

**The battle of neighborhood**  
**- Riyadh KSA**  
**Report**

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## 1. Problem definition

Investors always want to invest their money wisely. In our case an investor comes to us in order to help him make decision in his investment to open a restaurant in Riyadh and he is looking for the best Specialty (Indian, Arabian, Italian) and the best location for the restaurant

We will try to analyze the available data in order to determine the underserved Locations with restaurants and pick the right specialty and location.

## 2. Data

The data used for this project will be acquired from the Saudi Post website (<http://maps.address.gov.sa/>)

The datasets consists of the neighborhood of Riyadh City with

- Neighborhood Arabic Name
- Neighborhood English Name
- Coordinates of the neighborhood centroid

We will use Selenium for scraping the content

In addition, the Foursquare API search feature will be used to collect neighborhood venues information.

Details about local venues and locality will provide insight into the qualities of a neighborhood.

### 3. Methodology

To search for the ideal locations for opening a Restaurant, the locations of the existing restaurant in North of Riyadh (instead of entire Riyadh in order to limit the range of the data) are necessary.

The coordinates of the neighborhoods in Riyadh will be provided by scraping the address website. <http://maps.address.gov.sa/>

The following steps were taken in the coding to achieve the purpose.

#### 3.1. Web Scraping

Selenium is a good choice to interact with the website by choosing options from dropdown lists. These are the steps:

- Interact with the website to show the form containing the dropdownLists.
- Choose Riyadh from the Region dropdown list
- Choose RIYADH from the City dropdown list
- Extract all the neighborhoods in Riyadh City by calling REST Service and entering the Riyadh City ID

To accomplish our analysis and extracting insights and providing efficient recommendations and results, we will use many python packages:

- Pandas - Library for Data Analysis
- NumPy – Library to handle data in a vectorized manner
- Selenium for scraping dynamic websites
- JSON – Library to handle JSON files
- Geopy – To retrieve Location Data
- Requests – Library to handle http requests
- Matplotlib – Python Plotting Module
- Sklearn – Python machine learning Library
- Folium – Map rendering Library

Locator - National Address Maps

عربي

undefined

Explore Nearby

Advanced Search

Advanced Search

Search By Address

Search For Services

Search By Coordinates

Postal Services Offices

Region

Riyadh

City

RIYADH

District

All

Building No

Additional No

Postal Code

Street

Fill From The Map

Search

24.83342647, 46.72989680

6km

Scale: 288895

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Build 4.0.29

## 4. Results

There are 192 neighborhoods in Riyadh City with below details

	Neighborhood	Longitude	Latitude
0	Al Amal Dist.	46.722685627004	24.6459195903011
1	Al Namudhajiyah Dist.	46.6946166553506	24.6568510439173
2	Al Jarradiyah Dist.	46.6977718129774	24.6170344142602
3	Al Sinaiyah Dist.	46.7472157321497	24.6423874000809
4	Manfuha Al Jadidah Dist.	46.7184625177832	24.6127734900076
5	Al Fakhiriyah Dist.	46.6828304585185	24.6416215786556
6	Al Dirah Dist.	46.7100971796142	24.6323003457292
7	East Umm Al Hamam Dist.	46.6580446242283	24.686458280081
8	Al Sharafiyah Dist.	46.668830074744	24.658654035955
9	Al Hada Dist.	46.6406819928868	24.6607399084176

