Presented by Mohamed Ezz

Relocation between Neighborhoods in KSA Cities

Introduction

- Kingdom of Saudi Arabia (KSA) is an Arab Islamic state, the largest country in the. Capital of Saudi Arabia is Riyadh.

- KSA ranks first in production and reserves of petrol

- Saudi Vision 2030 opening Saudi Arabia further for business will boost productivity and smooth journey to become one of the largest economies

- The Saudi Human Resources Gateway is one of the major initiatives of HRDF that aims to create a leap forward in HR Management practice

- One of innovative services we can add to Saudi HR Gateway providing advising service for people to move and live in one of KSA cities suitable and nicely and suitable .

Problem Description

Now let me explain the context of coursera Capstone project through a an example as following.

- Fahed live on Al Wurud district which is a neighborhood in Jeddah city (one of KSA cities). Fahed love this neighborhood, mainly because of all the great surrounding and environment that exist in this neighborhood, such as burger joint, dessert shop, coffee shops, parks, pharmacies, graduate schools and so on.

- There are lot of opportunity and job offer from a great company in Riyadh city (the capital of KSA) with great career prospects. However, given the far distance from his current place he unfortunately must move if he decide to accept the offer.

- Wouldn't it be great if we are able to help Fahed or any similar person to determine neighborhoods on the other city that are the similar as the current neighborhood, and if not perhaps similar neighborhoods that are at least closer to his new job?

Objective

- The aim of this report is to study and analyze the neighborhoods of both Jeddah and Riyadh cities and group them into similar clusters, to analyze those clusters to gather meaningful information.

- That information can be used to find out Riyadh neighborhoods that are same as current neighborhood in Jeddah or at least similar but .

- This will help any person decide to move from one city to another in same country or different country

Data Description & Preparation

To consider the objective stated, we can list the below data sources used for the analysis.

a)   KSA Neighborhood Data

- The following github project (https://github.com/homaily/Saudi-Arabia-Regions-Cities-and-Districts/tree/master/json) contains Saudi Arabia Regions, Cities and Districts. The data is public data collected from https://maps.address.gov.sa/ as ,all coordinates in (Lat, Lon) This data divided into three parts:
 - regions.json
  - cities.json
  - districts.json

Sample Data

	region_id	name_ar	name_en	population	capital_city_id	Latitude	Longitude
0	1	منطقة الرياض	Riyadh	6777146	3	24.70000	46.73333
1	2	منطقة مكة المكرمة	Makkah	6915006	6	21.42718	39.84349
2	3	منطقة المدينة المنورة	Madinah	1777933	14	24.47058	39.60781
3	4	منطقة القصيم	Qassim	1215858	11	26.33034	43.97436
4	5	المنطقة الشرقية	Eastern Province	4105780	13	26.44199	50.10920

	city_id	region_id	name_ar	name_en	Latitude	Longitude
0	1	7	تبوك	Tabuk	28.41464	36.53387
1	2	7	نعمي	Na'mi	28.30508	35.74931
2	3	1	الرياض	Riyadh	24.70000	46.73333
3	4	7	حميط	Humayt	28.65152	35.38013
4	5	2	الطائف	At Taif	21.26848	40.41667

	district_id	city_id	region_id	name_ar	Neighborhood	Latitude	Longitude	boundaries
0	10100003001	3	1	حي العمل	Al Amal Dist.	24.644966	46.723598	[[24.64900056, 46.7248791], [24.64742521, 46.7...
1	10100003002	3	1	حي النموذجية	Al Namudhajiyah Dist.	24.655615	46.696523	[[24.65018372, 46.70227584], [24.64939455, 46....
2	10100003003	3	1	حي الجرادية	Al Jarradiyah Dist.	24.618815	46.696110	[[24.61729504, 46.70655201], [24.61727163, 46....
3	10100003004	3	1	حي الصناعية	Al Sinaiyah Dist.	24.646447	46.741675	[[24.64061956, 46.75999871], [24.6342299, 46.7...
4	10100003005	3	1	حي منفوحة الجديده	Manfuha Al Jadidah Dist.	24.613354	46.716463	[[24.61343234, 46.72718798], [24.61090205, 46....

