

Study on the Best Neighborhood in Maryland to Start Asian Restaurant

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1. Introduction

The state of Maryland is one of the states in the United States that is known for its diversity. Although it's one of the smallest states in the country, its population is dense and consists of different demographics: White, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and other Pacific Islander and many others.

In this project, we will be helping an Asian Association in the USA which is interested in opening an Asian Restaurant in Maryland. Financing is not an issue. However, the association would like to determine which state and neighborhood in Maryland will they be targeting.

They would like to get the following information to help them with their decision:

1. Which city in the state of Maryland has the most Asian population.
2. Which neighborhood in that city has the most Asian population.
3. How many similar establishments are already in that target location.

The first two (2) items will help the company determine the target community based on population. And the third item is to determine the competition the new establishment may be facing.

We will utilize knowledge we learned on Data Science to create reports that will support the answers to these questions, thus providing the association with relevant information to guide them in their venture.

2. Data Acquisition

In order to provide the Asian Association in the USA with the answers they need to help them with their decision, we will need to acquire the following data:

1. Demographic population of the state of Maryland.
2. Demographic population of the target city's neighborhood.
3. Foursquare data
4. Shape file of the city of Baltimore Maryland.

For the 1st item, we would need to get the data set containing Asian population of each city in the State in Maryland. This data can be found at the url <https://www.homesnacks.com/most-asian-cities-in-maryland/>. We will be needing to use BeautifulSoup to scrape the data from this website. It is important that we extract the following information: City, Asian population.

After determining which city has the most Asian population, we then move to the 2nd item in the list above. For this part, we will once again use BeautifulSoup to scrape the information from

<http://www.city-data.com/neighborhood>. The following information should be availed from this site: Neighborhood, Asian population.

Once we've determined the Neighborhood, we will have to answer the 3rd item which is to identify the existing establishments in that area, thus, determining how will the business competition be like. In this item, we will be needing **Foursquare** location data to search and explore the venue for other Asian restaurants.

I will also need the shape file of the map of Baltimore, which I got from <https://www.jhsph.edu/>.

3. Data Cleaning

I downloaded and scraped for the City, Asian Population and Asian Percentage from the Demographic population of the state of Maryland. This step is fairly straightforward and after sorting the records in descending order on Asian Population field, I was able to determine that Baltimore is the city that has the most number of Asian population.

As I knew that Baltimore is the city to explore, I needed to determine which amongst its neighborhoods would most likely be the best candidate to start the Asian Restaurant. My top criteria for this is again, the measure of its Asian population. To do this, I again scraped the web to collect the list of the names of these neighborhoods, and their Asian populations.

I also searched for the shape file of the map of Baltimore, as I was aiming to visualize the population using this map. So, after downloading it, I merged its data with that of the Baltimore neighborhoods data. However, as some of the names of the neighborhood (from the Baltimore neighborhood dataframe) do not perfectly match the LABEL field of the map's dataframe, the merge resulted to NaN values in some of the rows. This required further cleaning on the merged data.

I resolved this, I wrote a routine that would split the values of the LABEL fields and used them to search the Baltimore Neighborhood's dataframe for the best match. Afterwhich, I finally dropped all rows that remained null.

After these steps, I was able to plot the map of Baltimore's neighborhood which helped me visualize which part of this neighborhood has the most number of Asian population.

Later on, I was able to explore this neighborhood using Foursquare data.

4. Data Analysis

4.1. Determination of which city in Maryland with most Asian Population.

Below is the result of the Asian Population as downloaded and scraped from the web.

It is showing the top 5 cities with most numbers of Asian population, and the city of Baltimore is on the top of the list.

Top 5 cities with Asian population in Maryland

	City	Asian Pct	Population	Asian Population
22	Baltimore	2.57%	609,032	15,652
0	Rockville	20.92%	67,542	14,130
1	Gaithersburg	18.86%	67,742	12,776
2	College Park	14.43%	32,159	4,641
5	Frederick	6.14%	70,887	4,352

4.2. Determination of which neighborhood in Baltimore with most Asian Population.

Below figure shows the raw data which was the product of merging the Baltimore neighborhood's dataframe and the Baltimore map's shape file.