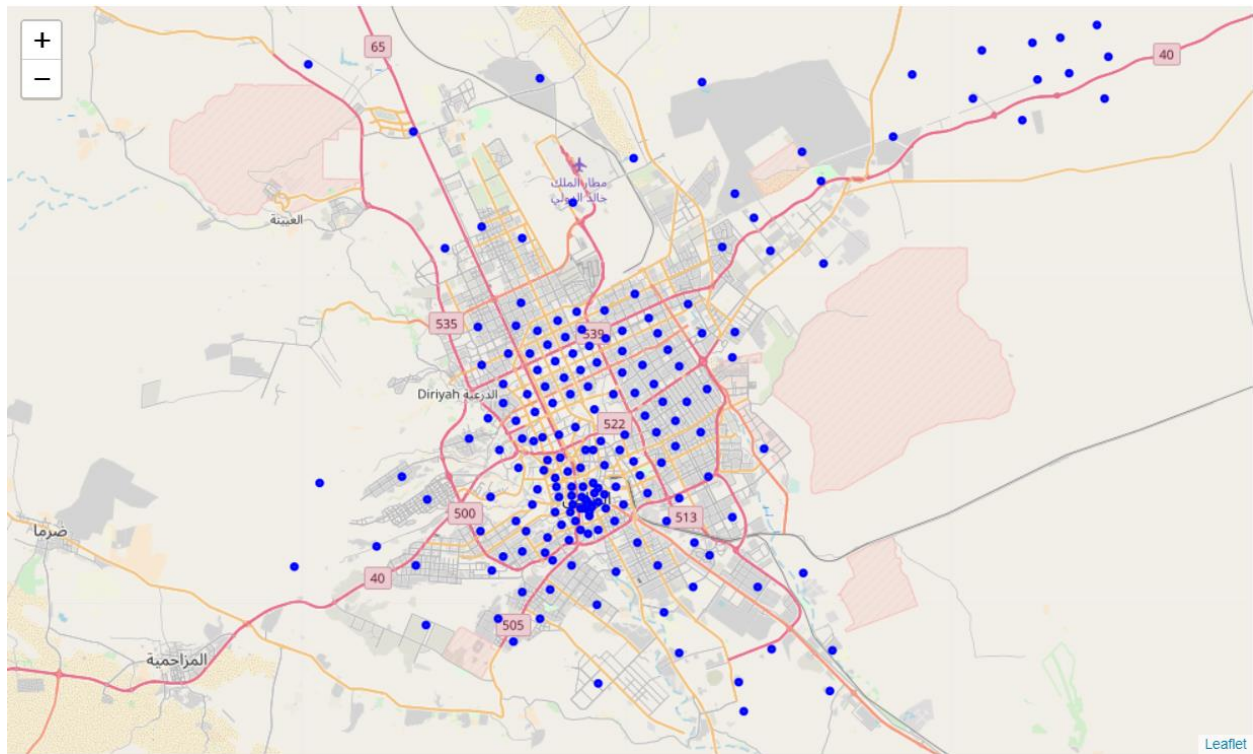
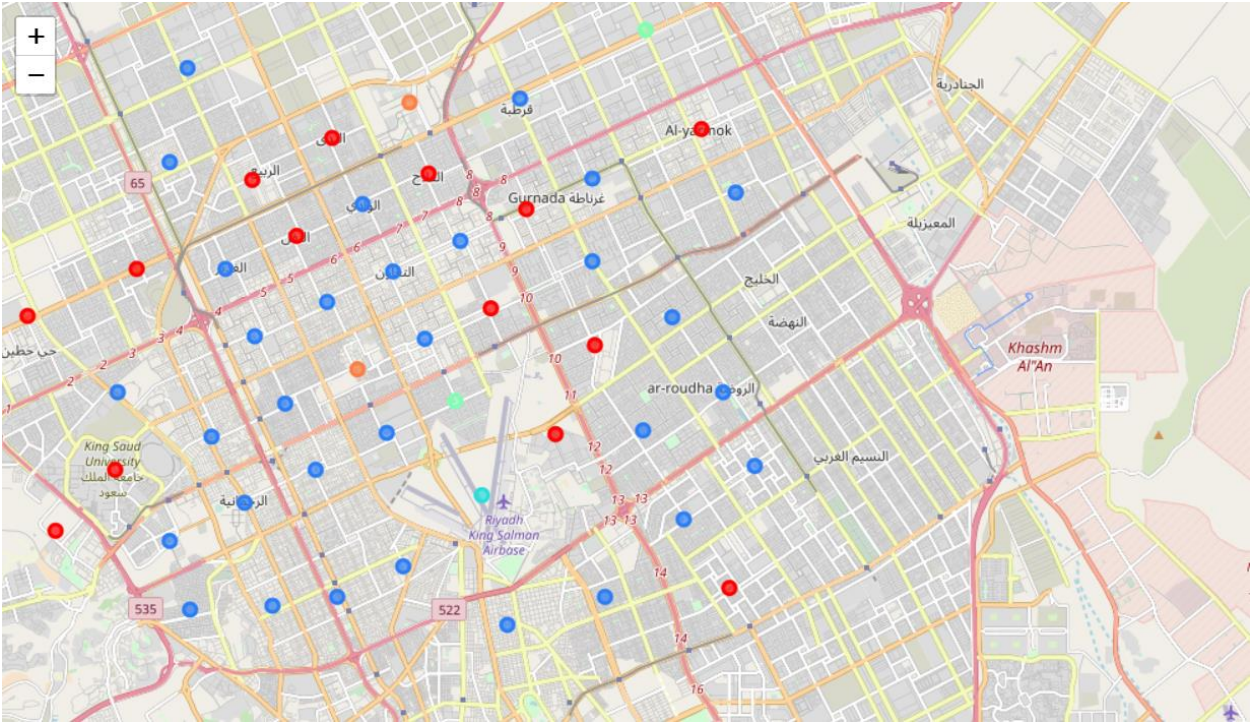


