Finding Best Place to Establishing Office in Tehran

Introduction

International oil companies are developing interest in investing Iran:

- the sanctions against Iran, especially Iranian oil industry are decreasing
- the work force in Iran is much cheaper than other oil-rich countries

some of oil companies are inclined to establish an office in the capital of Iran (Tehran)

Introduction

Some important factors that contribute to select suitable location for installing the office:

- The location of office should be in business area. (Being close to other government and private offices)

- The location should have high rate of green environment so the neighborhood would be pleasant for the clerks and workers.

- Being close to hotels and restaurants with foreign cuisine.
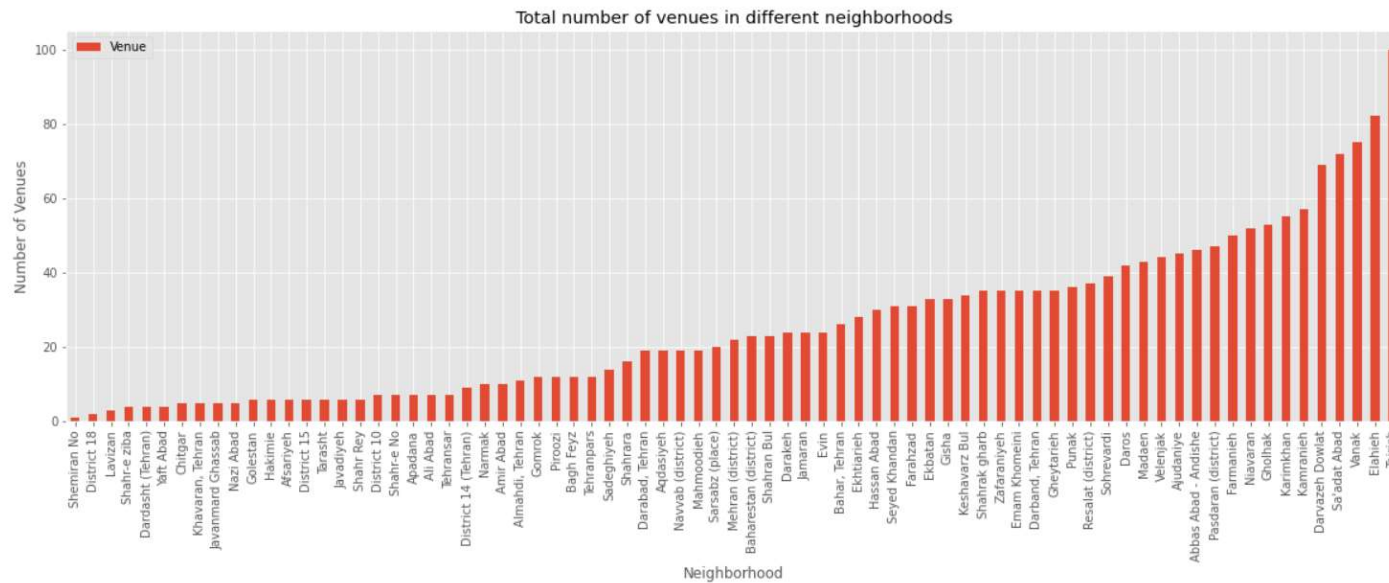
- Easy access to public transports like metro.

Data Acquisition and Cleaning

▶ Because of the shortage in data about Greater Tehran in the internet, I decided to carry out my project on Tehran that includes 22 districts. I first need to obtain a list of all the locations or neighborhoods in Tehran. This information will be obtained from the following web address: https://en.wikipedia.org/wiki/Category:Neighbourhoods_in_Tehran.

▶ Geographical coordinates for each neighborhood will be obtained with the aid of GEOPY Library.

▶ The Foursquare API with the help of the obtained coordinates has been used to retrieve venues

▶ By looking at the Wikipedia page it is clear that does not include all the neighborhoods. Therefore, the missed neighborhoods have been added to data.

Data Acquisition and Cleaning

▶ Some of the Neighborhoods names are not as same as what they are in Geopy API. Therefore, They have been change them into matched spelling in the Geopy AP.

▶ As some neighborhoods does not have longitude and latitude in Geopy API, they have been dropped.

▶ The location of 'Surena Street' is out of this project's scope so It has been deleted.

Total number of venues in different neighborhoods in Tehran

Total number of venues in different neighborhoods

Total number of venues in different neighborhoods in Tehran

► There are 77 neighborhoods.

► Shemiran No, District 18, Lavizan, Shahr-e Ziba, and Dardasht are the neighborhoods with the lowest number of venues.

► Tajrish, Elahieh, Vanak, Sa'adat Abad, and Darvazeh Dowlat have the highest number of venues.

