

The Battle of Neighbourhoods: Restaurant Opportunities around universities in Chicago

Introduction/Business Problem

Our data science company, DataInsights4ALL, has been hired by Mr Jus A. Restaurateur, Jr. to help plan his next restaurant location. The client is the Chairman and CEO of a multi-million dollar restaurant conglomerate that spans 40 countries and 1000 restaurants. The client is looking to expand their restaurant offerings to the university student market, with a pilot restaurant in Chicago planned to launch in 2022.

The client typically undertakes traditional market research through surveys and on-site visits before deciding on a new restaurant. However, Mr Jus A. Restaurateur, Jr. has taken interest in data science and how it could improve his business. Our company has won the tender to provide a research report as part of the client's initial investigation of potential opportunities that can be uncovered by data science.

The initial target market has been narrowed down to a location around one of three universities; University of Illinois at Chicago, DePaul University, and Loyola University Chicago. This report will investigate the existing restaurant offerings in the local area and provide recommendations to the client on segments of the market that are highly competitive as well as potential opportunities in underserved segments. Our company sees this as an opportunity to further prove our data science expertise to deliver actionable insights to our clientele.

Data

Only Foursquare data will be used for this report. Foursquare is a search-and-discovery mobile app launched in 2009 that provides local recommendations of the top venues (such as restaurants, bars, theatres, parks) in an area. User reviews are captured and provide ratings for the locations. Our initial research has suggested that university students in Chicago are avid users of Foursquare. Thus, we view this data source as providing key insights into the preferences of the target market.

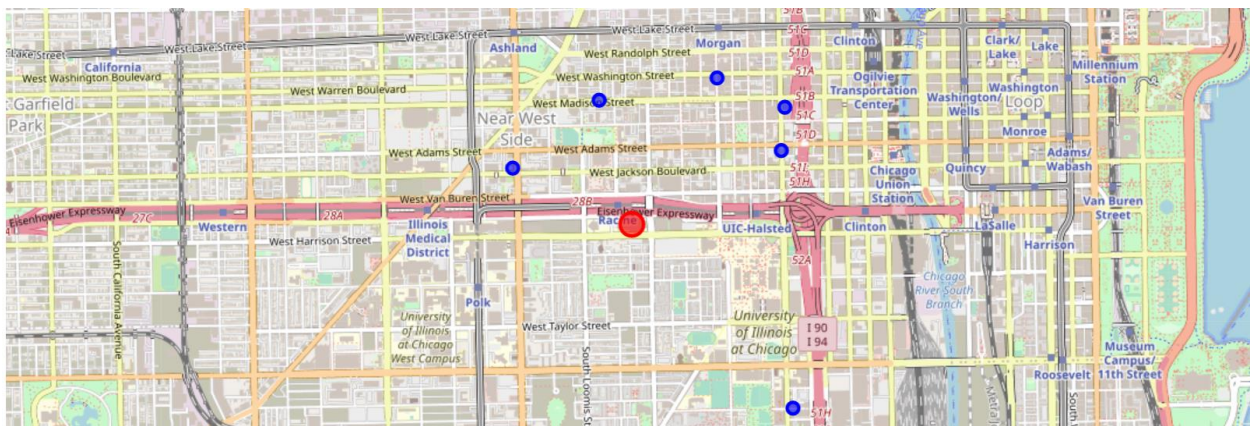
Our proposed approach is to investigate the area up to 2 kilometres around the respective universities, which roughly corresponds to a 20-30 minute walking distance. We will use the category definitions provided by Foursquare to examine the existing restaurant offerings and identify the highly competitive categories as well as underserved categories.

Methodology

Python was used along with Foursquare API to run queries on restaurants around the three universities within a radius of 2 kilometres. Calls were then made to obtain the Price Score and Rating for the restaurants. The data was then cleaned by removing restaurants without both Price Score and Rating. The dataset was then analysed per university and across all three universities.

