

# Predicting a Preferred Location for Restaurant in Dubai

*Presenting*

## The Battle of Neighborhoods

*A part of*

IBM - Applied Data Science Capstone

*Submitted by*

Sharvari Upasani

November 26, 2019

# Predicting a location for Location in Dubai

## *Why near Metro Station?*

- ❖ Dubai is a cosmo-politan city with diversified cultures.
- ❖ About 70% of Dubai's population is of expatriates, who belong to different countries and prefer trying various food cuisines.
- ❖ There are plenty of people travelling by metro.
- ❖ The restaurant location can be decided considering the utility as well as convenience of people.
- ❖ As metro is Dubai's lifeline, let's consider a restaurant to be opened close to metro station.

# Data Acquisition & Cleaning

❖ We shall use data from Two sources :-

## 1. Bayanat.ae

The data for Dubai metro stations & metro riders is scrapped & processed from

- [http://data.bayanat.ae/en\\_GB/dataset/metro-stations/resource/666412a8-3383-47df-b521-c70150698e6a](http://data.bayanat.ae/en_GB/dataset/metro-stations/resource/666412a8-3383-47df-b521-c70150698e6a)
- [http://data.bayanat.ae/en\\_GB/dataset/metro-ridership/resource/c9e51547-7f43-4475-9d35-17e0fc5e9eb2](http://data.bayanat.ae/en_GB/dataset/metro-ridership/resource/c9e51547-7f43-4475-9d35-17e0fc5e9eb2)

## 2. Foursquare API

- We'll collect different latitude longitudes of multiple metro stations.
- We'll try to compare their neighborhoods using Foursquare API.

# Modifying, Cleaning & Analyzing the Data

## Metro Stations

	Station	Line	Longitude	Latitude
0	World Trade Centre Metro Station	Red	55.285061	25.224829
1	Emirates Towers Metro Station	Red	55.279821	25.217214
2	Financial Centre Metro Station	Red	55.275587	25.211030
3	Burj Khalifa/ Dubai Mall Metro Station	Red	55.269518	25.201401
4	Business Bay Metro Station	Red	55.260419	25.191275

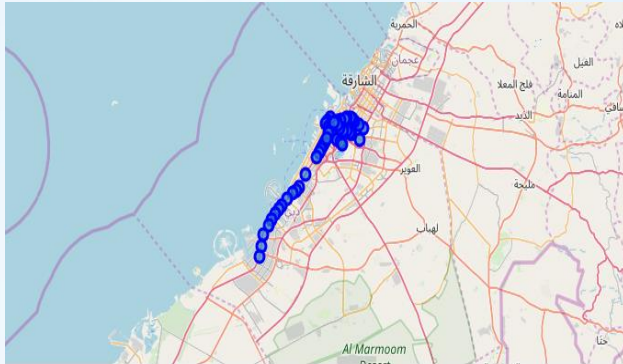
## Metro Riders

	Station	Line	Longitude	Latitude	Date	Trips
0	World Trade Centre Metro Station	Red	55.285061	25.224829	2017-11-04	11982
1	Emirates Towers Metro Station	Red	55.279821	25.217214	2017-11-04	13963
2	Financial Centre Metro Station	Red	55.275587	25.211030	2017-11-04	14687
3	Burj Khalifa/ Dubai Mall Metro Station	Red	55.269518	25.201401	2017-11-04	38862
4	Business Bay Metro Station	Red	55.260419	25.191275	2017-11-04	27444
5	Noor Bank Metro Station	Red	55.228509	25.155727	2017-11-04	27655
6	FGB Metro Station	Red	55.207898	25.126721	2017-11-04	18579
7	Mall of the Emirates Metro Station	Red	55.200443	25.121231	2017-11-04	39320
8	Sharaf DG Metro Station	Red	55.190931	25.114809	2017-11-04	14505

