

# Description of the Problem and a Discussion of the background

## Explore Investment Option in United Arab Emirates- a distant paradise from the western countries and Americas

United Arab Emirates, often called as Dubai, is a heaven of Tourists, As mentioned in TechFrisky- "Dubai is not only a distinctive and intriguing destination, but also a dynamic business center and a tourist paradise, with more attractions, good food, shopping and quality accommodation. It is a city and emirate known for extravagance shopping, ultra-modern architecture and a vibrant nightlife scene in the United Arab Emirates. The Glitzy city, Dubai is a land of monuments and is renowned for countless number of sightseeing fascinations such as the world's tallest building, Burj Khalifa, the man-made Palm Jumeirah Island, aquariums, shopping malls, indoor ski slopes and traditional Dubai Souks."

(here is the full link to the article) [Dubai a Heaven](#)



### UAE is a heaven, but...

UAE is not just a tourist spot. It is well known for its investment options also. High quality infrastructure & Non-corrupted governance are great advantages. However, for the people in western countries and in the American continents, Dubai is a strange place. They do not count Dubai as a primary investment option, because they are unfamiliar about the business there. They are doubtful with questions like, whether the country is too strict? Can we even have a pub there? etc. As the language is also a barrier, people are reluctant to explore more about it.

### Questions to Answer

1. What are different cities in United Arab Emirates & what are the population
2. What are all the business areas those are popular there ?
3. Is the country too strict about business? No pubs, winery shops?
4. In different areas , which can be a good investment option?
5. How much populated the cities there? etc

## Target Audience

Those who want to invest in UAE, but not aware of the place.

## Data to Use

**1. Wikipedia Link:** [https://en.wikipedia.org/wiki/List\\_of\\_cities\\_in\\_the\\_United\\_Arab\\_Emirates](https://en.wikipedia.org/wiki/List_of_cities_in_the_United_Arab_Emirates)  
Wikipedia is a multilingual open-collaborative online encyclopedia created and maintained by a community of volunteer editors using a wiki-based editing system. It is one of the 15 most popular websites as ranked by Alexa, as of August 2020. Featuring no ads, it is hosted by the Wikimedia Foundation, an American non-profit organization funded primarily through donations. Data in Wikipedia about UAE can be used to get the details of the country, We can find the list, population, location etc using this

### 2. Foursquare API

Foursquare Labs Inc., commonly known as Foursquare, is an American technology company. The company's location platform is the foundation of several business and consumer products, including the Foursquare City Guide and Foursquare Swarm apps. We will be using Foursquare to find out the venues in each city in Dubai, To find out the most visited/least visited venues, The cities with less business etc. We will get a clear idea about investment options in Cities of UAE.

N°		City	Population	Emirate	Location	Co-ordinates	Latitude	Longitude	Max_Rent
2	3	Sharjah	1274749	Sharjah	25°21'27"N 55°23'27"E / 25.3575°N 55.390833°E	(25.2311534, 54.21900831355923)	25.231153	54.219008	1097.00
4	5	Ajman	226172	Ajman	25°24'49"N 55°26'44"E / 25.413611°N 55.445556°E	(25.4037872, 55.52628406412467)	25.403787	55.526284	1138.50
7	8	Umm Al Quwain	61700	Umm al-Quwain	25°32'39"N 55°33'12"E / 25.544095°N 55.553305°E	(25.568522899999998, 55.64967186862421)	25.568523	55.649672	1062.25
10	11	Jebel Ali	31634	Dubai	25°00'41"N 55°03'40"E / 25.01126°N 55.06116°E	(13.3098436, 24.0666999)	13.309844	24.066700	826.00
13	14	Ruwais	25000	Abu Dhabi	24°06'12"N 52°35'01"E / 24.103333°N 52.583611°E	(24.0883186, 52.6486735)	24.088319	52.648674	1240.00
15	16	Dhaid	20165	Sharjah	25°17'00"N 55°53'00"E / 25.283333°N 55.883333°E	(25.2841793, 55.8796508)	25.284179	55.879651	1234.50

## Methodology

### a) Cleaning the data:

Identified labeled names & replaced them. Also Coordinates speeated to longitude & Latitude. After that filtered using rent to focus on few of the cities

### b)Processing the data:

Grouped the cities using Clustering, using k mean algorithm.

k-means clustering is a method of vector quantization, originally from signal processing, that aims to partition n observations into k clusters in which each observation belongs to the cluster with the nearest mean (cluster centers or cluster centroid), serving as a prototype of the cluster. This results in a partitioning of the data space into Voronoi cells. It is popular

for cluster analysis in data mining. k-means clustering minimizes within-cluster variances (squared Euclidean distances), but not regular Euclidean distances, which would be the more difficult Weber problem: the mean optimizes squared errors, whereas only the geometric median minimizes Euclidean distances. For instance, better Euclidean solutions can be found using k-medians and k-medoids.

