#### 1. Introduction & Business Problem:

The City of New York, is the most populous city in the United States. It is diverse and is the financial capital of USA. It is multicultural. It provides lot of business oppourtunities and business friendly environment. It has attracted many different players into the market. It is a global hub of business and commerce. The city is a major center for banking and finance, retailing, world trade, transportation, tourism, real estate, new media, traditional media, advertising, legal services, accountancy, insurance, theater, fashion, and the arts in the United States. This also means that the market is highly competitive. As it is highly developed city so cost of doing business is also one of the highest. Thus, any new business venture or expansion needs to be analysed carefully. The insights derived from analysis will give good understanding of the business environment which help in strategically targeting the market. This will help in reduction of risk. And the Return on Investment will be reasonable.

#### **Business Problem**

The City of New York is famous for its excellent cuisine. It's food culture includes an array of international cuisines influenced by the city's immigrant history. Sushi restaurants have become so popular in the United States now it seems that there is one on every corner, not only in major cities but also in smaller cities. Starting a sushi restaurant can be a great business opportunity, but you need to distinguish yourself from others to enjoy long-term success.

If you plan a real restaurant that can demand higher prices for fresh fish, delivered daily from Japan, focus on neighborhoods and outlets that already attract a sophisticated Japanese client. If you plan a cheap buffet restaurant, points to the masses looking for affordable high-traffic locations with large shopping centers and other local points of interest.

My client wants to open his business in Manhattan area, so I focus on that borough during my analysis. We define potential neighborhood based on the number of sushi bars which are operating right in each neighborhood. Manhattan has full potential but also is a very challenging district to open a business because of high competition. New sushi bar should be open in an area that inadequate neighborhood in this way the bar

can attract more customers. Therefore, this analysis necessary to ensure that we have enough customers and that we are not so close to other sushi places.

### 2. Data

**Data 1:** Neighborhood has a total of 5 boroughs and 306 neighborhoods. In order to segement the neighborhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the the latitude and logitude coordinates of each neighborhood. This dataset exists for free on the web. Link to the dataset is: https://geo.nyu.edu/catalog/nyu\_2451\_34572

	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585

**Data2:** Newyork city geographical coordinates data will be utilized as input for the Foursquare API, that will be leveraged to provision venues information for each neighborhood. We will use the Foursquare API to explore neighborhoods in New York City. The below is image of the Foursquare API data.

In addition, Sushi category Id 4bf58dd8d48988d1d2941735 is used for retrieving data from Foursquare API.

### 3. Methodology

In this project, I will use the basic methodology as taught in Week 3 lab.

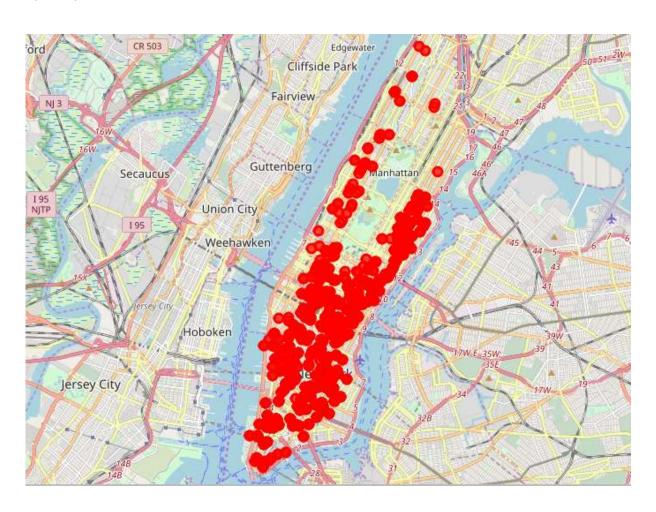
	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585

Above, I have done convert addresses into their equivalent latitude and longitude values. Then we will use the Foursquare API to explore neighborhoods in Manhattan, New York. After that, explore function to get sushi restaurant categories in each neighborhood.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Fieldston	40.895437	-73.905643	Asian Tokyo	40.890839	-73.898335	Sushi Restaurant
1	Fieldston	40.895437	-73.905643	Yokohama	40.887214	-73.904708	Sushi Restaurant
2	Riverdale	40.890834	-73.912585	Planet Tokyo	40.886158	-73.909615	Sushi Restaurant
3	Riverdale	40.890834	-73.912585	Yokohama	40.887214	-73.904708	Sushi Restaurant
4	Kingsbridge	40.881687	-73,902818	Yokohama	40.887214	-73.904708	Sushi Restaurant

newyork\_venues\_sushi.shape

(1763, 7)