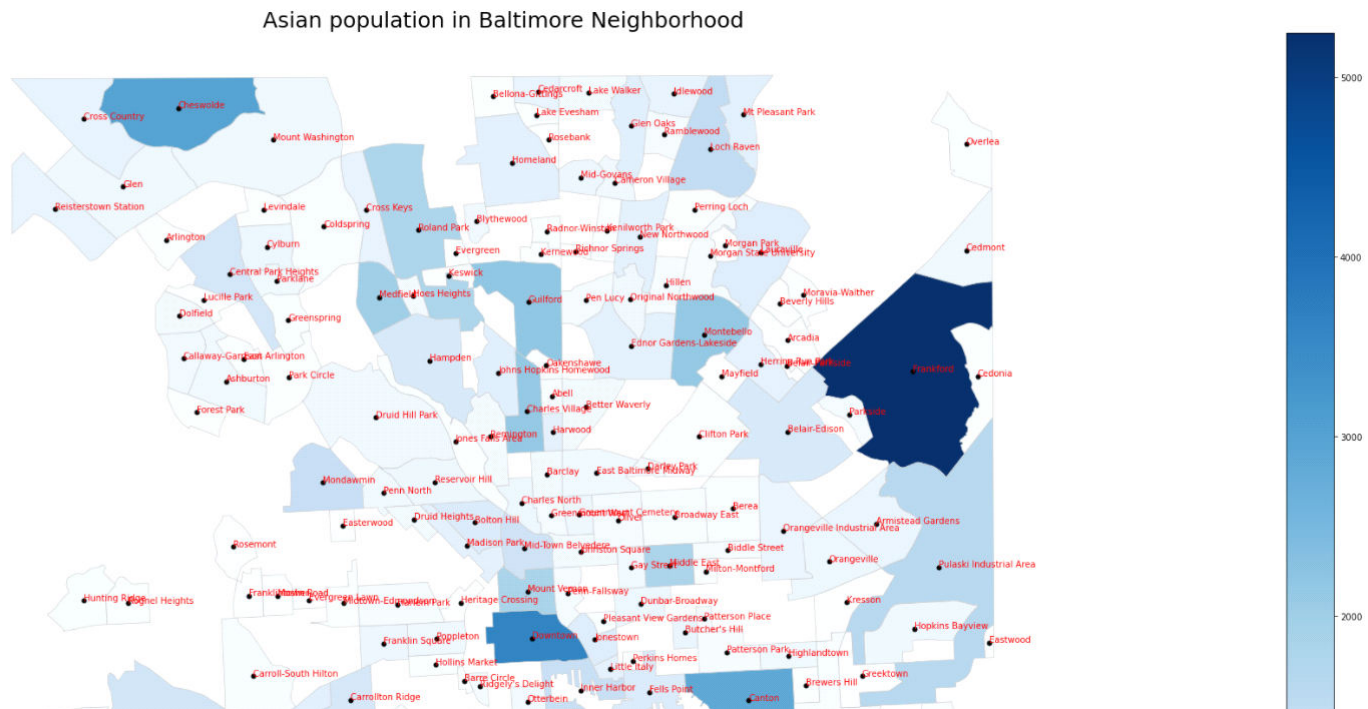
OBJECTID		NBRDESC	ACRES	LABEL	COLOR_2	geometry	Neighborhood	AsianPopulation	AsianPercentage
1	2.0	ALLENDALE	260.023864	Allendale	2.0	POLYGON ((1404989.665 592042.050, 1404989.913 ...	NaN	NaN	NaN
6	7.0	BALTIMORE HIGHLANDS	96.967070	Baltimore Highlands	4.0	POLYGON ((1434162.643 593039.546, 1434161.443 ...	NaN	NaN	NaN
7	8.0	PATTERSON PARK NEIGHBORHOOD	108.112661	Patterson Park Neighborhood	2.0	POLYGON ((1433312.950 593229.199, 1433451.437 ...	NaN	NaN	NaN
19	20.0	BOYD-BOOTH	24.788620	Boyd-Booth	2.0	POLYGON ((1410967.395 590094.986, 1410889.771 ...	NaN	NaN	NaN
21	22.0	BRIDGEVIEW/GREENLAWN	181.313308	Bridgeview/Greenlawn	1.0	POLYGON ((1410406.082 594500.536, 1410416.185 ...	NaN	NaN	NaN
...
303	NaN	NaN	NaN	NaN	NaN	None	Old Town	122.0	0.7%
304	NaN	NaN	NaN	NaN	NaN	None	Panway (Braddish Avenue)	10.0	0.9%
305	NaN	NaN	NaN	NaN	NaN	None	Penrose	28.0	0.9%
306	NaN	NaN	NaN	NaN	NaN	None	Pimlico	62.0	2.7%
307	NaN	NaN	NaN	NaN	NaN	None	Poplar Hill (North Roland Park)	142.0	11.9%

