



Exploring Restaurants in Neighborhoods of Dubai

Applied Data Science Capstone Project

By,

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Introduction

- ▶ Dubai is the most famous and populous city of U.A.E
 - ▶ Multicultural community
 - ▶ Hub of delicious culinary delights
 - ▶ Food is an attractive and sought-after market
 - ▶ Each restaurant category has its own value - be it a small tea cafeteria or a high-end dine in restaurant
- ▶ Location dilemma and identifying underserved regions is a challenge



Research Questions



What are the most frequent types of restaurant categories in neighborhoods of Dubai?



Can we segment neighborhoods based on their surrounding food venues?



Can we identify an underserved region for a breakfast spot in these neighborhoods?

Target Audience

- ▶ Investors interested in restaurant business
 - ▶ summarize the different categories and density of restaurants in neighborhoods of Dubai and potentially find a gap which they can target.
 - ▶ provide insights to the population in these neighborhoods to understand if a good customer base can be built.
- ▶ Students of data science
 - ▶ as a sample project to understand how foursquare can be used to understand and help solve venue related problems.



Data Requirements and sources



List of the neighborhoods
in Dubai and their location

Latitude and longitude - using geolocator
python

Population - using data from Dubai
government's website



Data on the different categories of restaurant
around a neighborhood - using Foursquare API

Data Cleaning and Preparation

- ▶ Neighborhoods with a population less than 500 excluded
- ▶ Different divisions of the same neighborhood merged into one and summed their populations.
- ▶ For this project, we only include the neighborhoods for which the coordinates are readily available through the geolocator.
- ▶ For Foursquare
 - ▶ categoryId of “Food” is used
 - ▶ Radius of 5km and a limit of 100 restaurants per neighborhood
 - ▶ A dataset including food venues for 66 neighborhoods is ready for analysis with a total of 5276 records.

Data



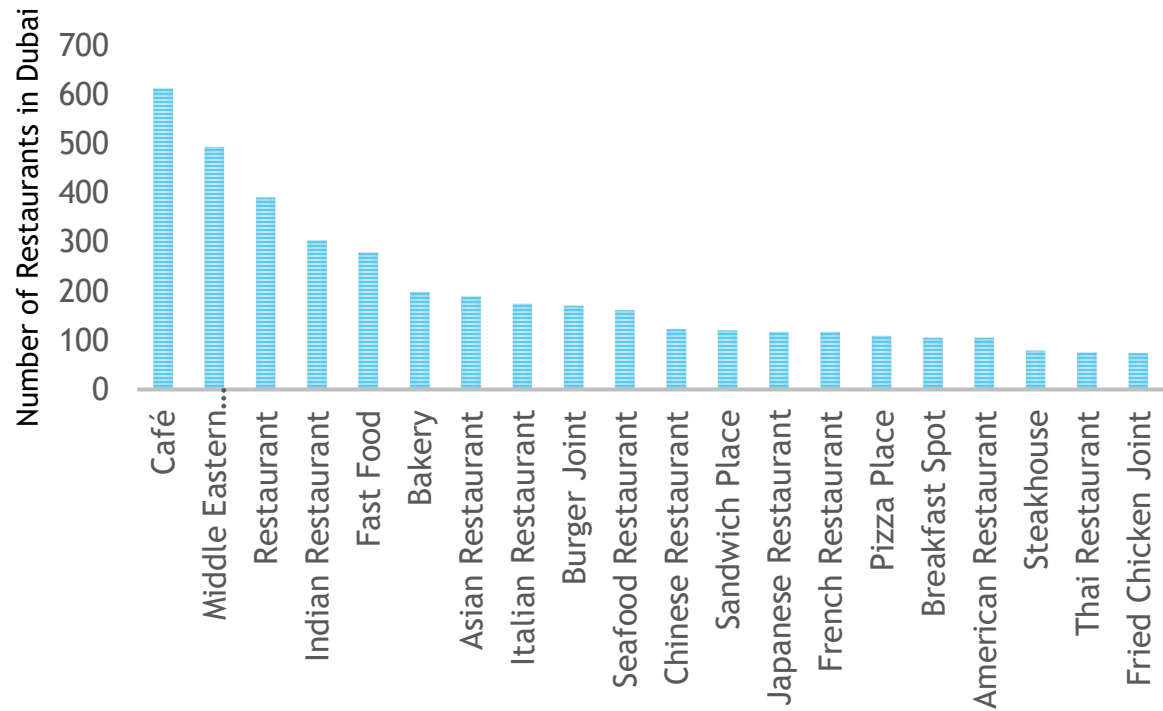
Figure 1 Dubai map with marked neighborhoods