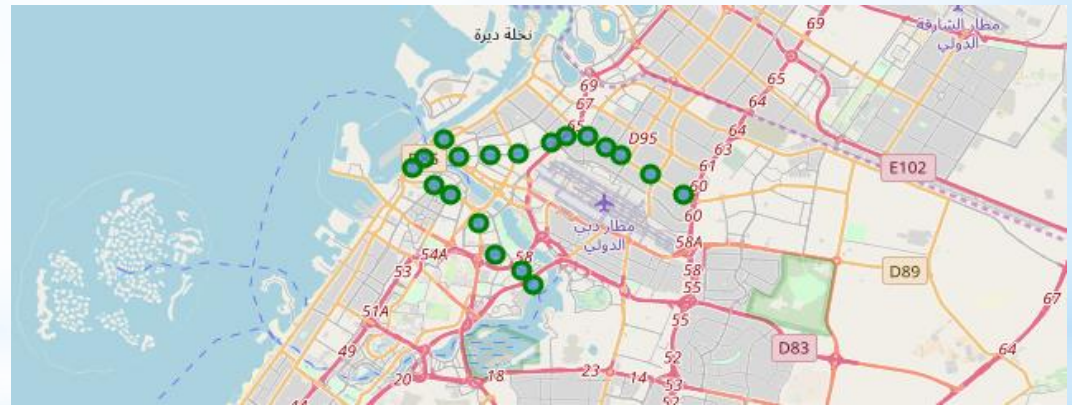
### *Scrapped Data frame showing Metro Trips after Merging*

	Station	Line	Longitude	Latitude	Date	Trips
0	World Trade Centre Metro Station	Red	55.285061	25.224829	2017-11-04	11982
1	Emirates Towers Metro Station	Red	55.279821	25.217214	2017-11-04	13963
2	Financial Centre Metro Station	Red	55.275587	25.211030	2017-11-04	14687
3	Burj Khalifa/ Dubai Mall Metro Station	Red	55.269518	25.201401	2017-11-04	38862
4	Business Bay Metro Station	Red	55.260419	25.191275	2017-11-04	27444
5	Noor Bank Metro Station	Red	55.228509	25.155727	2017-11-04	27655
6	FGB Metro Station	Red	55.207898	25.126721	2017-11-04	18579
7	Mall of the Emirates Metro Station	Red	55.200443	25.121231	2017-11-04	39320
8	Sharaf DG Metro Station	Red	55.190931	25.114809	2017-11-04	14505

# Dubai Metro Map



# Dubai Metro Lines



# Finding Neighborhoods with most & least trips

*Data frame showing least metro trips Dubai*

	Station	Line	Longitude	Latitude	Date	Trips
13	Nakheel Harbour & Tower Metro Station	Red	55.127173	25.057853	2017-11-04	1497
37	Creek Metro Station	Green	55.338953	25.218949	2017-11-04	2923

- The intersection of both Green & Red Metro lines is Burjaman. This metro station has max number of trips.

*Data frame showing most metro trips Dubai*

	Station	Line	Longitude	Latitude	Date	Trips
32	BurJuman Metro Station	Green	55.304253	25.254856	2017-11-04	64269
33	BurJuman Metro Station	Red	55.304253	25.254856	2017-11-04	64269