Data Description & Preparation

b)   Coordinate data for each Neighborhood in KSA Cities:

- All the venues in each neighborhood in the KSA cities will be collected from Fousquare using Fousquare API By using this api we will get all the venues in each neighborhood. We can filter these venues to get only two cities will be anlyzed.
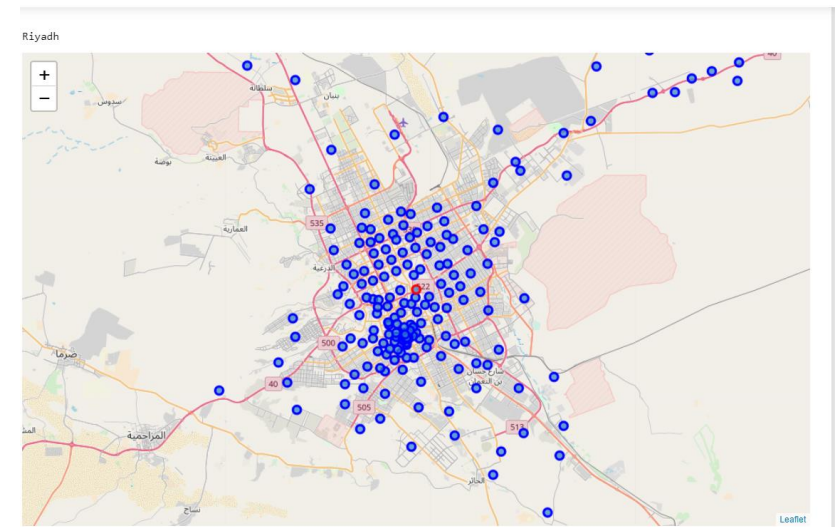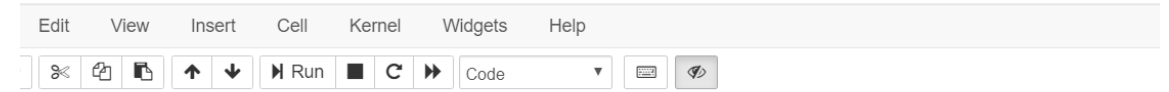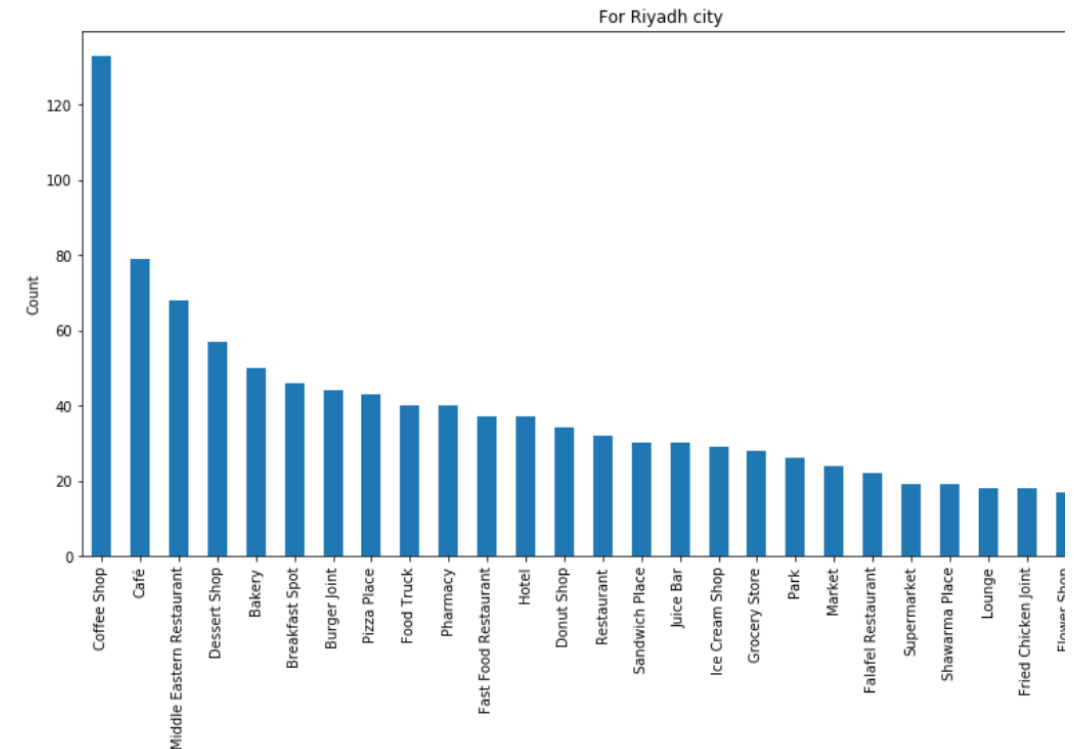
Data Analysis

