pizza Place	0.03
6	Discount Store	0.03
7	Seafood Restaurant	0.03
8	Chinese Restaurant	0.03
9	Bus Stop	0.03

## ----Northwest----

	venue	freq
0	Park	0.08
1	Liquor Store	0.05
2	American Restaurant	0.05
3	Grocery Store	0.04
4	Chinese Restaurant	0.04
5	Pharmacy	0.04
6	Arts & Crafts Store	0.04
7	Discount Store	0.03
8	Convenience Store	0.03
9	Market	0.03

## ----South----

	venue	freq
0	Bar	0.11
1	Pizza Place	0.06
2	Sandwich Place	0.03
3	Mexican Restaurant	0.03
4	Sushi Restaurant	0.03
5	Café	0.03
6	Park	0.03
7	Seafood Restaurant	0.03
8	Gym	0.02
9	Market	0.02

## ----Southeast----

	venue	freq
0	Italian Restaurant	0.05
1	Bar	0.05
2	American Restaurant	0.04
3	Mexican Restaurant	0.04
4	Seafood Restaurant	0.03
5	Hotel	0.03
6	Pizza Place	0.03
7	Coffee Shop	0.02
8	Greek Restaurant	0.02
9	Clothing Store	0.02

## ----Southwest----

	venue	freq
0	Sandwich Place	0.05
1	American Restaurant	0.04
2	Convenience Store	0.04
3	History Museum	0.03
4	Coffee Shop	0.03
5	Discount Store	0.03
6	Pizza Place	0.03
7	Fried Chicken Joint	0.03
8	Fast Food Restaurant	0.02
9	Hotel	0.02

## ----West----

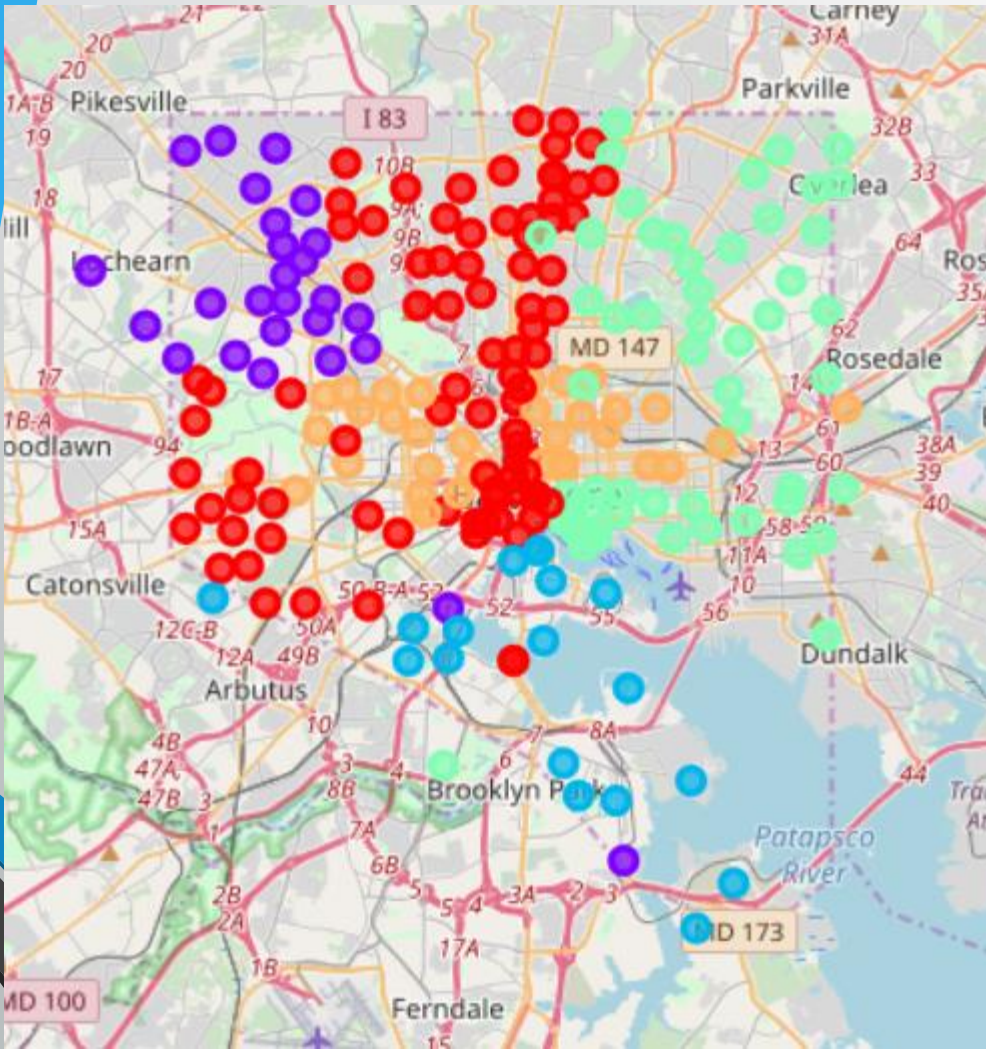
	venue	freq
0	American Restaurant	0.06
1	Fried Chicken Joint	0.04
2	Sandwich Place	0.04
3	Pizza Place	0.03
4	Chinese Restaurant	0.03
5	Bus Stop	0.03
6	Park	0.03
7	Bank	0.03
8	Grocery Store	0.03
9	Convenience Store	0.03