Figure 1: Folium map showing the location of Riyadh Neighborhood



For the study we will choose the neighborhood in North of Riyadh with only 54 neighborhoods

KMeans clustering



We split the neighborhoods into 7 clusters

Cluster1 : 14 neighborhoods.

	Neighborhood	Latitude	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	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
4	Al Shohda Dist.	\$24.78817	0	Hotel	Café	National Park	Dessert Shop	Market	Food Truck	Motel	Bakery	Coffee Shop	Gym
6	Al Falah Dist.	\$24.79702	0	Coffee Shop	Hotel	Donut Shop	Burger Joint	Theater	Food Court	Dumpling Restaurant	Eastern European Restaurant	Dog Run	Discount Store
7	Al Nada Dist.	\$24.80584	0	Women's Store	Park	Coffee Shop	Food Truck	Discount Store	Farm	Food & Drink Shop	Flower Shop	Fish Market	Fish & Chips Shop
12	King Abdullah Dist.	\$24.73323	0	Hotel	Coffee Shop	Flower Shop	Hostel	Airport Terminal	Farm	Food Court	Food & Drink Shop	Accessories Store	Fish Market
21	Al Quds Dist.	\$24.75480	0	Coffee Shop	Gift Shop	Video Game Store	Middle Eastern Restaurant	Fast Food Restaurant	Indian Restaurant	Grocery Store	Restaurant	Breakfast Spot	Supermarket
23	Al Nafel Dist.	\$24.78188	0	Grocery Store	Hotel	Athletics & Sports	Gym	Motel	Park	Hostel	Coffee Shop	Café	Hookah Bar
29	Al Rawabi Dist.	\$24.69527	0	Bakery	Supermarket	Deli / Bodega	Fruit & Vegetable Store	Market	Middle Eastern Restaurant	Dessert Shop	Food Truck	Farmers Market	Tailor Shop
32	Al Rabie Dist.	\$24.79547	0	Health Food Store	Coffee Shop	Market	Mobile Phone Shop	Food Truck	Mountain	Juice Bar	Diner	Paper / Office Supplies Store	Pizza Place
33	Al Mughrazat Dist.	\$24.76412	0	Coffee Shop	Food Truck	Bakery	Motel	Burger Joint	Trail	Italian Restaurant	Frozen Yogurt Shop	Fried Chicken Joint	Gym
34	Al Aqeeq Dist.	\$24.77362	0	Hotel	Coffee Shop	Tailor Shop	Arts & Crafts Store	Shawarma Place	Café	Fast Food Restaurant	Falafel Restaurant	Health Food Store	Middle Eastern Restaurant

Cluster2: 1 neighborhood.

	Neighborhood	Latitude	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	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
49	King Khalid International Airport	\$24.92175	1	Hotel	Food Service	Food & Drink Shop	Flower Shop	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm	Falafel Restaurant