► Tajrish is the only neighborhood that reached the maximum limit number of venues. (100)

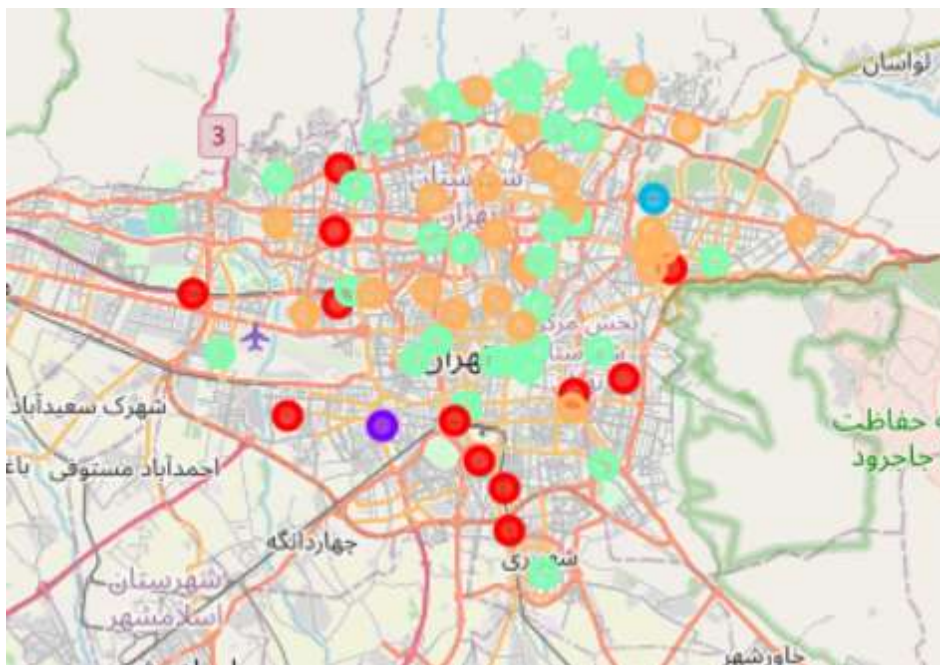# Run k-means to Cluster the Neighborhood into 5 Clusters

```python
# set number of clusters
kclusters=5
tehran_grouped = tehran_onehot.groupby('Neighborhood').mean().reset_index()

tehran_grouped_clustering = tehran_grouped.drop('Neighborhood', 1)

# run k-means clustering
kmeans=KMeans(init = "k-means++", n_clusters = kclusters, n_init = 12).fit(tehran_grouped_clustering)

# check cluster labels generated for each row in the dataframe
kmeans.labels_[0:10]
```

Visualizing Each Neighborhood with Its Cluster on The Map Using Folium Library

The 10 Most Common Venues for Each Cluster

	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
0	0	Park	Plaza	Shopping Mall	Metro Station	Amphitheater	Italian Restaurant	Clothing Store	Market	Persian Restaurant	Cosmetics Shop
1	1	Furniture / Home Store	American Restaurant	Mobile Phone Shop	Moroccan Restaurant	Mosque	Mountain	Movie Theater	Multiplex	Museum	Music Store
2	2	Persian Restaurant	American Restaurant	Notary	Monument / Landmark	Moroccan Restaurant	Mosque	Mountain	Movie Theater	Multiplex	Museum
3	3	Persian Restaurant	Café	Fast Food Restaurant	Pastry Shop	Plaza	Shopping Mall	Bakery	Gym / Fitness Center	Park	Restaurant
4	4	Café	Fast Food Restaurant	Park	Persian Restaurant	Coffee Shop	Pizza Place	Plaza	Ice Cream Shop	Pastry Shop	Shopping Mall

Choosing The Right Cluster

▶ From exploring the map and also from examining clusters, cluster 4 is the best candidate for establishing the office.

▶ This cluster shows high frequency of green environment and different restaurants and also from the map it is clear that the most of neighborhoods of this cluster are close to downtown.

Exploring Cluster 4 for Choosing Best Location

	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	Abbas Abad - Andishe	Café	Fast Food Restaurant	Persian Restaurant	Sandwich Place	Pastry Shop	IT Services	Auto Garage	Art Gallery	Paper / Office Supplies Store	Comfort Food Restaurant
11	Darabad, Tehran	Tennis Court	Café	Park	Athletics & Sports	Fast Food Restaurant	Science Museum	Mountain	Coffee Shop	Gym	Gym / Fitness Center
15	Daros	Café	Park	Bakery	Pastry Shop	Bookstore	Gym / Fitness Center	Market	Supermarket	Sports Club	Mexican Restaurant
17	Darvazeh Dowlat	Café	Hotel	Persian Restaurant	Pastry Shop	Ice Cream Shop	Art Gallery	Camera Store	Hookah Bar	Sandwich Place	Coffee Shop
18	Ekbatan	Café	Shopping Mall	Bookstore	Gym / Fitness Center	Clothing Store	Food Court	Multiplex	Stadium	Sporting Goods Shop	Fruit & Vegetable Store

Conclusion

Now, by exploring the neighborhood of cluster 4 and assuming the main factors which have mentioned earlier, Resalat (district) is the best place for the installing of office. In this neighborhood, venues like Park, Hotel, Bus stop and Restaurant have high frequency. Therefore, the office would be close to hotels, restaurants and also public transports as well as parks would provide green environment.

Resalat (district)	Café	Hotel	Park	Bus Stop	Scenic Lookout	Tabbakhi	Women's Store	Plaza	Fast Food Restaurant	BBQ Joint