# Top Venue by Location

	Location	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	Central	Sandwich Place	Hotel	Coffee Shop	Convenience Store	Theater	American Restaurant	Café	Bar	Pizza Place	Indian Restaurant
1	East	American Restaurant	Convenience Store	Coffee Shop	Theater	Bus Stop	Sandwich Place	Fast Food Restaurant	Chinese Restaurant	Intersection	Grocery Store
2	North	Coffee Shop	Pizza Place	Bar	American Restaurant	Pharmacy	Sandwich Place	Café	Convenience Store	Chinese Restaurant	Liquor Store
3	Northeast	Italian Restaurant	American Restaurant	Convenience Store	Seafood Restaurant	Chinese Restaurant	Fried Chicken Joint	Pizza Place	Bar	Discount Store	Bus Stop
4	Northwest	Park	Liquor Store	American Restaurant	Chinese Restaurant	Arts & Crafts Store	Grocery Store	Pharmacy	Discount Store	Market	Convenience Store
5	South	Bar	Pizza Place	Sandwich Place	Café	Sushi Restaurant	Park	Mexican Restaurant	Seafood Restaurant	Gym	Liquor Store
6	Southeast	Bar	Italian Restaurant	American Restaurant	Mexican Restaurant	Seafood Restaurant	Pizza Place	Hotel	Coffee Shop	Greek Restaurant	Clothing Store
7	Southwest	Sandwich Place	American Restaurant	Convenience Store	Discount Store	History Museum	Pizza Place	Fried Chicken Joint	Coffee Shop	Hotel	Pub
8	West	American Restaurant	Fried Chicken Joint	Sandwich Place	Pizza Place	Convenience Store	Bus Stop	Bank	Chinese Restaurant	Park	Grocery Store

# Baltimore Clusters



- Cluster 0 – North/Southwest/Central
- Cluster 1 – Northwest
- Cluster 2 – South
- Cluster 3 – Northeast
- Cluster 4 - Central

# Cluster o Results

- North/Southwest/Central
- 88 rows
- Most Diverse

	Neighborhood	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	Abell	0	Coffee Shop	Pizza Place	Bar	American Restaurant	Pharmacy	Sandwich Place	Café	Convenience Store	Chinese Restaurant	Liquor Store
9	Barre Circle	0	Sandwich Place	American Restaurant	Convenience Store	Discount Store	History Museum	Pizza Place	Fried Chicken Joint	Coffee Shop	Hotel	Pub
11	Beechfield	0	Sandwich Place	American Restaurant	Convenience Store	Discount Store	History Museum	Pizza Place	Fried Chicken Joint	Coffee Shop	Hotel	Pub
17	Bolton Hill	0	Sandwich Place	Hotel	Coffee Shop	Convenience Store	Theater	American Restaurant	Café	Bar	Pizza Place	Indian Restaurant
24	Cameron Village	0	Coffee Shop	Pizza Place	Bar	American Restaurant	Pharmacy	Sandwich Place	Café	Convenience Store	Chinese Restaurant	Liquor Store