	name	categories	lat	lng
0	Al Raslan Cafe	Café	25.178707	55.545097
1	Al Raslaan Star Cafe الرسلان ستار كافيه	Café	25.178739	55.545027
2	Sports Restaurant مطعم الرياضة	Burger Joint	25.175851	55.542336
3	Zaffran AlAweer Cafe (مقهى زعفران العوير)	Café	25.160281	55.535183
4	Qalat al shay cafeteria (كافيتريا قلعة الشاي)	Cafeteria	25.176925	55.542434
5	Jernas Cafe	Café	25.178689	55.544648
6	كَفَيْتِرَتَا الرَّسْلَان (الْعُوَيْرَا)	Cafeteria	25.178810	55.545098

Figure 2 Snapshot of the results from FOURSQUARE when food related venues are searched for Aweer, Dubai.

Methodology and Results - Descriptive Analysis

- Most frequent restaurants in Dubai



- ▶ The 20 most frequent restaurant categories in Dubai are shown in the bar plot.
- ▶ 97 unique categories of restaurants identified in neighborhoods of Dubai

Methodology and Results - Descriptive Analysis

- ▶ A sliced snapshot of most common venues in each neighborhood

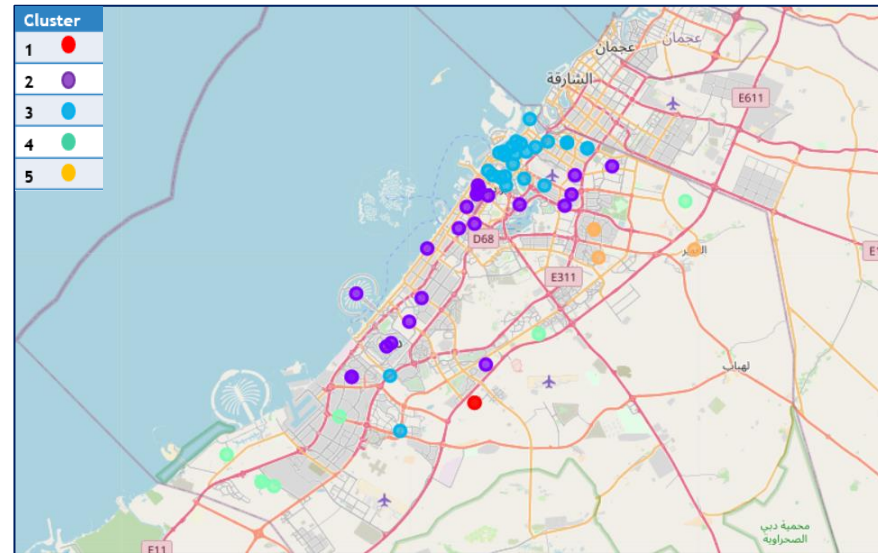
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	AWEER , DUBAI	Café	Cafeteria	Indian Restaurant	Seafood Restaurant	Burger Joint	Fast Food Restaurant	Yemeni Restaurant	Filipino Restaurant	Donut Shop	Eastern European Restaurant
1	AYAS, DUBAI	Café	Restaurant	Burger Joint	French Restaurant	Middle Eastern Restaurant	Italian Restaurant	Breakfast Spot	Steakhouse	Japanese Restaurant	Turkish Restaurant
2	BARAHA, DUBAI	Middle Eastern Restaurant	Indian Restaurant	Café	Restaurant	Asian Restaurant	Fast Food Restaurant	Seafood Restaurant	Japanese Restaurant	Fried Chicken Joint	North Indian Restaurant
3	BARSHA SOUTH , DUBAI	Café	Restaurant	Middle Eastern Restaurant	Bakery	Seafood Restaurant	Burger Joint	Lebanese Restaurant	Breakfast Spot	Indian Restaurant	Turkish Restaurant
4	BARSHAA , DUBAI	Café	Restaurant	Seafood Restaurant	Middle Eastern Restaurant	Italian Restaurant	Bakery	African Restaurant	Thai Restaurant	French Restaurant	Asian Restaurant