Results

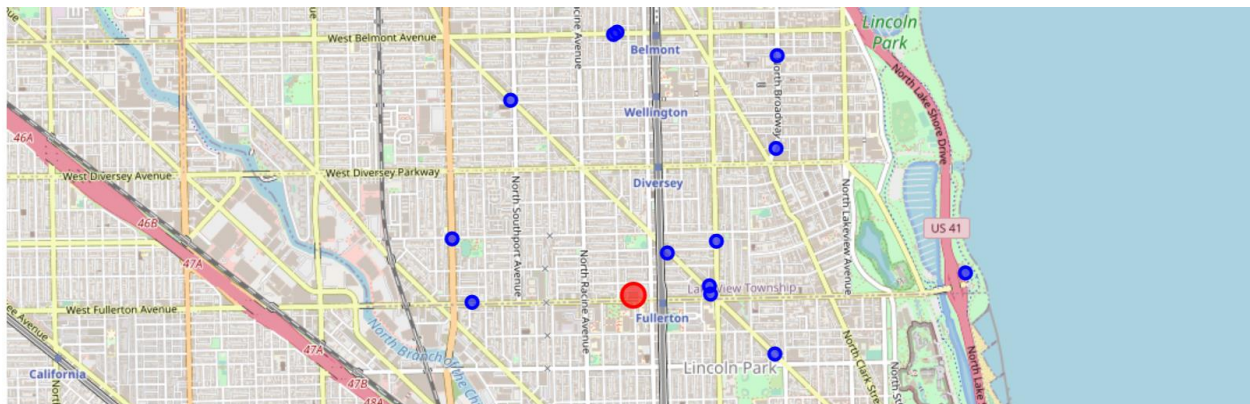
The map and filtered restaurants for University of Illinois at Chicago are as follows:



	name	categories	lat	lng	distance	id	Price_Score	Rating
0	Athena Greek Restaurant	Greek Restaurant	41.878871	-87.647309	1013	4a805101f964a520f0f41fe3	2	8.2
1	Wishbone Restaurant	Southern / Soul Food Restaurant	41.882858	-87.652054	1031	4a08f0f9f964a52027741fe3	2	9.0
11	Angel's Restaurant	Mexican Restaurant	41.877930	-87.667070	806	4bb3822d14cfd13a192116ab	2	7.3
14	Dine Restaurant	Diner	41.881255	-87.647000	1176	4b4673b7f964a520732126e3	2	5.1
21	Kohan Japanese Restaurant	Sushi Restaurant	41.864803	-87.646404	1488	49ece2a5f964a520aa671fe3	2	7.7
29	Viaggio	Italian Restaurant	41.881614	-87.660717	781	4b3d5dcef964a520279325e3	2	8.8

There were only 6 relevant restaurants after the data cleansing. The average Price Score, Rating and Distance for restaurants around University of Illinois at Chicago was 2.00, 7.68 and 1049.17 metres respectively. Restaurants were mainly focused towards the north of the university with no restaurants in the same category.

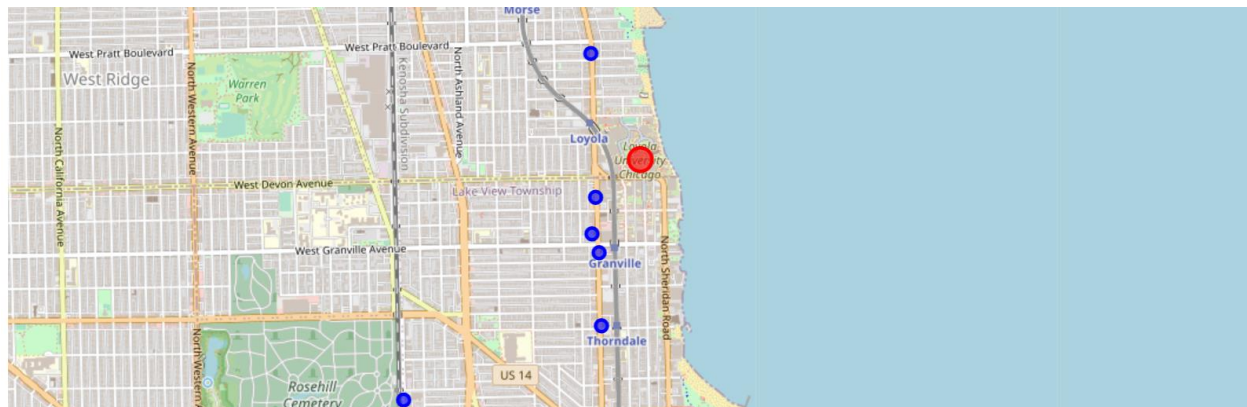
The map and filtered restaurants for DePaul University are as follows:



	name	categories	lat	lng	distance	id	Price_Score	Rating
0	Allende Restaurant	Mexican Restaurant	41.922481	-87.644567	926	4a4838fdf964a520a5aa1fe3	1	7.0
2	Sam & George's Restaurant	Diner	41.936277	-87.663935	1398	4ab65a04f964a520b37620e3	2	8.5
3	Allende Restaurante	Taco Place	41.925709	-87.649231	469	4ae3eb9cf964a5209b9921e3	1	7.8
4	Ukai Japanese Restaurant	Japanese Restaurant	41.939842	-87.656426	1583	4c5851eab7a31b8d243d52da	2	8.2
5	New Jeanny's Chinese Restaurant	Chinese Restaurant	41.939937	-87.656165	1592	4b61e66bf964a520082a2ae3	1	5.4
6	Fiesta Mexicana Restaurants	Food Court	41.926171	-87.649382	460	57acf8d8cd10f22b848bafb3	2	5.0
7	El Presidente Restaurante	Mexican Restaurant	41.928692	-87.668236	1154	4ab6ed8ef964a5207f7920e3	2	7.1
10	Jia's Restaurant	Sushi Restaurant	41.928566	-87.648845	596	4b25a02cf964a520b87424e3	2	6.0
15	Kyoto Sushi Restaurant	Japanese Restaurant	41.927963	-87.652423	328	4b049edaf964a520b95522e3	2	7.5
17	Salam Restaurant	Middle Eastern Restaurant	41.925274	-87.666785	985	5307a9fd498ee76b9ecff229	2	6.8
23	Mavi Turkish Restaurant	Turkish Restaurant	41.933666	-87.644480	1240	572547b0cd1024dc4a5f09bf	2	7.6
24	Wilde Bar & Restaurant	Pub	41.938651	-87.644370	1688	4a345eb1f964a520259c1fe3	2	8.6
25	Lakefront Restaurant	Restaurant	41.926872	-87.630571	2019	596bb3ea35d3fc5ceccb2bdf	2	8.0

There were only 13 relevant restaurants after the data cleansing. The average Price Score, Rating and Distance for restaurants around DePaul University was 1.77, 7.19 and 1110.62 metres respectively. Restaurants were mainly distributed to the north and east of the university, with two restaurants in the same category.

The map and filtered restaurants for Loyola University Chicago are as follows:



	name	categories	lat	lng	distance	id	Price_Score	Rating
0	Susupuato Restaurant and Taqueria	Mexican Restaurant	41.994120	-87.660349	611	4b761d27f964a520963d2ee3	1	6.6
1	Little Corner Restaurant	Diner	41.990167	-87.660195	1026	4a9ff6d5f964a520c23d20e3	1	8.1
2	Fireside Restaurant & Lounge	Bar	41.986191	-87.674546	2024	41a7c380f964a520461e1fe3	2	8.1
5	Shan's Grocery & Restaurant	Indian Restaurant	41.975222	-87.655122	2670	4ad7d628f964a520390f21e3	1	7.3
6	Awash Ethiopian Restaurant	Ethiopian Restaurant	41.997108	-87.660563	348	4dd6e48652b1a5c6443f31f	2	7.3
10	Vee Vee's African Restaurant	African Restaurant	41.995176	-87.660826	526	4c4ce59874e81b8deff1ef06	2	6.9
11	Andies Restaurant	Mediterranean Restaurant	41.977720	-87.668364	2553	49f4e327f964a520676b1fe3	2	8.0
17	Great Wall Chinese Restaurant	Chinese Restaurant	42.004928	-87.660930	707	4b721efbf964a520b36f2de3	1	5.5

There were only 8 relevant restaurants after the data cleansing. The average Price Score, Rating and Distance for restaurants around Loyola University Chicago was 1.50, 7.23 and 1308.13 metres respectively. Restaurants were mainly focused in the southwest with no restaurants in the same category.