# Cluster 1 Results

- Northwest
- 27 rows

	Neighborhood	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
3	Arlington	1	Park	Liquor Store	American Restaurant	Chinese Restaurant	Arts & Crafts Store	Grocery Store	Pharmacy	Discount Store	Market	Convenience Store
6	Ashburton	1	Park	Liquor Store	American Restaurant	Chinese Restaurant	Arts & Crafts Store	Grocery Store	Pharmacy	Discount Store	Market	Convenience Store
23	Callaway-Garrison	1	Park	Liquor Store	American Restaurant	Chinese Restaurant	Arts & Crafts Store	Grocery Store	Pharmacy	Discount Store	Market	Convenience Store
31	Central Park Heights	1	Park	Liquor Store	American Restaurant	Chinese Restaurant	Arts & Crafts Store	Grocery Store	Pharmacy	Discount Store	Market	Convenience Store
36	Cheswolde	1	Park	Liquor Store	American Restaurant	Chinese Restaurant	Arts & Crafts Store	Grocery Store	Pharmacy	Discount Store	Market	Convenience Store

# Cluster 2 Results

- South
- 18 rows

	Neighborhood	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
5	Arundel Cove	2	Bar	Pizza Place	Sandwich Place	Café	Sushi Restaurant	Park	Mexican Restaurant	Seafood Restaurant	Gym	Liquor Store
20	Brooklyn	2	Bar	Pizza Place	Sandwich Place	Café	Sushi Restaurant	Park	Mexican Restaurant	Seafood Restaurant	Gym	Liquor Store
21	Brooklyn Homes	2	Bar	Pizza Place	Sandwich Place	Café	Sushi Restaurant	Park	Mexican Restaurant	Seafood Restaurant	Gym	Liquor Store
35	Cherry Hill	2	Bar	Pizza Place	Sandwich Place	Café	Sushi Restaurant	Park	Mexican Restaurant	Seafood Restaurant	Gym	Liquor Store

# Cluster 3 Results

- Northeast
- 54 rows

	Neighborhood	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	Arcadia	3	Italian Restaurant	American Restaurant	Convenience Store	Seafood Restaurant	Chinese Restaurant	Fried Chicken Joint	Pizza Place	Bar	Discount Store	Bus Stop
4	Armistead Gardens	3	Italian Restaurant	American Restaurant	Convenience Store	Seafood Restaurant	Chinese Restaurant	Fried Chicken Joint	Pizza Place	Bar	Discount Store	Bus Stop
7	Baltimore Highlands	3	Bar	Italian Restaurant	American Restaurant	Mexican Restaurant	Seafood Restaurant	Pizza Place	Hotel	Coffee Shop	Greek Restaurant	Clothing Store
10	Bayview	3	Bar	Italian Restaurant	American Restaurant	Mexican Restaurant	Seafood Restaurant	Pizza Place	Hotel	Coffee Shop	Greek Restaurant	Clothing Store

# Cluster 4 Results

- Central
- 34 rows

	Neighborhood	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	Allendale	4	American Restaurant	Fried Chicken Joint	Sandwich Place	Pizza Place	Convenience Store	Bus Stop	Bank	Chinese Restaurant	Park	Grocery Store
8	Barclay	4	American Restaurant	Convenience Store	Coffee Shop	Theater	Bus Stop	Sandwich Place	Fast Food Restaurant	Chinese Restaurant	Intersection	Grocery Store
14	Berea	4	American Restaurant	Convenience Store	Coffee Shop	Theater	Bus Stop	Sandwich Place	Fast Food Restaurant	Chinese Restaurant	Intersection	Grocery Store
16	Biddle Street	4	American Restaurant	Convenience Store	Coffee Shop	Theater	Bus Stop	Sandwich Place	Fast Food Restaurant	Chinese Restaurant	Intersection	Grocery Store



# Conclusion and Future Research

- Geological location plays a very important role in the trending venues within Baltimore City
- Further research and data can be added to this project such as demographic and income to see how additional variables can effect the trending venues
- This research did not conclude where neighborhoods are currently lacking a specific type of venue, it only took into account what venues are popular