As can be seen in this figure, some of the fields are NaN. These were caused by the LABEL had no matching Neighborhood value during the merge, or, the Neighborhood had the name in different format (example, with dash, slash etc).

After doing the data cleanup, the resulting dataframe gam

	OBJECTID	NBRDESC	ACRES	LABEL	COLOR_2	geometry	Neighborhood	AsianPopulation	AsianPercentage	center
0	1.0	ABELL	46.710432	Abell	2.0	POLYGON ((1422345.337 603620.765, 1422192.136 ...	Abell	33.0	3.0%	POINT (1422266.863 604534.066)
2	3.0	ARCADIA	144.678075	Arcadia	2.0	POLYGON ((1434376.830 608229.661, 1434486.755 ...	Arcadia	7.0	0.6%	POINT (1434603.725 607469.517)
3	4.0	ARLINGTON	115.584689	Arlington	5.0	POLYGON ((1401059.486 612450.588, 1401004.764 ...	Arlington	13.0	0.6%	POINT (1402055.725 612718.466)
4	5.0	ARMISTEAD GARDENS	302.585653	Armistead Gardens	2.0	POLYGON ((1437179.460 597502.829, 1437145.202 ...	Armistead Gardens	109.0	3.3%	POINT (1439257.445 597835.344)
5	6.0	ASHBURTON	225.555236	Ashburton	3.0	POLYGON ((1404374.743 604165.231, 1404114.311 ...	Ashburton	73.0	1.8%	POINT (1405203.525 605298.807)
...
209	210.0	ROLAND PARK	612.795699	Roland Park	4.0	POLYGON ((1415827.424 614397.662, 1415867.341 ...	Roland Park	389.0	7.6%	POINT (1415273.148 613246.973)
210	211.0	ROSEBANK	42.329316	Rosebank	3.0	POLYGON ((1422615.548 618445.529, 1422615.341 ...	Rosebank	5.0	1.2%	POINT (1422111.952 617991.889)
211	212.0	ROSEMONT	111.471360	Rosemont	4.0	POLYGON ((1406293.308 595787.350, 1406005.454 ...	Rosemont	9.0	0.3%	POINT (1405562.588 596629.445)
274	275.0	BELAIR-EDISON	527.968507	Belair-Edison	1.0	POLYGON ((1432204.448 603179.733, 1432106.992 ...	Belair-Edison	213.0	1.0%	POINT (1434614.080 602667.624)
276	277.0	CHARLES VILLAGE	168.544540	Charles Village	5.0	POLYGON ((1421149.074 601598.138, 1421102.000 ...	Charles Village	464.0	7.2%	POINT (1420932.590 603746.952)

Plotting these values into a map gives us the following figure, which clearly shows that Frankford neighborhood has the most number of Asian population in the city of Baltimore Maryland.



4.2. Explore Frankford Neighborhood using Foursquare.

4.2.1. Search Frankford neighborhood for any existing Asian establishments within 4000 meters radius from the center of the neighborhood.

	name	categories	address	lat	lng	labeledLatLngs	distance	postalCode	cc	city	state	country	formattedAddress	crossStreet	id
0	Asian Taste	Asian Restaurant	5443 Belair Rd	39.339024	-76.549850	[[{"label": "display", "lat": 39.339024, "lng": ...	1148	21206	US	Baltimore	MD	United States	[5443 Belair Rd, Baltimore, MD 21206]	NaN	4cc486fb3d7fa1cd7f7bac5f
1	HaHa Food	Grocery Store	7501 Pulaski Hwy	39.311243	-76.525020	[[{"label": "display", "lat": 39.31124283384103...	2746	21237	US	Rosedale	MD	United States	[7501 Pulaski Hwy (at 66th St), Rosedale, MD 2...	at 66th St	4c9a6ec49c663704269058fd
2	Asiatic's Cutz Barber Shop	Salon / Barbershop	1560 Havenwood Rd	39.341135	-76.590481	[[{"label": "display", "lat": 39.34113539402315...	3959	21218	US	Baltimore	MD	United States	[1560 Havenwood Rd (btwn Hillen & Loch Raven)....	btwn Hillen & Loch Raven	4b2c157df964a5203bc124e3

As seen in the figure above, there are 3 Asian establishments around the desired radius of the neighborhood. But only one of these establishments is a restaurant, that is, Asian Taste restaurant.

