

The-battle-of-neighborhoods Report

Introduction:

Riyadh, my hometown, is the capital city of Saudi Arabia and its the third-largest city in the Arab world and the 39th-largest in Asia. Riyadh is the political and administrative center of Saudi Arabia and is the headquarters of the country's central government bodies, such as the Saudi Royal Court and the Council of Ministers of Saudi Arabia.

Riyadh is of great economic importance, as it is the headquarters of many banks and major companies. It is also the location of the King Abdullah Financial District, one of the world's largest financial centers.

Business Problem:

My report is for those who are want to move for a new home or apartment in the city of Riyadh, I will provide a suggestion on what would be the best districts in specifically in north of Riyadh and Comparison between them in terms of near venues within 2 km.

most of the luxury or fancy districts are in the north of the city so if someone thinks to move there it will be kind of confusion of how he should decide that decision. so this report will help this kind of people to compare between each one based on their interests and favorites venues.

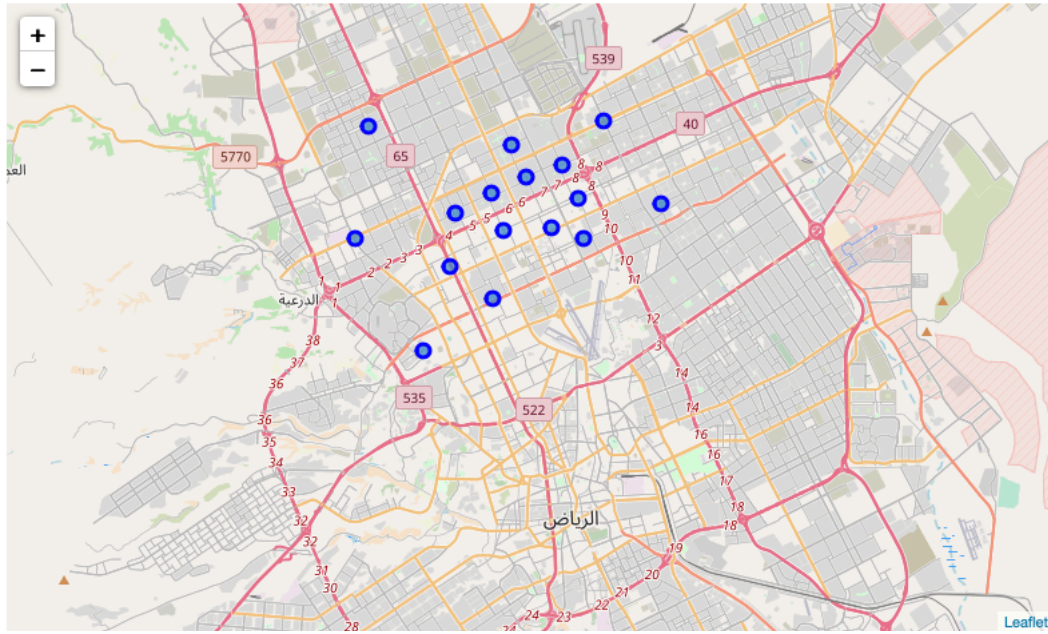
Data source:

The data that I have been used are actually gathered manually since I didn't find any dataset or website that provide a list of the neighborhoods and the coordinates of them. so I collect a list of the northern districts and find the coordinates using google

District	latitude	longitude
Al Izdihar	24.7803	46.7189
Al-Masif	24.7656	46.6803
Al-Mugharrazat	24.7617	46.7214
Al-Nakheel	24.7489	46.6527
Al-Malga	24.8143	46.6107
Hittin	24.762	46.6038
Al-Wadi	24.7905	46.6919
Al-Ghadir	24.7734	46.6552
Al-Nafil	24.783	46.6738
Al-Hamra	24.7783	46.7614
Qortubah	24.8166	46.732
Al-Ra'id	24.7092	46.6387
King Fahd District	24.7338	46.6744
al-nada	24.8057	46.6844
al taawon	24.7666	46.7051
alflah	24.796	46.7101

Methodology:

Since we have 16 districts from northern of Riyadh, I visualize the location of these districts By using folium library and we can notice that all the districts are in the north of the city as the figure shown below:



- Data acquisition:

The Foursquare API was used to looking for nearby venues of each neighborhood in a radius of 2 km. After obtaining the data about venues, I have counted the unique categories among all of the neighborhoods, we have 177 unique categories And grouped the data based on Districts

- Data analysis:

after grouping the data based on Districts, I encoding the features by using get_dummies function to convert the data into binary form (0 or 1) for each venue and take the mean for all districts as shown below :