# Exploring Neighborhoods having least trips

*Data frame showing Nakheel Harbour Metro station - Neighborhoods*

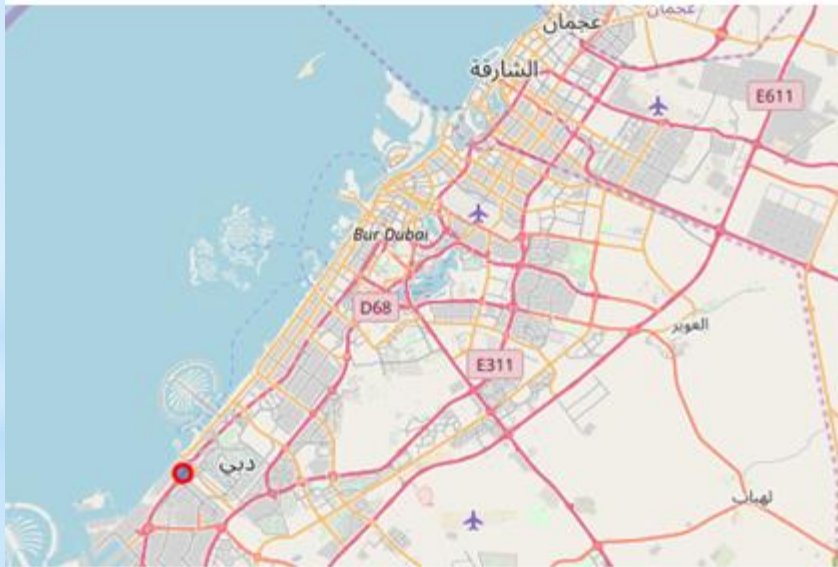
	name	categories	lat	lng	distance
0	McDonald's	Fast Food Restaurant	25.057769	55.127391	23
1	Nakheel Harbour & Tower Metro Station (محطة ناع...	Metro Station	25.057951	55.127259	13
2	Canali Boutique	Men's Store	25.060925	55.128980	387
3	Arz's tent	Trail	25.061336	55.129579	457
4	Last Exit Dubai	Bistro	25.061697	55.129670	496

*Data frame showing Dubai Creek Metro station - Neighborhoods*

	name	categories	lat	lng	distance
0	Creek Metro Station (محطة الخور)	Metro Station	25.218915	55.339029	8
1	Jadaf Pier	Harbor / Marina	25.219566	55.337019	206
2	Dubai Maritime city	Harbor / Marina	25.220886	55.337834	243
3	Al Jadaf Marine Transport Station	Boat or Ferry	25.216270	55.341010	363
4	Freez Ice Cream - Al Jaddaf	Ice Cream Shop	25.221217	55.335346	442
5	Premier Inn Al Jadaf	Hotel	25.218785	55.334404	458
6	Goldstate Hotel	Hotel	25.221015	55.334680	487

# Distance of other neighborhoods from the selected location

Map showing **Nakheel Harbour Metro Station** from Bur Dubai



Map showing **Dubai Creek Metro Station** from Bur Dubai





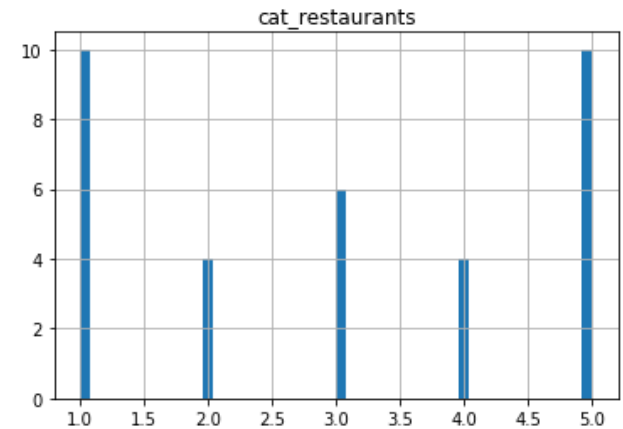
# K-Nearest Neighbor Classification Model

- We have a list of Restaurants with the latitude, longitude, distance. We'll give a numeric value to categories.

*Data frame showing Burjuman Metro Station – Restaurants*

	name	categories	lat	lng	distance	cat_restaurants
13	Olive Gourmet	Middle Eastern Restaurant	25.254631	55.303768	54	3
24	Mr Chaat	Indian Restaurant	25.254322	55.304618	69	5
11	Aryaas Veg Restaurant	Vegetarian / Vegan Restaurant	25.255373	55.303743	77	1
63	Ravi Darbar	Asian Restaurant	25.254391	55.304898	83	5
46	Pita Restaurant	Asian Restaurant	25.254432	55.305111	98	5
39	GRK Fresh Greek Burjuman	Greek Restaurant	25.254017	55.303518	119	1
41	Al Ustad Special Kabab	Persian Restaurant	25.255458	55.303137	130	1
44	YOI Sushi	Sushi Restaurant	25.253792	55.303534	138	1
56	KFC	Fast Food Restaurant	25.253985	55.303098	151	3
53	Nando's	African Restaurant	25.253682	55.303324	160	1