In order to find out how the competition will look like, I tried to check for any reviews on Asian Taste restaurant. As a result, it appears that this restaurant had not received any review so far.

4.2.2. I also explored the other establishments within the 4000 meters from the center of this neighborhood. I set to query to retrieve only 30 establishments. Below is the result of this exploration.

	name	categories	address	lat	lng	labeledLatLngs	distance	postalCode	cc	city	state	country	formattedAddress	crossStreet	id
0	Woodlea Bakery	Bakery	4905 Belair Rd	39.334611	-76.556517	[[{"label": "display", "lat": 39.33461081810566...	1016	21206	US	Baltimore	MD	United States	[4905 Belair Rd, Baltimore, MD 21206, United S...	NaN	4b5732abf964a5209b2a28e3
1	Aldi food market	Grocery Store	4212 Frankford Ave	39.337785	-76.550497	[[{"label": "display", "lat": 39.33778471832159...	1026	21206	US	Baltimore	MD	United States	[4212 Frankford Ave (5400 bel air rd), Baltim...	5400 bel air rd.	4c275feba852c9284919e86c
2	Zeke's Coffee (retail)	Coffee Shop	4607 Harford Rd	39.342333	-76.569978	[[{"label": "display", "lat": 39.34233267656300...	2459	21214	US	Baltimore	MD	United States	[4607 Harford Rd (Grindon Ave.), Baltimore, MD...	Grindon Ave.	4b9502e9f964a520808b34e3
3	Koco's Pub	Seafood Restaurant	4301 Harford Rd	39.338625	-76.573334	[[{"label": "display", "lat": 39.33862519046768...	2489	21214	US	Baltimore	MD	United States	[4301 Harford Rd (at Weaver Ave), Baltimore, M...	at Weaver Ave	4b2b9cddf964a5203cb824e3
4	Dollar General	Discount Store	4810 Belair Rd	39.334164	-76.558022	[[{"label": "entrance", "lat": 39.333839, "lng": ...	1093	21206	US	Baltimore	MD	United States	[4810 Belair Rd, Baltimore, MD 21206, United S...	NaN	4dd57f81bd41965192d1494d
5	Subway	Sandwich Place	5112 Sinclair Ln	39.324537	-76.545355	[[{"label": "display", "lat": 39.3245365, "lng": ...	513	21206	US	Baltimore	MD	United States	[5112 Sinclair Ln (in Parkside Shopping Center...	in Parkside Shopping Center	4c6fe75d344437040447225f
6	The Red Canoe	Bookstore	4337 Harford Rd	39.339434	-76.572701	[[{"label": "display", "lat": 39.33943404389466...	2481	21214	US	Baltimore	MD	United States	[4337 Harford Rd, Baltimore, MD 21214, United ...	NaN	4b435f03f964a52010df25e3
7	Maggie's Farm	New American Restaurant	4341 Harford Rd	39.339445	-76.572431	[[{"label": "display", "lat": 39.33944458747611...	2461	21214	US	Baltimore	MD	United States	[4341 Harford Rd (at Montebello Ter), Baltimor...	at Montebello Ter	50a92c25498ea24de189e4a5
8	Hazelwood Inn	American Restaurant	4937 Hazelwood Ave	39.340288	-76.524650	[[{"label": "display", "lat": 39.34028793200447...	2325	21206	US	Baltimore	MD	United States	[4937 Hazelwood Ave, Baltimore, MD 21206, Unit...	NaN	4b47f488f964a5200e4526e3
9	Blake's Crab House	Seafood Restaurant	5005 Erdman Ave	39.305810	-76.558289	[[{"label": "display", "lat": 39.30581000148488...	2739	21205	US	Baltimore	MD	United States	[5005 Erdman Ave, Baltimore, MD 21205, United ...	NaN	4c59be20f346c9284a554dca
10	GameStop	Video Game Store	5114 Sinclair Lane Ste 8	39.324234	-76.545566	[[{"label": "display", "lat": 39.32423409975297...	540	21206	US	Baltimore	MD	United States	[5114 Sinclair Lane Ste 8, Baltimore, MD 21206...	NaN	4cb625691b0af04d7872ce25
11	Silver Queen Cafe	American Restaurant	NaN	39.351921	-76.561711	[[{"label": "display", "lat": 39.35192082437295...	2847	21214	US	Baltimore	MD	United States	[Baltimore, MD 21214, United States]	NaN	566b5032498e34042544c6ed
12	Hamilton Tavern	Gastropub	5517 Harford Rd	39.352581	-76.561100	[[{"label": "display", "lat": 39.35258073284586...	2891	21214	US	Baltimore	MD	United States	[5517 Harford Rd (at Wisteria Ave), Baltimore, ...	at Wisteria Ave	4ac68d43f964a52005b520e3
13	Family Dollar	Discount Store	5330 Frankford Ave	39.324245	-76.540455	[[{"label": "display", "lat": 39.324245, "lng": ...	784	21206	US	Baltimore	MD	United States	[5330 Frankford Ave (Frankford), Baltimore, MD...	Frankford	4c0132cf94c1c9b6eddcba5f
14	Chaps Pit Beef	BBQ Joint	5801 Pulaski Hwy	39.301645	-76.548127	[[{"label": "display", "lat": 39.30164522104727...	3034	21205	US	Baltimore	MD	United States	[5801 Pulaski Hwy (at Mapleton Ave), Baltimore...	at Mapleton Ave	4b1ad3f8f964a520b3f223e3
15	T-Mobile	Mobile Phone Shop	5400 Belair Rd	39.338583	-76.551525	[[{"label": "display", "lat": 39.33858337101828...	1137	21206	US	Baltimore	MD	United States	[5400 Belair Rd (Frankford Ave.), Baltimore, M...	Frankford Ave.	4ed7c3fec2ee190c3f6fbb20