Methodology and Results - K - means clustering

- ▶ K-Means Clustering - a type of unsupervised learning which can be used to find groups within unlabeled data.
- ▶ Divides the data into clusters - “a collection of data points aggregated together because of certain similarities”
- ▶ k means clustering would allow
 - ▶ 1) Neighborhood segmentation
 - ▶ 2) Understand the distribution of restaurants
 - ▶ 3) Identify underserved neighborhoods

Methodology and Results - K - means clustering

- ▶ Data standardized by finding mean frequencies of restaurant categories
- ▶ Number of clusters used were 5
- ▶ Each neighborhood color coded on the map according to the cluster it belongs to
- ▶ most neighborhoods geographically close to each other are clustered into one.



K-Means clustered neighborhoods

Methodology and Results - K - means clustering

Cluster	1 st Most Common Venue	2 nd Most Common Venue	3 rd Most Common Venue	4 th Most Common Venue	5 th Most Common Venue	6 th Most Common Venue	7 th Most Common Venue	8 th Most Common Venue	9 th Most Common Venue	10 th Most Common Venue
1	Restaurant	Café	Lebanese Restaurant	French Restaurant	Sushi Restaurant	South American Restaurant	Diner	Fast food Restaurant		
2	Café	Restaurant	Middle Eastern Restaurant	Burger Joint	Italian Restaurant	Bakery	Indian Restaurant	French Restaurant	Seafood Restaurant	Breakfast spot
3	Middle Eastern Restaurant	Indian Restaurant	Café	Restaurant	Fast Food Restaurant	Asian Restaurant	Bakery	Seafood Restaurant	Japanese Restaurant	Sandwich Place
4	Fast Food Restaurant	Café	Restaurant	Italian Restaurant	Pizza Place	Indian Restaurant	Sandwich Place	Burger Joint	Middle Eastern Restaurant	Chinese Restaurant
5	Café	Middle Eastern Restaurant	Chinese Restaurant	Fast Food Restaurant	Burger Joint	Sandwich Place	Indian Restaurant	Pizza Place	Restaurant	Bakery

Most Common Venues in Clusters

Methodology and Results - Breakfast spot

- ▶ Only cluster 2 has breakfast spots in the top 10 categories.
- ▶ Cluster 3 has varieties of restaurants but underserved for breakfast spot
- ▶ Cluster 1, 4 and 5 far from city and mostly include industrial areas of Dubai
- ▶ Most populated neighborhoods in this cluster underserved for breakfast spot
- ▶ These neighborhoods can be a starting point for a reasonable location for opening a breakfast spot
- ▶ Other factors should be researched.

	Neighborhood	Breakfast Spot	Total Restaurants	Total population
20	MUHAISANAH , DUBAI	1	100	196316
9	NAHDA , DUBAI	1	100	93385
18	HOR AL ANZ, DUBAI	2	100	83187
4	KARAMA, DUBAI	2	100	75066
10	QUSAIS , DUBAI	1	100	65292

Most populated neighborhoods of cluster 3

Discussion

- ▶ Summarized the different categories of restaurants in neighborhoods of Dubai using foursquare
- ▶ Different ethnic cuisines - reflection of the multicultural community
- ▶ Clustered different neighborhoods based on surrounding food venues.
- ▶ Interestingly, neighborhoods that are geographically close are also homogenous in their surrounding food venues and tend to have the same food environment.
- ▶ Identified an underserved region for a breakfast spot in Dubai.

Conclusion

- ▶ Dubai is home to many different cuisines and has something to suit all tastes.
- ▶ Foursquare is a useful platform to discover venue information.
- ▶ Future studies should leverage platforms like foursquare for a deeper understanding of how venues are related to other factors in the society, for instance, relationship of obesity and density of restaurants in a place.

The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the left and right sides of the frame, creating a modern, dynamic feel. The central area is a plain, light grayish-white.

Thank you