	District	Afghan Restaurant	American Restaurant	Arepa Restaurant	Art Gallery	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Au
0	Al Izdihar	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.0
1	Al-Ghadir	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.0
2	Al-Hamra	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0
3	Al-Malga	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	Al-Masif	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.0
5	Al-Mugharrizat	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	Al-Nafil	0.00	0.01	0.00	0.01	0.00	0.00	0.01	0.0
7	Al-Nakheel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0
8	Al-Ra'id	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.0
9	Al-Wadi	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0
10	Hittin	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.0
11	King Fahd District	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.0
12	Qortubah	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.0
13	al taawon	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.0
14	al-nada	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
15	alfiah	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0

To summarize the data, I take the top 5 most common venues for each district

```

----al taawon----
      venue  freq
0  Coffee Shop  0.18
1  Ice Cream Shop  0.06
2  Dessert Shop  0.04
3    Pharmacy  0.04
4      Café  0.04

----al-nada----
      venue  freq
0  Coffee Shop  0.24
1      Café  0.06
2  Burger Joint  0.05
3    Restaurant  0.05
4  Dessert Shop  0.05

```

After encoding the data frame i get it is the districts with the top 10 venues as columns

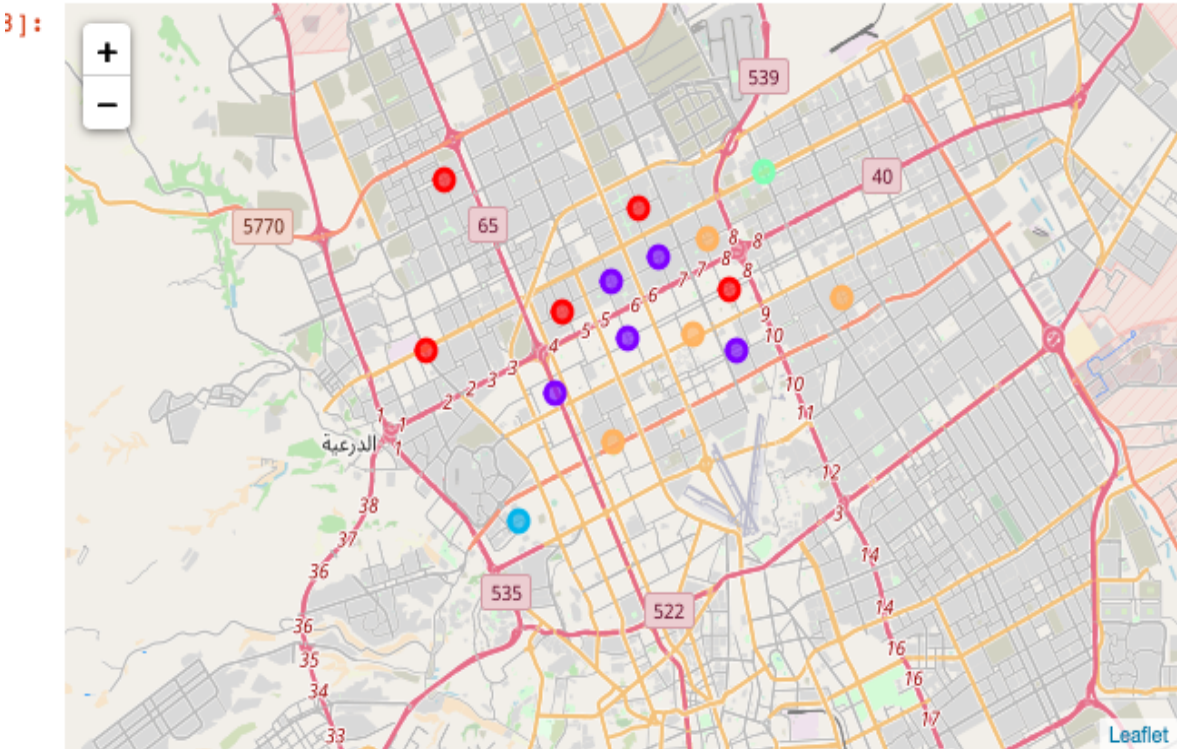
10

District	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
Al Izdihar	Coffee Shop	Juice Bar	Dessert Shop	Cosmetics Shop	Pharmacy	Breakfast Spot	Shopping Mall	Chocolate Shop
Al-Ghadir	Coffee Shop	Dessert Shop	Burger Joint	Café	Donut Shop	Ice Cream Shop	Gym / Fitness Center	Hotel
Al-Hamra	Coffee Shop	Dessert Shop	Pizza Place	Pharmacy	Ice Cream Shop	Donut Shop	Gym / Fitness Center	Juice Bar
Al-Malga	Coffee Shop	Burger Joint	Pharmacy	Café	Supermarket	Bakery	Restaurant	Food Truck
Al-Masif	Coffee Shop	Donut Shop	Breakfast Spot	Middle Eastern Restaurant	Fast Food Restaurant	Candy Store	Bookstore	Juice Bar
Al-gharrazat	Coffee Shop	Burger Joint	Juice Bar	Bakery	Donut Shop	Supermarket	Dessert Shop	Pharmacy
Al-Nafil	Coffee Shop	Donut Shop	Dessert Shop	Café	Juice Bar	Burger Joint	Gym / Fitness Center	Bakery
Al-Nakheel	Coffee Shop	Bakery	Ice Cream Shop	Dessert Shop	Donut Shop	Grocery Store	Breakfast Spot	Café