The problem is computationally difficult (NP-hard); however, efficient heuristic algorithms converge quickly to a local optimum. These are usually similar to the expectation-maximization algorithm for mixtures of Gaussian distributions via an iterative refinement approach employed by both k-means and Gaussian mixture modeling. They both use cluster centers to model the data; however, k-means clustering tends to find clusters of comparable spatial extent, while the expectation-maximization mechanism allows clusters to have different shapes.

We done clustering after merfging it with Foresquare Venue details::

J:

	City	Latitude	Longitude	Venue	Venue_Lat	Venue_Long	Venue_Category
0	Sharjah	25.231153	54.219008	جزيرة #صير يونجيز	25.218775	54.232231	Beach
1	Sharjah	25.231153	54.219008	جزيرة صير يونجيز Sir Bu Nuayr Island	25.220801	54.236935	Surf Spot
2	Sharjah	25.231153	54.219008	The Island	25.253850	54.242777	Beach
3	Ajman	25.403787	55.526284	Seventy One Steakhouse	25.401181	55.525029	Steakhouse
4	Ajman	25.403787	55.526284	FOODBOX (فود بوكس)	25.409113	55.510894	Japanese Restaurant
...	...	...	...	...	...	...	...
114	Dhaid	25.284179	55.879651	Omar Al Khayam Restaurant (مطعم عمر الخيام)	25.287796	55.884457	Middle Eastern Restaurant
115	Dhaid	25.284179	55.879651	مطعم و مطبخ خالد حرية الشحي	25.280865	55.878513	Restaurant
116	Dhaid	25.284179	55.879651	درايش Daraysh	25.288363	55.892546	Restaurant
117	Dhaid	25.284179	55.879651	سوبر ماركيت الزيزفونه	25.287634	55.900341	Food
118	Dhaid	25.284179	55.879651	سسوبر ماركيت الجزيرة الخضرا	25.285046	55.924665	Grocery Store

Cluster 0: Its the Sea side of Dubai. Beach, Surf sport etc. No scope of restaurant here. People may be coming to relax..not to eat.

J: City\_merged.loc[City\_merged['Cluster Label'] == 1, City\_merged.columns[[0,1,2,4] + list(range(6, City\_merged.shape[1]))]]

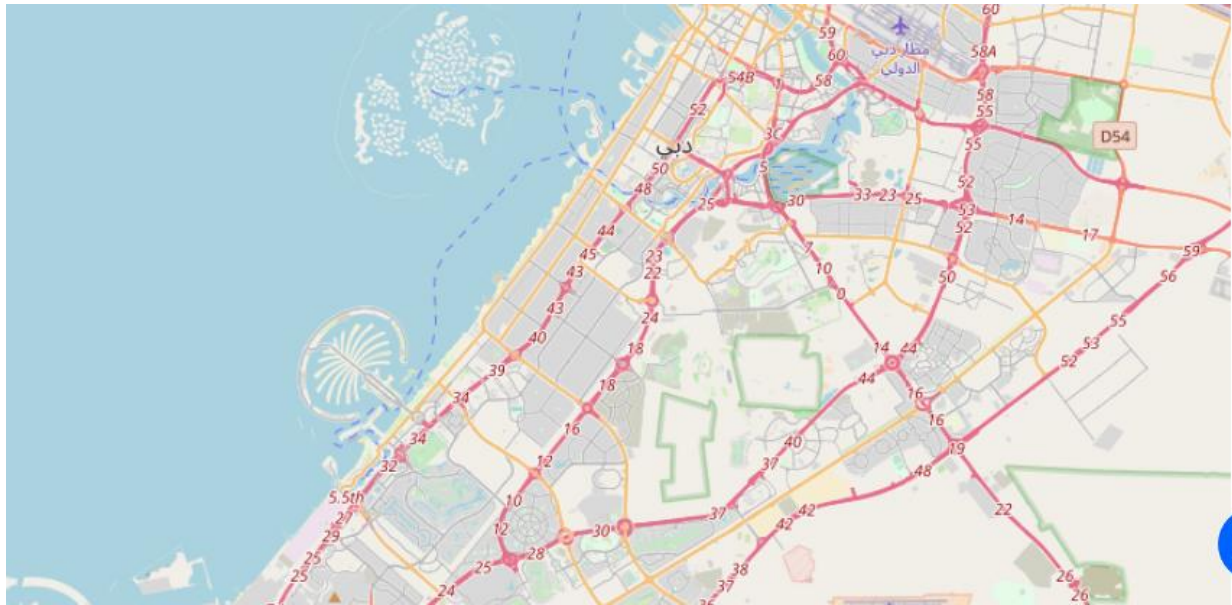
[11]:

	N°	City	Population	Location	Longitude	Co-ordinates	Max_Rent	Cluster Label	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1	5	Ajman	226172	25°24'49"N 55°26'44"E / 25.413611°N 55.445556°E	55.526284	(25.4037872, 55.52628406412467)	1138.5	1	Café	Coffee Shop	Fast Food Restaurant	Tea Room	Burger Joint
3	14	Ruwais	25000	24°06'12"N 52°35'01"E / 24.103333°N 52.583611°E	52.648674	(24.0883186, 52.6486735)	1240.0	1	Recreation Center	Sports Club	Fast Food Restaurant	Shopping Mall	Café
4	16	Dhaid	20165	25°17'00"N 55°53'00"E / 25.283333°N 55.883333°E	55.879651	(25.2841793, 55.8796508)	1234.5	1	Restaurant	Professional & Other Places	Soccer Field	Ice Cream Shop	Food

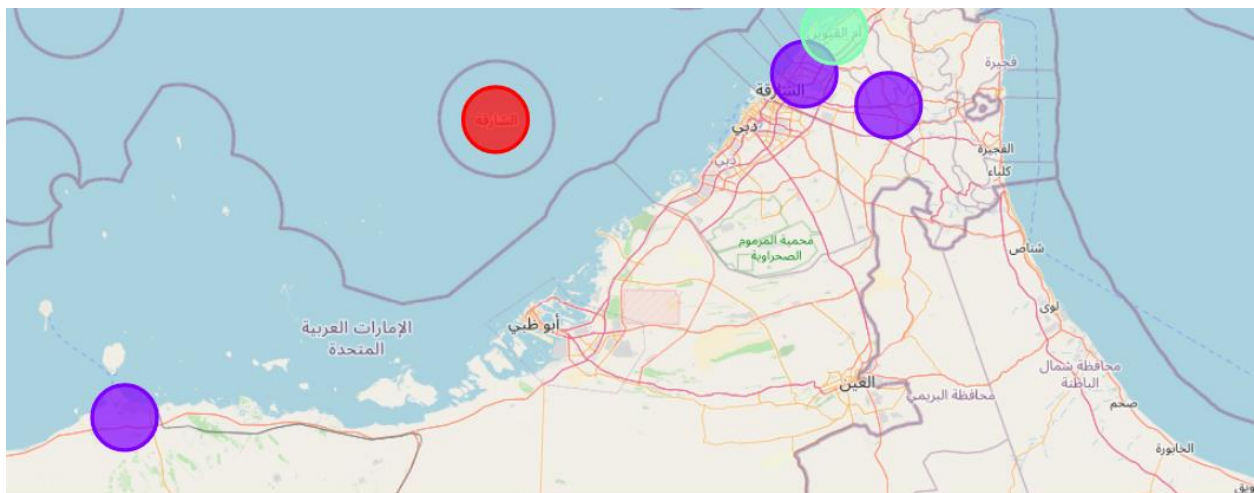
## b) Visualisation:

Once the data clustered, used folio library to visualize the same, as below

**Before Clustering:**



**After clustering:**



## Results

1. Undoubtedly, Ajman is the best place to invest, as it's well populated & people go out there often.
2. Food business is the best in Ajman.
3. Sharjah & Umm al-Qaiwain are relax spots. Sharjah with sea side & other city with resorts. Those types of investments may be good here
4. Entire cities are not too good for opening pubs/bars. Seems the culture is different from western countries.

## Discussion

Looking at the data, Cities in Dubai is a good investment spot for Food shops.

1. Seeing the Most visited venues, rather than a generic restaurant, a specialised one like - cafe, pizza etc may also gain good business
2. Though we couldn't see bars/pubs. Still it has wine shops..So, it's not too strict by law. May be it's just part of the culture. So, don't worry about the strictness of government

## **Conclusion**

Using the data from wikipedia and Python, and processing and analysing them using Python functions & clustering methods, we could find , Ajman is the best option to invest in Dubai & that too for food business. Also, it looks an investor friendly country with a beautiful geographical attractions. Hopefully, these findings may help someone to invest few of thie millions in Dubai in future !! :)