As shown most common categories in new city:

- Coffee Shop
- Café
- Middle Eastern Restaurant
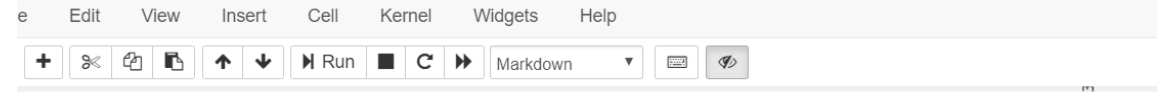- Dessert Shop
- Bakery

Data Analysis

As shown most common categories in current city:

- Coffee Shop
- Café
- Middle Eastern Restaurant
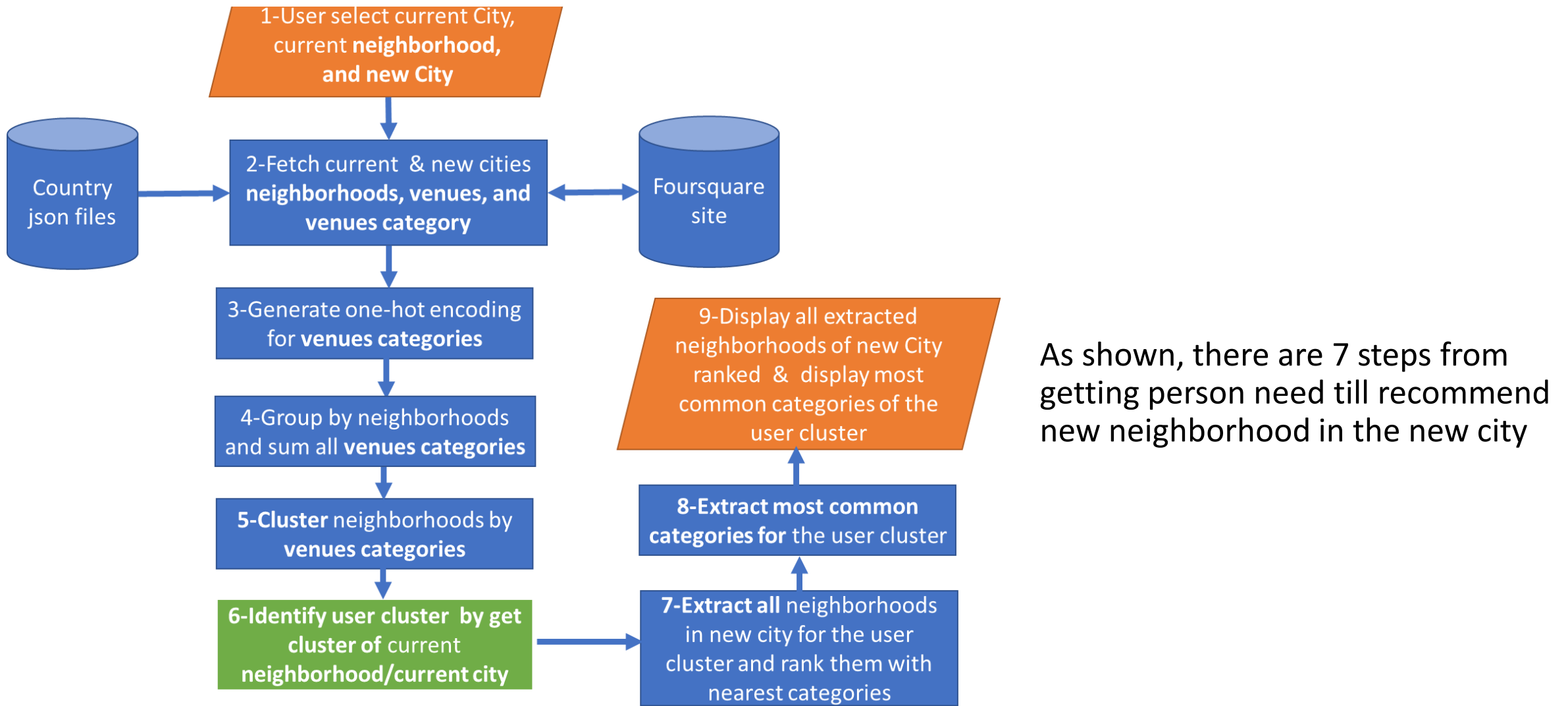- Fast Food
- Dessert Shop
- Hotel