*Graph showing Burjuman Metro Station Restaurant Categories*

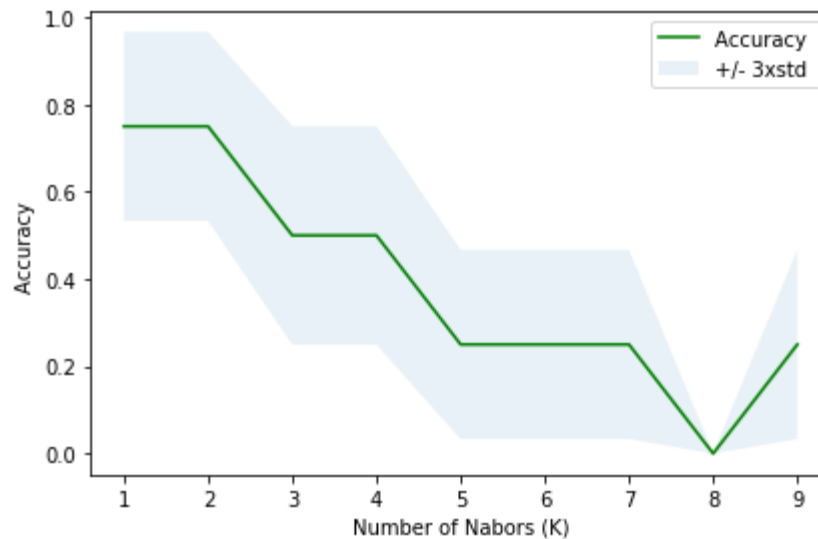


# Type of restaurants in the locality of Burjuman metro station

*Data frame showing Restaurants based on Distance*

	name	categories	lat	lng	distance	cat_restaurants
13	Olive Gourmet	Middle Eastern Restaurant	25.254631	55.303768	54	3
24	Mr Chaat	Indian Restaurant	25.254322	55.304618	69	5
11	Aryaas Veg Restaurant	Vegetarian / Vegan Restaurant	25.255373	55.303743	77	1
63	Ravi Darbar	Asian Restaurant	25.254391	55.304898	83	5
46	Pita Restaurant	Asian Restaurant	25.254432	55.305111	98	5
39	GRK Fresh Greek Burjuman	Greek Restaurant	25.254017	55.303518	119	1
41	Al Ustad Special Kabab	Persian Restaurant	25.255458	55.303137	130	1
44	YOI Sushi	Sushi Restaurant	25.253792	55.303534	138	1
56	KFC	Fast Food Restaurant	25.253985	55.303098	151	3
53	Nando's	African Restaurant	25.253682	55.303324	160	1
28	McDonald's	Fast Food Restaurant	25.253920	55.302908	170	3
40	Teriyaki Boy	Japanese Restaurant	25.253289	55.303350	196	1
27	Rocky's Cafe	Asian Restaurant	25.253096	55.303884	199	5
1	Jollibee	Fast Food Restaurant	25.253250	55.303333	201	3
18	Nanking	Asian Restaurant	25.252908	55.303574	227	5

# KNN Classification Model



Train set Accuracy: 1.0  
Test set Accuracy: 0.75

The best accuracy was with 0.75 with  $k=1$

# Conclusion

- A restaurant near metro station will be beneficial for customers & metro commuters.
- We can open a restaurant where there is more number of metro users.
- We are able to predict cuisines which will be most suitable for the Restaurant.
- We can have a multi-cuisine restaurant at the heart of Dubai which is expected to have less setup cost, more utility and more profit as well.

# Drawbacks

- There are fewer restaurants where metro users are less.
- We do require additional data to support this argument. We do have enough restaurants in the crowd area of Dubai which is Burjuman.

\*Thank You!