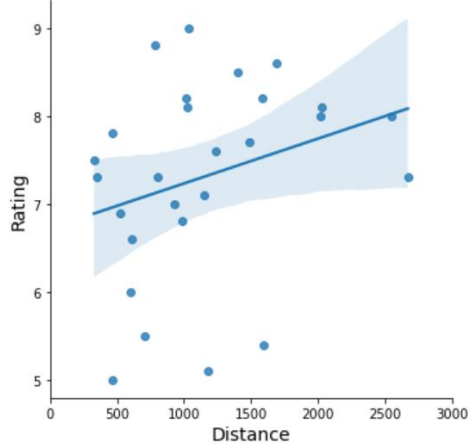
The filtered restaurants across all three universities were then assessed with summary table as per below:

	categories	Number	Average Price Score	Average Rating	Average Distance
11	Mexican Restaurant	4	1.500000	7.000000	874.25
3	Diner	3	1.666667	7.233333	1200.00
9	Japanese Restaurant	2	2.000000	7.850000	955.50
2	Chinese Restaurant	2	1.000000	5.450000	1149.50
16	Sushi Restaurant	2	2.000000	6.850000	1042.00
17	Taco Place	1	1.000000	7.800000	469.00
15	Southern / Soul Food Restaurant	1	2.000000	9.000000	1031.00
14	Restaurant	1	2.000000	8.000000	2019.00
13	Pub	1	2.000000	8.600000	1688.00
12	Middle Eastern Restaurant	1	2.000000	6.800000	985.00
0	African Restaurant	1	2.000000	6.900000	526.00
10	Mediterranean Restaurant	1	2.000000	8.000000	2553.00
1	Bar	1	2.000000	8.100000	2024.00
8	Italian Restaurant	1	2.000000	8.800000	781.00
7	Indian Restaurant	1	1.000000	7.300000	2670.00
6	Greek Restaurant	1	2.000000	8.200000	1013.00
5	Food Court	1	2.000000	5.000000	460.00
4	Ethiopian Restaurant	1	2.000000	7.300000	348.00
18	Turkish Restaurant	1	2.000000	7.600000	1240.00

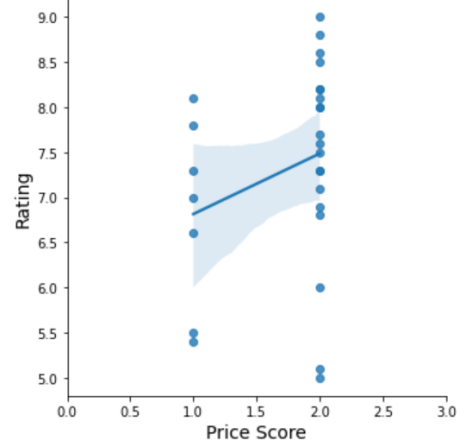
The minimum and maximum Price Score across all three universities was 1.0 and 2.0 respectively. The minimum and maximum Rating across all three universities was 9.0 and 5.0 respectively. The minimum and maximum Distance across all three universities was 328 metres and 2670 metres respectively. The most common restaurant is in the Mexican Restaurant category.

It was investigated whether Rating could be predicted by other variables such as Distance and Price Score. Scatter plots of the relationships are as per below:

Scatter Plot comparing Distance with Rating



Scatter Plot comparing Price Score with Rating



The relationships appear very weak due to high variability. It does not appear that Distance or Price Score is a significant determinant of the Rating for the restaurant.

Discussion

Based on the analysis, the most competitive market in terms of number of restaurants is DePaul University, followed by Loyola University Chicago then University of Illinois at Chicago. In terms of average Price Score, the cheapest market is Loyola University Chicago, followed by DePaul University then University of Illinois at Chicago.

Overall, it is recommended that Mr Jus A. Restaurateur, Jr. open his restaurant around the University of Illinois at Chicago. The area has the fewest number of competitors. The higher Price Score in the area will provide price flexibility on restaurant offerings. In terms of the top 5 most common restaurant categories, there are no offerings of Japanese Restaurant or Chinese Restaurant in the area. Furthermore, the Diner category restaurant in the area has a lower than average Rating compared to Diner category restaurants across the three universities. The south side of the area is underserved with only 1 competitor. Finally, Mr Jus A. Restaurateur, Jr. should aim for a restaurant within the average Distance in that area (1049.17 metres) to ensure that Distance considerations will not be a disadvantage to the new restaurant.

Conclusion

Based on our detailed analysis, DataInsights4ALL would like to recommend for Mr Jus A. Restaurateur, Jr. to open a Japanese Restaurant, Chinese Restaurant or Diner around the University of Illinois at Chicago. The target location should be within 1049.17 metres of the university and can take advantage of a lack of restaurants to the south of the university.