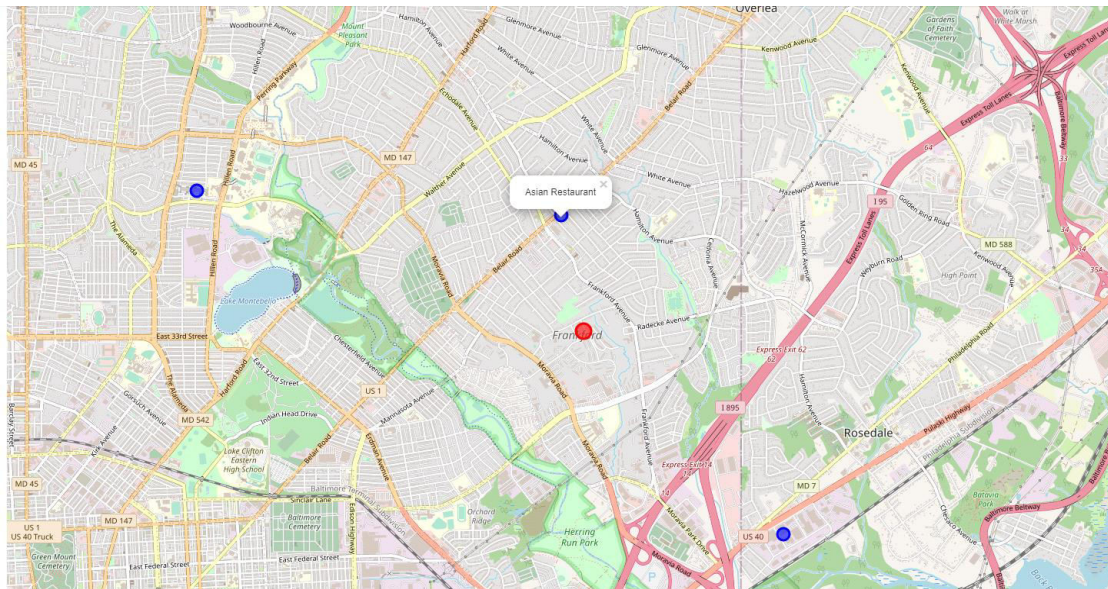
16	U-Haul Moving & Storage at Belair Rd	Storage Facility	4650 Belair Rd	39.332516	-76.560044	[[{"label": "display", "lat": 39.33251596239205...	1168	21206	US	Baltimore	MD	United States	[4650 Belair Rd, Baltimore, MD 21206, United S...	NaN	4bdc0bb1c79cc928f01385e9
17	Wells Fargo	Bank	5040 Sinclair Ln	39.322695	-76.545675	[[{"label": "display", "lat": 39.32269539434969...	704	21206	US	Baltimore	MD	United States	[5040 Sinclair Ln (btwn Moravia and Goodnow Rd...	btwn Moravia and Goodnow Rd	4e765ee781dc463907905560
18	Fiesta Mexicana	Mexican Restaurant	8304 Philadelphia Rd	39.327590	-76.504773	[[{"label": "display", "lat": 39.32758996778533...	3664	21237	US	Rosedale	MD	United States	[8304 Philadelphia Rd, Rosedale, MD 21237, Uni...	NaN	4adb5ce7f964a520702621e3
19	CVS pharmacy	Pharmacy	3300 Belair Rd	39.321792	-76.573671	[[{"label": "display", "lat": 39.32179168090557...	2404	21213	US	Baltimore	MD	United States	[3300 Belair Rd (at Erdman Ave), Baltimore, MD...	at Erdman Ave	4c6d22c71fb2a143a936fde6
20	Green Onion	Fruit & Vegetable Store	Harford Rd	39.352339	-76.561628	[[{"label": "display", "lat": 39.35233897351644...	2886	21214	US	Baltimore	MD	United States	[Harford Rd (Hamilton Ave), Baltimore, MD 2121...	Hamilton Ave	4e3466a62271b2cf066cae16
21	7-Eleven	Convenience Store	5401 Radecke Ave	39.329024	-76.541171	[[{"label": "display", "lat": 39.3290235378583...	527	21206	US	Baltimore	MD	United States	[5401 Radecke Ave (at Frankford Ave), Baltimor...	at Frankford Ave	4b5b8dbc9f64a520980629e3
22	Frank's Pizza & Pasta	Pizza Place	6620 Belair Rd	39.356690	-76.520834	[[{"label": "display", "lat": 39.35668993553858...	3842	21206	US	Baltimore	MD	United States	[6620 Belair Rd (Kenwood Ave), Baltimore, MD 2...	Kenwood Ave	4b8b2024f964a520119432e3