Al-Ra'id	Coffee Shop	Dessert Shop	Donut Shop	Middle Eastern Restaurant	Burger Joint	Food Truck	Hotel	Pizza Place
Al-Wadi	Coffee Shop	Restaurant	Dessert Shop	Donut Shop	Café	Gym	Pharmacy	Ice Cream Shop
Hittin	Food Truck	Coffee Shop	Café	Italian Restaurant	Plaza	French Restaurant	Restaurant	Tea Room
King Fahd District	Coffee Shop	Jewelry Store	Gift Shop	Pharmacy	Donut Shop	Furniture / Home Store	Breakfast Spot	Bakery
Qortubah	Coffee Shop	Ice Cream Shop	Plaza	Burger Joint	Pharmacy	Italian Restaurant	Donut Shop	Bakery
al taawon	Coffee Shop	Ice Cream Shop	Café	Pharmacy	Dessert Shop	Juice Bar	Hotel	Falafel Restaurant
al-nada	Coffee Shop	Café	Burger Joint	Restaurant	Dessert Shop	Donut Shop	Plaza	Ice Cream Shop
alfiah	Coffee Shop	Donut Shop	Gym / Fitness Center	Ice Cream Shop	Falafel Restaurant	Fast Food Restaurant	Restaurant	Hotel

Then adding the original data set with this dataframe to get full information about each one to preparing for clustering

	District	latitude	longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Al Izdihar	24.7803	46.7189	0	Coffee Shop	Juice Bar	Dessert Shop	Cosmetics Shop	Pharmacy
1	Al-Masif	24.7656	46.6803	1	Coffee Shop	Donut Shop	Breakfast Spot	Middle Eastern Restaurant	Fast Food Restaurant
2	Al-Mugharrazat	24.7617	46.7214	1	Coffee Shop	Burger Joint	Juice Bar	Bakery	Donut Shop
3	Al-Nakheel	24.7489	46.6527	1	Coffee Shop	Bakery	Ice Cream Shop	Dessert Shop	Donut Shop
4	Al-Malga	24.8143	46.6107	0	Coffee Shop	Burger Joint	Pharmacy	Café	Supermarket
5	Hittin	24.7620	46.6038	0	Food Truck	Coffee Shop	Café	Italian Restaurant	Plaza
6	Al-Wadi	24.7905	46.6919	1	Coffee Shop	Restaurant	Dessert Shop	Donut Shop	Café
7	Al-Ghadir	24.7734	46.6552	0	Coffee Shop	Dessert Shop	Burger Joint	Café	Donut Shop
8	Al-Nafil	24.7830	46.6738	1	Coffee Shop	Donut Shop	Dessert Shop	Café	Juice Bar
9	Al-Hamra	24.7783	46.7614	4	Coffee Shop	Dessert Shop	Pizza Place	Pharmacy	Ice Cream Shop
10	Qortubah	24.8166	46.7320	3	Coffee Shop	Ice Cream Shop	Plaza	Burger Joint	Pharmacy
11	Al-Ra'id	24.7092	46.6387	2	Coffee Shop	Dessert Shop	Donut Shop	Middle Eastern Restaurant	Burger Joint
12	King Fahd District	24.7338	46.6744	4	Coffee Shop	Jewelry Store	Gift Shop	Pharmacy	Donut Shop
13	al-nada	24.8057	46.6844	0	Coffee Shop	Café	Burger Joint	Restaurant	Dessert Shop
14	al taawon	24.7666	46.7051	4	Coffee Shop	Ice Cream Shop	Café	Pharmacy	Dessert Shop
15	alflah	24.7960	46.7101	4	Coffee Shop	Donut Shop	Gym / Fitness Center	Ice Cream Shop	Falafel Restaurant

for the clustering process, I have used the K-mean model to cluster the districts into 5 categories as shown :