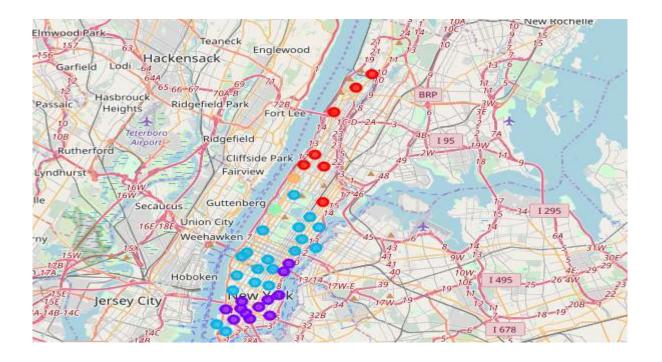


Sushi bars in Manhattan

	Neighborhood	Asian Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant	Noodle House	Poke Place	Ramen Restaurant	Restaurant	Sake Bar	Sandwich Place	Re
0	Marble Hill	0	0	0	0	0	0	.0	0	0	0	¢	0	0	0	
1	Chinatown		.0	0	0	0	0	. 0	0	0	0	0	0	0	0	
2	Chinatown	.0	0	0	0	.0	0	0	1.	0	0	0	0	0	0	
3	Chinatown	.0	.0	0	0	0	0		0	0	0	0	0	0	0	
4	Chinatown	0	0	0	0	0	0	. 0	0	0	0	0	0	0	0	
4																

Then use this feature to group the neighborhoods into clusters K-means clustering algorithm will be use to complete this task. And also, the Folium library to visualize the neighborhoods in Manhattan and its emerging clusters.

	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
0	Annadale	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
1	Arden Heights	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
2	Astoria	S <mark>ushi</mark> Restaurant	Asian Restaurant	Japanese Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joi <mark>n</mark> t	Café	Chinese Restaurant
3	Astoria Heights	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
4	Auburndale	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar



## 4. Results

K-mean Cluster Using K-mean to clustering data area with less number of sushi bars

# Cluster 0

	Borough	Neighborhood	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	¢
0	Manhaltan	Marble Hill	40.876551	-73.910660	0	Sushi Restaurant	Vegetarian / Vegan Restaurant	Konsen Restaurent	Bakery	Subble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	
1	Manhattan	Chinatown	40.715618	-73.994279	0	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Saltery	Bubble Tee Shop	Burger Joint	Café	Chinese Restaurant	
2	Manhattan	Washington Heights	40.851903	-73.936900	0	Sushi Restaurant	Vegetarian 7 Vegari Restaurant	Korean Restaurant	Bakery	Subble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	
	Menhattan	Inwood	40.867684	-73.921210	0	Sushii Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Subble Tes Shop	Burger Joint	Cafe	Chinese Restaurant	Cocktail Bar	
4	Manhattan	Hamilton Heights	40.823604	73,949688	0	Sushi Restaurant	Vegetarian / Vegan	Korean Restaurant	Bakery	Subble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	