23	DeNiro's	Pizza Place	6701 Belair Rd	39.355461	-76.529868	[[{"label": "display", "lat": 39.35546076463995...	3315	21206	US	Baltimore	MD	United States	[6701 Belair Rd (Fleetwood ave), Baltimore, MD...	Fleetwood ave	4d194fdb25cda143f92e86d6
24	King's Discount Liquors	Liquor Store	8226 Pulaski Hwy	39.322638	-76.504573	[[{"label": "display", "lat": 39.32263778289933...	3744	21237	US	Rosedale	MD	United States	[8226 Pulaski Hwy, Rosedale, MD 21237, United ...	NaN	4c3f98ebd691c9b6b9fe890a
25	Rosario's Italian Kitchen	Italian Restaurant	7301 Pulaski Hwy	39.310595	-76.528486	[[{"label": "display", "lat": 39.31059470667883...	2603	21237	US	Rosedale	MD	United States	[7301 Pulaski Hwy, Rosedale, MD 21237, United ...	NaN	50468cbee4b0f61f46211fe7
26	Dollar General	Discount Store	2401 Belair Rd Ste 116	39.317894	-76.575583	[[{"label": "display", "lat": 39.317894, "lng": ...	2726	21213	US	Baltimore	MD	United States	[2401 Belair Rd Ste 116, Baltimore, MD 21213, ...	NaN	4cd5d13fa5b3468896609050
27	Planet Fitness	Gym / Fitness Center	5201 Belair Rd At Frankford Ave	39.336891	-76.552770	[[{"label": "display", "lat": 39.3368906119751, ...	1006	21206	US	Baltimore	MD	United States	[5201 Belair Rd At Frankford Ave, Baltimore, M...	NaN	5339ce24498e8490af020fdb
28	Kahler's Crabhouse	Seafood Restaurant	8036 Philadelphia Rd	39.322322	-76.512789	[[{"label": "display", "lat": 39.32232226916037...	3060	21237	US	Rosedale	MD	United States	[8036 Philadelphia Rd, Rosedale, MD 21237, Uni...	NaN	4bdddad2587b2d7f025b5509
29	Bi Rite Supermarket	Grocery Store	5950 Belair Rd	39.346873	-76.540214	[[{"label": "display", "lat": 39.34687264794748...	2091	21206	US	Baltimore	MD	United States	[5950 Belair Rd, Baltimore, MD 21206, United S...	NaN	4bf56c98ff90c9b61f5a5628

