

## Coursera Capstone – “The Battle of the Neighborhoods”

Comparative analysis using location data via Foursquare.

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### Problem Statement

Due to its central geographic location and generally welcoming climate, Dubai is known for its international atmosphere. It is home to close to 2.5 Million expatriates who make up 90% of the total population<sup>1</sup> and it hosts close to 15 Million visitors per year.<sup>2</sup> In addition to its multi-cultural population and capital flows, Dubai is becoming well known as a destination of choice for great food. It is a place where people can rest and try the best of each culture, either while they work here temporarily, or if they are just passing through.

The mission of this project is to use Foursquare location data and regional clustering of venue information to determine what might be the ‘best’ neighborhood in Dubai to open a restaurant. As a westerner who has a passion for good Mexican food, I have found that there is not a lot of selection in the region. This is supported by the fact that a review of Foursquare venues reveals zero Mexican restaurants listed on the site.

My proposal, then, is an analysis of the neighborhoods in Dubai for the consideration of opening a new Mexican restaurant. The objective is to have a location that is within one of the more reasonable rent zones, but also within a close enough range (5km) to a ‘high’ rent zone. The assumption that proximity to high rent neighborhoods would result in takeout opportunities or provide residents an option to travel to our restaurant.

### Data Overview

The data that we will use for this analysis is a combination of a CSV file that has been prepared for the purposes of the analysis from multiple sources (Dubai\_neighborhoods.csv) and the location/venue information in foursquare.

We will first determine the most likely neighborhoods for a restaurant based on average rental prices and relative distance to a high rent center. In the case of Dubai, the three highest rent averages can be found in Palm Jumeirah, Jumeirah, and Zabeel. We will then consider the total number of venues and additional criteria such as proximity to a shopping center or offices for mid-day traffic to make a final determination.

### *Dubai\_neighborhoods.csv*

The first step in data preparation is to establish the neighborhoods in Dubai and a summary of their average rental prices. The average rental index is published annually and can be referenced by a number of different websites.<sup>3</sup> We then make a calculation of the ‘Z-score’ to standardize the data and sort from lowest to highest average rent. Using google, I looked up the latitude and longitude of each neighborhood and entered it. This information is used to calculate the distance

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<sup>1</sup> <https://www.dsc.gov.ae/en-us/Themes/Pages/Population-and-Vital-Statistics.aspx>

<sup>2</sup> <https://www.statista.com/statistics/284636/visitor-arrivals-in-dubai-from-international-destinations/>

<sup>3</sup> <https://www.propertymonitor.ae/research/uae-communities-index/dubai-rental-index.html>

of each neighborhood from the highest rent regions and will also be entered to the Foursquare database for venue query later.

Neighborhood	Avg Rent Per Unit	Z-Score	Average Distance from High Rent Areas			Latitude	Longitude	Low Rent Avg
			Distance from Palm	Distance from Zabeel	Distance from Jumeirah			
Discovery Gardens	44,672	-1.53	8.18	26.15	20.73	25.039	55.1445	<div>High Rent Avg</div>
Dubai Silicon Oasis	54,417	-1.30	24.96	13.31	16.39	25.1279	55.3863	
Jumeirah Village Circle	60,068	-1.17	9.16	20.56	16.13	25.0602	55.2094	
Dubai Sports City	62,753	-1.10	11.36	22.32	18.28	25.0391	55.2176	
Remraam	67,284	-0.99	16.71	25.27	22.27	25.0014	55.2508	
Al Furjan	73,648	-0.84	9.70	27.28	22.02	25.0252	55.1459	
Jumeirah Village Triangle	82,014	-0.64	8.87	22.78	18.04	25.0473	55.19	
Motor City	83,876	-0.60	12.61	20.90	17.42	25.045	55.2397	
Damac Hills	94,630	-0.34	16.40	22.41	19.37	25.0275	55.2524	
Al Sufouh	95,804	-0.31	0.70	17.88	12.02	25.1134	55.1762	
DIFC	105,183	-0.09	17.86	3.02	3.57	25.2106	55.2794	
Business Bay	105,682	-0.08	15.61	5.55	3.45	25.1832	55.2729	
Jumeirah Lakes Towers	106,352	-0.06	4.80	23.80	18.03	25.0693	55.1417	
Barsha Heights	111,804	0.07	4.10	19.08	13.48	25.097	55.1776	
Emirates Living	114,422	0.13	7.82	23.43	18.36	25.0496	55.174	
Dubai Marina	115,236	0.15	3.55	23.02	17.12	25.0805	55.1403	
Dubai Investments Park	116,379	0.18	15.30	30.13	25.71	24.979	55.1762	
Jumeirah Beach Residence	143,520	0.83	3.97	23.75	17.82	25.0769	55.1341	
Dubai Festival City	151,341	1.02	25.23	5.60	11.81	25.2171	55.3614	
Downtown	153,546	1.07	16.77	4.19	3.41	25.195	55.2784	
Zabeel	176,213	1.61	20.84	0.00	6.57	25.2231	55.3061	
Jumeirah	180,180	1.71	14.59	6.57	0.00	25.2016	55.2453	
Palm Jumeirah	204,430	2.29	0.00	20.84	14.59	25.1124	55.139	

The csv is stored can be found at: [https://github.com/talentric/coursera\\_capstone/](https://github.com/talentric/coursera_capstone/)

Venue 'type' frequency using Foursquare:

Using clustering techniques developed in prior exercises in the capstone project, we will examine the most common venues by neighborhood listed in Foursquare. When we cluster the data together and rank by 'most common', it appears that Mexican venues not registered in any of the neighborhoods, so it is safe to assume there would be minimum competition.



Map of Dubai neighborhoods using Folium

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Business Bay	Restaurant	Middle Eastern Restaurant	Italian Restaurant	Tapas Restaurant	Chinese Restaurant
1	Deira	Asian Restaurant	Indian Restaurant	Vietnamese Restaurant	Japanese Restaurant	Brazilian Restaurant
2	Downtown	Middle Eastern Restaurant	American Restaurant	Restaurant	Asian Restaurant	Turkish Restaurant
3	Dubai Marina	Middle Eastern Restaurant	Italian Restaurant	Asian Restaurant	Restaurant	French Restaurant
4	Jebel Ali	Italian Restaurant	Seafood Restaurant	Ethiopian Restaurant	Indonesian Restaurant	Indian Restaurant
5	Jumeirah Beach	Restaurant	Thai Restaurant	Sushi Restaurant	Moroccan Restaurant	English Restaurant
6	Jumeirah Lake Towers	Italian Restaurant	Vietnamese Restaurant	Modern European Restaurant	Greek Restaurant	Indian Restaurant
7	Media City	Middle Eastern Restaurant	Italian Restaurant	French Restaurant	Fast Food Restaurant	Indonesian Restaurant
8	Old Dubai	Middle Eastern Restaurant	Vietnamese Restaurant	Fast Food Restaurant	Indonesian Restaurant	Indian Restaurant
9	Palm Jumeirah	Restaurant	Seafood Restaurant	Indian Restaurant	Brazilian Restaurant	English Restaurant

The remaining steps in the capstone project will be to evaluate which neighborhood is most suited using the criteria shown above: the rent index of the neighborhood is close to the mean average rent in Dubai, the neighborhood's is located close to a 'high rent' neighborhood, the general restaurant frequency in the neighborhood is reasonable, and proximity to 'other' venues such as business centers or malls is maximized.