# **Cluster 1**

	Neighborhood	1st West Common Versey	2nd Meet Common Venue	and Most Corneau Venue	4th Most Carwenn Verses	Sth Most Convene Version	6th Mort Corneon Venue	Jth Mart Coremon Venue	8th Most Common Versie	9th Most Cornesso Venue	Mich Most Common Venue
t	Director	Sub-National	Japanesis Personneri	Tegesean/Tegen Secoured	Sooth House	Salary	Ornox Nanayam	Cronwitter	Dell : Sodega	Groupy Josep	Havailer Nationale
	Desmith (Rage	Such Retained	Squess Resource	late for	Growy Staw	Vikgeneter / Veget Retrauters	Noode House	bies	Divisio Nationalists	Cooltel Sar	Del / Broop
	Serryitage	Suchi Resources	Japanese Persavant	regetation / regar- Rettection	Totalla House	favory	Chinese femalesm	Costral far	Del / Yearge	Groups Stone	meralian Restaurant
	Larver Sart Side	Soft Farturers	James Resource	Nepterlen / Vegan Retteutern	Scools House	Bites	Chines Research	Costal Se	Det / Stringe	Groces Store	Number Recover
,	Tribical	Sub-Renauser	Stoods House	Japanesa Fectauriero	There fects, over	Tregeranten / Vegan Restaurent	Battery	Chinasa Restaurant	Cockeal Bar	Del / Sorege	Greeny Store
Ė	Univisity	Sum Netsurers	Jepanesi Seracart	Noode House	Teprone / Tepro Network	3697	Others formulate	Costral Ser	Del / Storage	Drowy Stone	Transfer Resources
ì	Sono	Sub-Remuser	Japanese Rectaurant	Noodle House	Trene fecturary	Vegeneran i Vegen Reclaurant	Array .	Chinese Retraurent	Cooked Ber	Celi / Sconge	Grosey Iton
	Tono	Sub-Network	Jeanne fersorer:	regeteren/lagen. Receivers	North Your	Select	Chines Network	Coorei Sw	Del / Sodepa	thosay Stare.	Manager National
	Onle Denne	Supplement	Задалное Респасант:	Nande House	There Netsuare	Ingetimen / Vegan Asstaurent	Banery	Chinece Recoursers	Control Ber	Del / Scokge	Stoney Stone
	Turte lily	Sum Remarket	Japanese Restaurant	Adan Rettaularin	Destroyee	Textood Retrainant	Salety	Chinasa Rettaurant	Contral Bar	Del / Screga	Growy Store
	Type Oy	Sub-Retainer	Adam National Inc.	Injerior Personant	Highester / Vegen Seneuren	Statement	Descriptions	Sanhood Restaurant	Sanayon Place	Same Sar	Netsuser
r	Troyson:	Soft Federate	Japanes National	Veprarian / Vepar Recourses	Noodle House	Serg	Others Removed	Dotted by	Del - Screge	Discoy Dave	Section Services