There are other restaurants ranging from Italian to seafood restaurants within the selected radius. There are also coffee shops, bakeshops, grocery stores and gyms. This neighborhood has a good distribution of establishments which indicates this is a promising location to start a business.

5. Visualization of Frankford Neighborhood.

5.1. Asian establishments

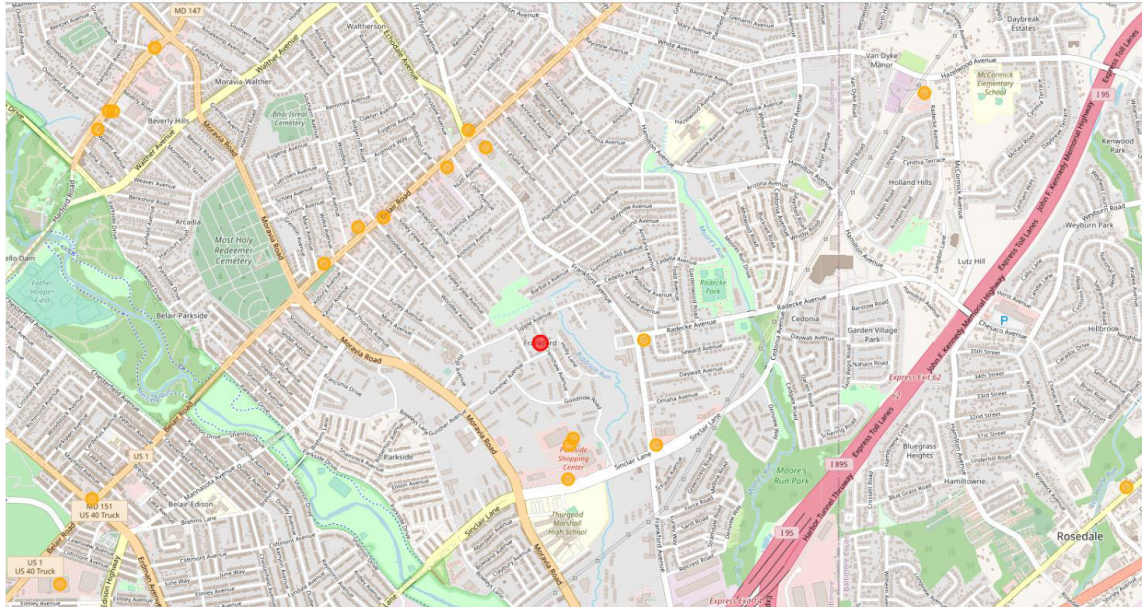
There are 3 Asian establishments within the 4000 meters radius from the the center of Frankford neighborhood. One of these establishments is an Asian restaurant called Asian Taste.



This restaurant is currently has not been reviewed so far.

5.2. Other establishments

After exploring the area, the url returned the requested 30 popular venues around Frankford neighborhood. It appears that the area along Belair Road is a busy area as it has several establishments in it.



6. Conclusion.

The following information requested had been answered based on the studies conducted in this project. That is, the Frankford Neighborhood in Baltimore Maryland is a promising area to start a new Asian restaurant, due to the following observations:

1. Frankford neighborhood has the most Asian population in the entire Maryland state.
2. The neighborhood has a well-distributed kinds of establishments which indicates that the area is a promising site to start a new business.
3. In this community, there is only one Asian restaurant, which may be, or may not be a competition as it currently has not been reviewed yet. However, a new Asian restaurant may be a welcoming new option for this neighborhood.