Results:

- Cluster 0 :

Cluster 0 - Most common venues: Coffee Shop and Food Truck

```
ry_merged.loc[ry_merged['Cluster Labels'] == 0]
```

	District	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
0	Al Izdihar	24.7803	46.7189	0	Coffee Shop	Juice Bar	Dessert Shop	Cosmetics Shop	Pharmacy	E
4	Al-Malga	24.8143	46.6107	0	Coffee Shop	Burger Joint	Pharmacy	Café	Supermarket	
5	Hittin	24.7620	46.6038	0	Food Truck	Coffee Shop	Café	Italian Restaurant	Plaza	Re
7	Al-Ghadir	24.7734	46.6552	0	Coffee Shop	Dessert Shop	Burger Joint	Café	Donut Shop	ic
13	al-nada	24.8057	46.6844	0	Coffee Shop	Café	Burger Joint	Restaurant	Dessert Shop	

- Cluster 1 :

Cluster 1 - Most common venues: Coffee Shop and Donut Shop

```
ry_merged.loc[ry_merged['Cluster Labels'] == 1]
```

	District	latitude	longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1	Al-Masif	24.7656	46.6803	1	Coffee Shop	Donut Shop	Breakfast Spot	Middle Eastern Restaurant	Fast Food Restaurant
2	Al-Mugharrazat	24.7617	46.7214	1	Coffee Shop	Burger Joint	Juice Bar	Bakery	Donut Shop
3	Al-Nakheel	24.7489	46.6527	1	Coffee Shop	Bakery	Ice Cream Shop	Dessert Shop	Donut Shop
6	Al-Wadi	24.7905	46.6919	1	Coffee Shop	Restaurant	Dessert Shop	Donut Shop	Café
8	Al-Nafil	24.7830	46.6738	1	Coffee Shop	Donut Shop	Dessert Shop	Café	Juice Bar

- Cluster 2 :

Cluster 2 - Most common venues: Coffee Shop Dessert Shop

```
ry_merged.loc[ry_merged['Cluster Labels'] == 2]
```

	District	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
11	Al-Ra'id	24.7092	46.6387	2	Coffee Shop	Dessert Shop	Donut Shop	Middle Eastern Restaurant	Burger Joint	Fast Food Restaurant

- Cluster 3 :

Cluster 3 - Most common venues: Coffee Shop and Ice Cream Shop

```
ry_merged.loc[ry_merged['Cluster Labels'] == 3]
```

	District	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
10	Qortubah	24.8166	46.732	3	Coffee Shop	Ice Cream Shop	Plaza	Burger Joint	Pharmacy	Restaurant

- Cluster 4 :

Cluster 4 - Most common venues: Coffee Shop and Pharmacies

```
ry_merged.loc[ry_merged['Cluster Labels'] == 4]
```

	District	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 Common Venue
9	Al-Hamra	24.7783	46.7614	4	Coffee Shop	Dessert Shop	Pizza Place	Pharmacy	Ice Cream Shop	
12	King Fahd District	24.7338	46.6744	4	Coffee Shop	Jewelry Store	Gift Shop	Pharmacy	Donut Shop	Furniture
14	al taawon	24.7666	46.7051	4	Coffee Shop	Ice Cream Shop	Café	Pharmacy	Dessert Shop	Juice
15	alflah	24.7960	46.7101	4	Coffee Shop	Donut Shop	Gym / Fitness Center	Ice Cream Shop	Falafel Restaurant	Fast Resta

The following are the highlights of the 5 clusters above:

- Coffee Shops are clearly located in all clusters for first common venues since the Arabic people love the coffee so we cant use the first column as a unique feature for the districts
- cluster 1 and 4 looks it contains more variety than the rest, which may be important for some people to be close, like the gym, bakery, and supermarket and plaza .
- for the cluster 2 and 3 it seems like not to much options there almost all of venues are shops for food or restaurants

Conclusion:

It may be clear that cluster No. 0 tends to suit the times when people spend their time in visiting upscale places and wonderful coffee stores, but it may not be appropriate because they are far from the individual's basic and daily needs, which may be stressful going daily for long distances to get Simple things, and I suggest group 1 and 4 in my view because it contains a good variety of stores and offers more options.

Ultimately, of course, each person has his own needs and a different lifestyle, some people may be preferred over another based on personal criteria such as closeness to work

This report may be useful for those who were planning to move to a new neighborhood and want to see what they want in their daily life in that neighborhood and decide if it's suitable for them or not