# **Cluster 2**

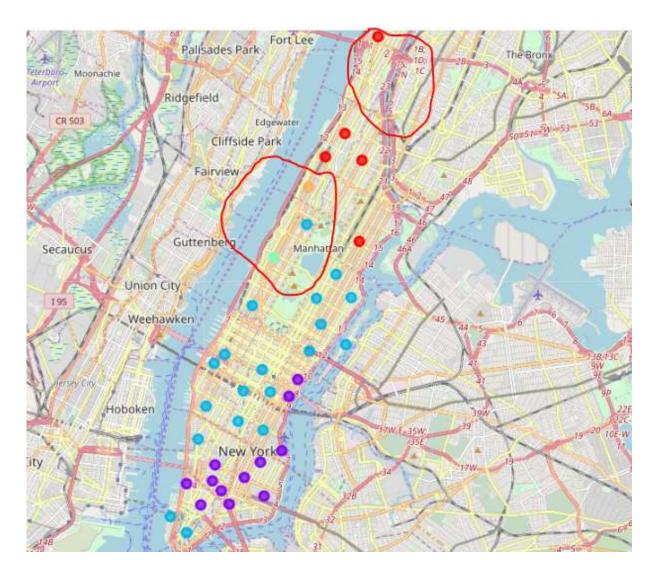
	Neighborhood	1st Must Common Venue	Zyal Most Commerce Venue	Sent Most Conneces Version	4th Most Common Vense	Bith Most Common Venue	Eth Most Common Verse	Trt: Mear Common Venue	Std: Mest Common Venue	Sex Most Corneron Vense	10th Most Common Venue
	Upper Dart Side	Suph Retricted	Napocinia Patraurant	Apart Resources	Grately State	Hoody House	July	Chinasa Reztaurani	Cookeal flar	Dell / Sociege	median festivan
9	Service	Sughi Retrovent	laparete Satteurers	Scan Senaurent	Crimin Senaver	Herefalthous	Takey	Costral Set	Daf / Bedage	Droop ben	Teneral Sensorer
100	1899 199	Such Research	Aries Restaurant	Japanese Restaurant	Sinsiery State	110006110006	Senery	Chinese Persaurent	Contraction	Det / Bridge	manager ferranser
**	Sometic lease	Such femores	Asian Passaciant	Japanese Remailant	Totophi-House	3000	Dines Resuren	Constitle	Del / Bedage	Doory Door	moder females
11	SPACE TOWN	Sont Personner	Name of Street	Imeems Thep	Chinese National Print	Stereny Stere	Toperarian / Tapen Faviaurant	1100000-11000	teles	Shortel Ser	Dat / Strange
10	Circus	Suit-Sersalier	Approve Recounted	Pobe Hade	Direct Retainer	Const liv	Water Remarked	Serlood Remainent	Dansey Para	Sales Tar	Seractor
15	Mason	Suit Petrovery	Aren Nebeurer	Леончик Распецияли	Serbod Nationals	Same Sections	terry	Nepetician / Vilgan Protection	Serio Para	Sets Ser	house
16	Name and	Sub-Retailed	Manager Patricians	Approfessions	Resource	Service	Chinese Personal	Same Resulted	Vegetarian / Veget Restaurant	Salarite	Sensor Place
17	Order	Subhi Recisionent	Nomina Netsurent	Apper Recognision	(regetartan / Vegan Tarrainan)	Secreta Stop	Serbod Renauters	Sandwich Flats	Setu Set	Personn	Servic Serauters
14	West Strage	Such desauters	Appears Security	Vegetarian / Veget Sectionario	less for	Strang Store	non femores	Securities	Section Sections	Reserve	Factor Sections
2%	Warnattan Yafay	Such Personner	Yearin Terrorers	REWINDS SETSURED	Tregeranse / Vagan Rectaurant	Yeode (fpus	Salary	Chinese Fernancer	Codnel Ser	Self / Brolege	Growy Store
er	James .	Syste Personnell	Appears for by over	regeration of Vagare Valdaurance	Circum Indianas	Nonle House	Billing	Delan by	Dat / Bridge	Street Street	The section of the section of
28	Berwy Fark Dty	Sub-ferracem	Appeners Retractant	Noode House	Trene ferauero	(regetation) //egain Sentauronis	Datery	Chinese Recourses	Costrari Ber	Dell / Stonge	Snowy Store
ĮW.	Newviel Ziestin	Suite Research	Meanway Research	Treprietar / Yegen Retrovers	Totals House	Banany	Chinese Personant	CostrairNer	Dati / Stoleya	Street Street	Married Residence
10	Zenege (n)	Sugni Rectaulent	Japanese Settle-Fert	Apar Serai are	Divers Nataurat	Record House	Savery	Cooksall Rev	Del / Rodnija	Glosey Store	HALLES SECTION
17	Military South	Suchi Removany	Arien Securiors	Reprint Fereurary	Searer	Bring	Otinea fersions	Server Sursurers	Segment / Segar Seminary	Selector	[and-ich Place
14	Sutton Finise	Sub-Sections	Asian Sestauters	Harmonia Restaurant	Constitute	Serting Securiors	Del / Busings	Tables	Chinese Sectaured	Count lie	Graves Store

## **Cluster 3**



## **Cluster 4**

				n Labels'] 4,							
	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
26	Marningside Heights	Sushi Restaurant	Havelan Restaurent	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktal) Bar	Del / Sodega	Grocery Stone	Japanese Restaurant



Based on dataframe analysis above Cluster 3 (Upper West Side ) and Cluster 4 (Morningside Heights) areas are the best places to open a new sushi bar business.

#### 5. Discussion

In this section, I would be discussing the observations I have noted and the recommendation that I can make based on the results.

This analysis is performed on limited data. This may be right or may be wrong. But if good amount of data is available there is scope to come up with better results.

- There is high competition in Midtown and Soho so it is very risky to open business in these areas.
- Central Harlem has also potential where closes to Morningside Heights area.
- It can be done more detailed analysis by adding other factors such as transportation, demographics of inhabitants.

Finally, FourSquare proved to be a good source of data but frustrating at times.

Despite having a Developer account I regularly exceeded my hourly limit locking me out for the day.

### 6. Conclusion

Although all of the goals of this project were met there is definitely room for further improvement and development as noted below. However, the goals of the project were met and, with some more work, could easily be devleoped into a fully phledged application that could support the opening a business idea in an unknown location.

As per the neighbourhood or restaurant type mentioned like Sushi restaurants analysis can be checked. A venue with lowest risk and competition can be identified.