1-User select current City, current neighborhood, and new City

Country json files

2-Fetch current & new cities neighborhoods, venues, and venues category

Foursquare site

3-Generate one-hot encoding for venues categories

4-Group by neighborhoods and sum all venues categories

5-Cluster neighborhoods by venues categories

6-Identify user cluster by get cluster of current neighborhood/current city

7-Extract all neighborhoods in new city for the user cluster and rank them with nearest categories

8-Extract most common categories for the user cluster

9-Display all extracted neighborhoods of new City ranked & display most common categories of the user cluster

As shown, there are 7 steps from getting person need till recommend new neighborhood in the new city
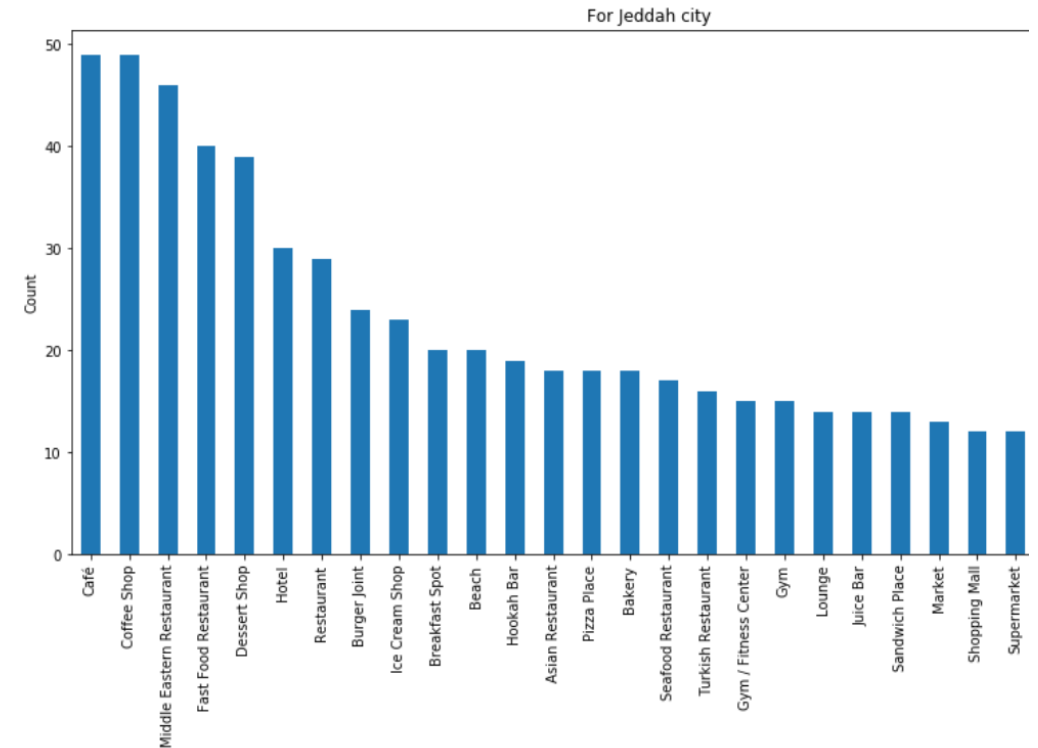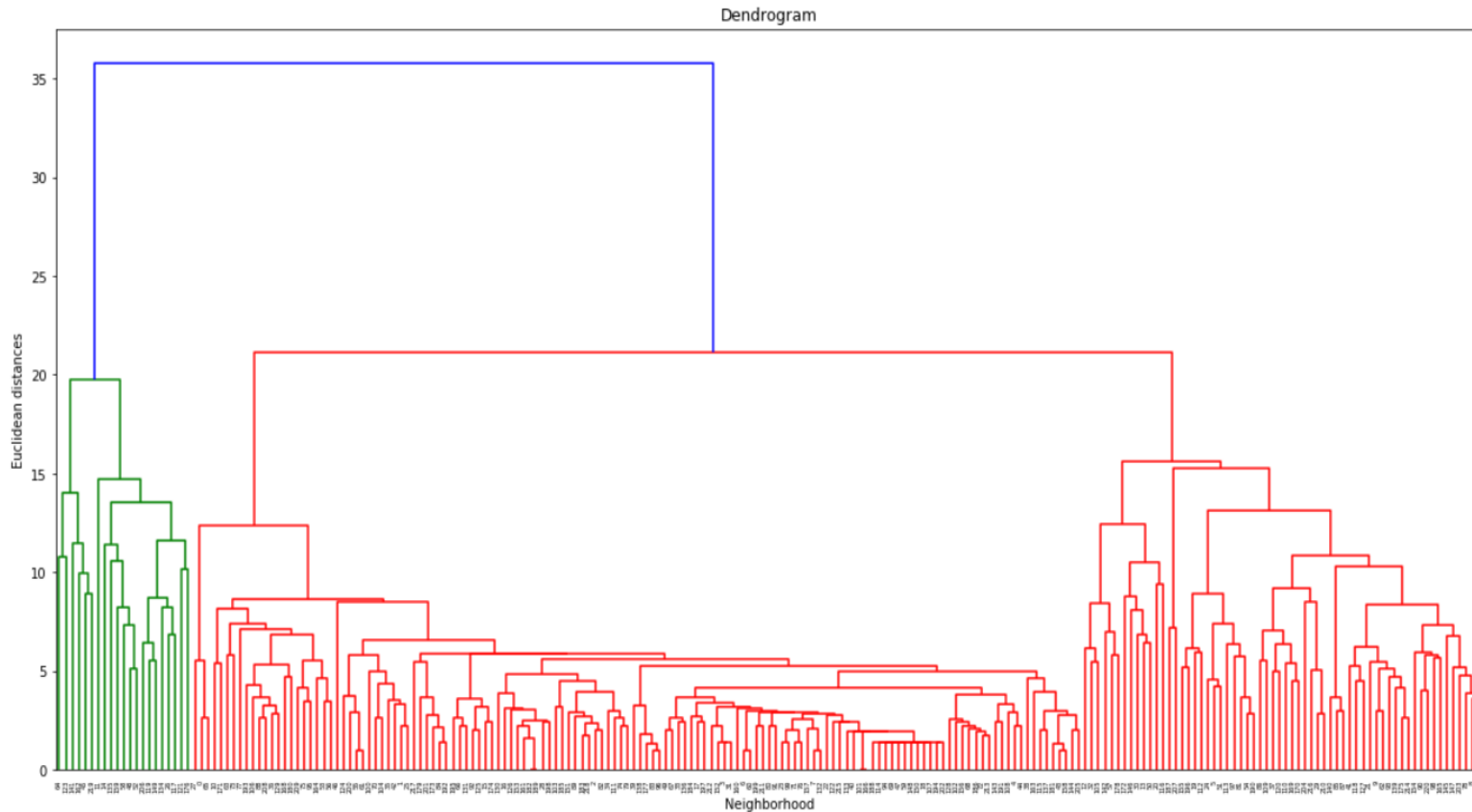
Methodology