Cluster3: 31 neighborhoods

	Neighborhood	Latitude	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	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
1	North Mathar Dist.	\$24.69113	2	Jewelry Store	Coffee Shop	Clothing Store	Watch Shop	Dessert Shop	Bakery	Ice Cream Shop	Accessories Store	Cosmetics Shop
2	West Umm Al Hamam Dist.	\$24.68997	2	Falafel Restaurant	Breakfast Spot	Middle Eastern Restaurant	Mobile Phone Shop	Supermarket	BBQ Joint	Restaurant	Dessert Shop	Pizza Place
3	Al Rahmaniyah Dist.	\$24.71613	2	Dessert Shop	Chocolate Shop	Coffee Shop	Pharmacy	Optical Shop	Mobile Phone Shop	Flower Shop	Bar	Cupcake Shop
5	King Fahd Dist.	\$24.74062	2	Middle Eastern Restaurant	Breakfast Spot	Pharmacy	Juice Bar	Massage Studio	Market	Flower Shop	Sandwich Place	Café
9	Al Nuzha Dist.	\$24.75643	2	Juice Bar	Coffee Shop	Hotel	Flower Shop	Trail	Burger Joint	Shawarma Place	Breakfast Spot	Dessert Shop
10	Al Woroud Dist.	\$24.72445	2	Café	Middle Eastern Restaurant	Coffee Shop	Gift Shop	Pharmacy	Other Repair Shop	Pizza Place	Breakfast Spot	Salon / Barbershop
11	King Faisal Dist.	\$24.76186	2	Middle Eastern Restaurant	Pharmacy	Pie Shop	Fast Food Restaurant	Ice Cream Shop	Sandwich Place	Restaurant	Electronics Store	Farmers Market
14	Salahuddin Dist.	\$24.73338	2	Café	Sandwich Place	Coffee Shop	Health Food Store	Juice Bar	Breakfast Spot	Restaurant	Dessert Shop	Comic Shop
16	Al Rabwah Dist.	\$24.69330	2	Shawarma Place	Pizza Place	Dessert Shop	Park	Bakery	Juice Bar	Café	Burger Joint	Shopping Plaza
17	Al Muhammadiyah Dist.	\$24.73258	2	Ice Cream Shop	Bakery	Café	Boutique	Coffee Shop	Plaza	Chocolate Shop	Cupcake Shop	Pop-Up Shop
18	Al Sulaimaniyah Dist.	\$24.70076	2	Ice Cream Shop	Café	Burger Joint	Coffee Shop	Dessert Shop	Pizza Place	Italian Restaurant	Japanese Restaurant	Park
19	Al Olaya Dist.	\$24.69310	2	Jewelry Store	Coffee Shop	Boutique	Café	Hotel	Spa	French Restaurant	Cosmetics Shop	Italian Restaurant

Cluster4: 1 neighborhood.

	Neighborhood	Latitude	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	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
15	King Abdulaziz Dist.	\$24.71816	3	Airport Terminal	Women's Store	Event Service	Food & Drink Shop	Flower Shop	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm

Cluster5: 3 neighborhoods.



	Neighborhood	Latitude	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	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
13	Al Wahah Dist.	\$24.74109	4	Food Truck	Hookah Bar	Lounge	Gym / Fitness Center	Event Service	Flower Shop	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market
44	Al Munisiyah Dist.	\$24.83215	4	Farm	Hookah Bar	Market	Lounge	Rental Car Location	Resort	Breakfast Spot	Falafel Restaurant	Women's Store	Flower Shop
48	Al Arid Dist.	\$24.89791	4	Lounge	Hookah Bar	Country Dance Club	Bar	Fast Food Restaurant	Rest Area	Farm	Falafel Restaurant	Flower Shop	Fish Market

## Cluster6: 1 neighborhood .

	Neighborhood	Latitude	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	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
50	Al Narjis Dist.	\$24.88684	5	Hookah Bar	Women's Store	Event Service	Food & Drink Shop	Flower Shop	Fish Market	Fish & Chips Shop	Fast Food Restaurant	Farmers Market	Farm

## Cluster7: 2 neighborhoods .

	Neighborhood	Latitude	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	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
8	Al Mursalat Dist.	\$24.74886	6	Café	Soccer Field	Shopping Mall	Gym Pool	Donut Shop	Mobile Phone Shop	Electronics Store	Athletics & Sports	Farmers Market	Flower Shop
51	Imam Muhammed Bin Saud Islamic University	\$24.81446	6	Café	Food Court	Fast Food Restaurant	Falafel Restaurant	Food & Drink Shop	Flower Shop	Fish Market	Fish & Chips Shop	Farmers Market	Farm

## 5. Discussion

Cluster analysis gives us the same neighborhoods venues and group them Together.

Investors always search for the opportunities where there is scarcity of the service so they can fill the gap.

The best location for a new restaurant will be in underserved (Restaurant service) neighborhoods

If we take a look in our 7 clusters, we note that **cluster6** which has 1 Neighborhood (Al Narjis) has restaurants as the 8<sup>th</sup> Most Common Venue.

We can say that this neighborhood is a good place to open a restaurant.

Our analysis will be more robust if we have other data like census data, with census data we will have additional features like number of restaurant by certain number of people and then more accuracy to do gap analysis

## 6. Conclusion

In our study we fetched the list of Riyadh neighborhood by scraping the address website and determined the top venues for each neighborhood and cluster them together

By performing a gap analysis we found that the most suitable location for opening a new restaurant is cluster6.