	city_id	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	18	18_Abhur Al Janubiyah Dist.	Beach	Seafood Restaurant	Boat Rental	Fountain	Restaurant	Surf Spot	Yoga Studio	Filipino Restaurant	Farm	Farmers Market
1	18	18_Al Adel Dist.	Gym	Dessert Shop	Gym / Fitness Center	Arts & Crafts Store	Donut Shop	Food & Drink Shop	Food	Flower Shop	Flea Market	Fish Market
2	18	18_Al Ajwad Dist.	Market	Hookah Bar	Burger Joint	Food Truck	Department Store	Dessert Shop	Food Service	Food Court	Food & Drink Shop	Food
3	18	18_Al Amir Fawaz Al Janouby Dist.	Trail	Mini Golf	Yoga Studio	Fish & Chips Shop	Falafel Restaurant	Farm	Farmers Market	Fast Food Restaurant	Filipino Restaurant	Fish Market
4	18	18_Al Amir Fawaz Ash Shamaly Dist.	Turkish Restaurant	Hospital	Seafood Restaurant	Yoga Studio	Fabric Shop	Falafel Restaurant	Farm	Farmers Market	Fast Food Restaurant	Filipino Restaurant

- Generate one-hot encoding for venues categories
- Group by neighborhoods and sum all venues categories
- Calculating most common venues categories for each Neighborhood

Methodology

- Cluster neighborhoods by venues categories

Methodology

Methodology

Display most common categories in cluster

- First 5 Neighborhoods in this cluster

- The most five common categories in this cluster

- The number of Neighborhoods per each city in this cluster

Catagory	Count
Fast Food Restaurant	84
Farm	82
Farmers Market	81
Falafel Restaurant	75
Filipino Restaurant	70

City	Count
3	73
18	31

candidate_Neighborhoods	similarity
3_Al Fayha Dist.	0.288675
3_Shubra Dist.	0.235702
3_Al Suwaidi Dist.	0.200000

Results

- Identify user cluster by get cluster of current neighborhood current city

- Extract all neighborhoods in new city for the user cluster and rank them with nearest categories

- Display all extracted neighborhoods of new City ranked
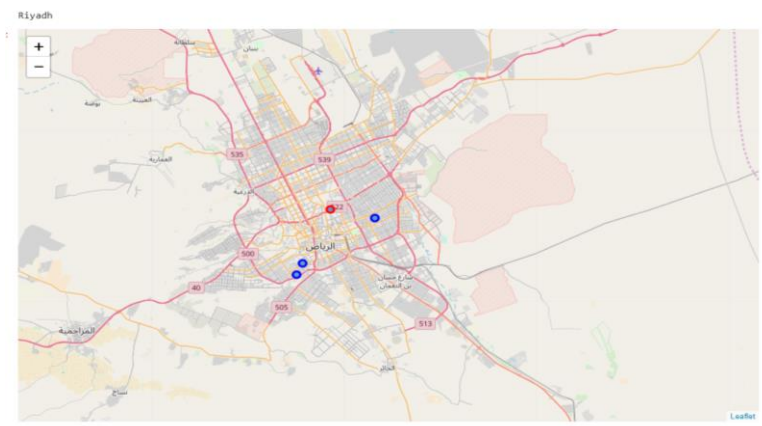
Discussion

- If a person's current location were in the Neighborhood of Taibah District in in Jedda city, which has venues like Fast Food, Pizza, Juice Bar and Turkish Restaurant nearby

- The person, would like to relocate to a neighborhood like Fayha District in Riyadh city which also has venues like Fast Food, Pizza, Juice Bar and Turkish Restaurant nearby.

- This is just one example of how our data analysis can help people relocate from one city to another which similar to their current localities.

Taibah District in in Jedda city

	catagory
Fast Food Restaurant	2
Pizza Place	2
Dessert Shop	1
Juice Bar	1
Pharmacy	1
Doner Restaurant	1
Turkish Restaurant	1

Fayha District in Riyadh city

	catagory
Juice Bar	2
Turkish Restaurant	1
Donut Shop	1
Middle Eastern Restaurant	1
Falafel Restaurant	1
Supermarket	1
Burger Joint	1
Fast Food Restaurant	1
Pizza Place	1
Breakfast Spot	1

Conclusion

- In a fast moving world, there are many real life problems or scenarios where data can be used to find solutions to those problems.

- Like seen in the example above, data was used to cluster neighborhoods in KAS cities based on the most common venues in those neighborhoods.

- Similarly, data can also be used to solve other problems, which most people face in metropolitan cities.