OPENING A NEW SHOPPING MALL IN ALGIERS, ALGERIA

BY

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Introduction

This project seeks to identify areas where establishing a new shopping mall in the capital of Algeria which is Algiers, would work best for the investors and business owners and the government, by extension also the citizens of the city.

Business problem

The demand for the retail industry to establish itself firmly in Algiers is growing daily as the Algeria's economic development as impacted positively on the income of the populace. Also, due to strong fiscal position of the country, the purchasing power of citizens has been on the increase. However, the number of malls in the state capital has not been enough to cater to the growing needs of the populace as regards the retail market.

The challenge or problem for the retail industry in Algiers is to meet up with the domestic demand for retail goods which can be sold in and thru shopping malls, in areas where they are sure to make sales and this will in turn ensure profitability for the investors or business owners and overall increased revenue for the government.

This project seeks to explore data insights which will enable potential investors and business owners and the government to identify the best areas to build shopping malls (or in the case of the government, to encourage both local and foreign investors on the best areas to build shopping malls). It is also a source of information for the government as to which areas in neighbourhoods in Algiers would interest new investors and business owners when it comes to the retail industry. This would overall impact positively on the revenue which can be generated thru tax and import duties.

Audience and Stakeholders

The audience and stakeholders for this project are the local and international investors looking for profitable opportunities to diversify their investments. Also shop owners within and outside the country looking for ways to grow and increase their customer base. Stakeholders in the government who are open to new ways of generating revenue for the city(in the form of sale of land, tax and other avenues).

Data source, data collection and data cleaning

This project sources and integrates data from the Wikipedia: https://en.wikipedia.org/wiki/Category:Suburbs_of_Algiers. Another data source is Foursquare API. This section describes each of these data sources and provides examples of the data.

The Wikipedia page provided suburbs in Algiers as well as populated areas in the city. The data included provinces in an alphabetical order and grouped as such.

As the data was obtained from a Wikipedia page, it was scraped and the Beautiful soup package was used to parse the data. Then the data was appended into a list and a pandas dataframe created.

Foursquare API,a social networking service which provides a mobile app that allows each user to search for venues close by and see information and reviews from other users was used to get location data. Users feed information to Foursquare passively as the app tracks users' locations. Users also do so actively whenever they enter venue names, locations, and reviews. This project will access Foursquare venue data for the selected Suburbs in Algiers to obtain neighbourhoods, specifically popular venues. The Foursquare venue data will particularly seek to identify popular areas that have unique categories. These data will then be used for subsequent categorization of neighborhoods to provide insight to places where shopping malls are present or totally absent.

The Foursquare data sample is one of the imported data showing particularly the venues (by name) and locations within Algiers:

	Neighborhood	Latitude	Longitude	VenueName	VenueLatitude	VenueLongitude	VenueCategory
0	Aïn Bénian, Algiers	36.80095	2.91856	Restaurant El Kahina	36.801243	2.905486	Seafood Restaurant
1	Aïn Bénian, Algiers	36.80095	2.91856	La Paella Restaurante Y Tapas	36.802166	2.899236	Seafood Restaurant
2	Aïn Bénian, Algiers	36.80095	2.91856	La Madrague	36.801747	2.899505	Beach
3	Aïn Bénian, Algiers	36.80095	2.91856	le rancho	36.800127	2.900348	Mediterranean Restaurant
4	Aïn Bénian, Algiers	36.80095	2.91856	Le Sauveur	36.802758	2.897456	Seafood Restaurant

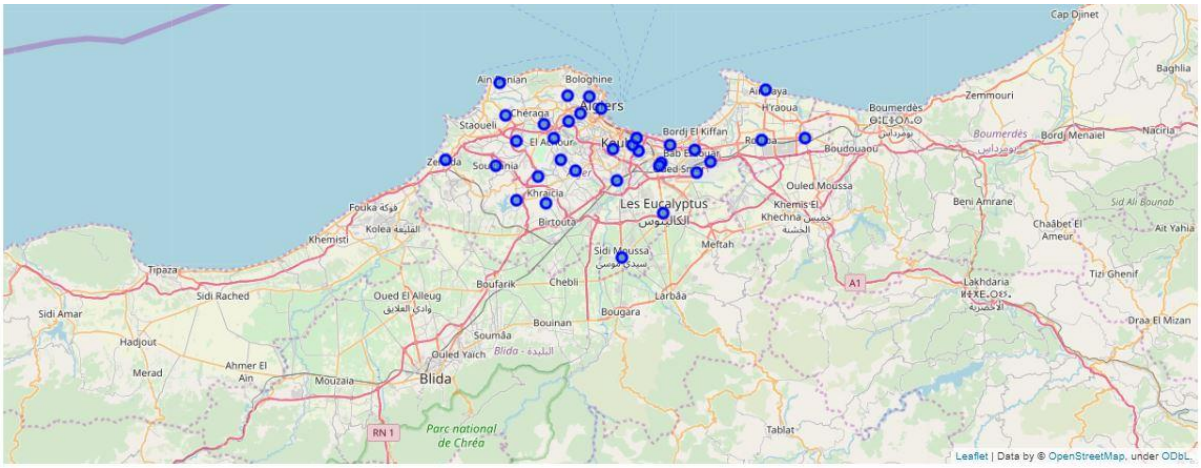
Methodology

After obtaining the geographical coordinates of the neighbourhoods in Algiers and saving the neighbourhoods and coordinates into a dataframe as shown below:

	Neighborhood	Latitude	Longitude
0	Aïn Bénian, Algiers	36.800950	2.91856
1	Aïn Taya	36.792940	3.28888
2	Ain-bessem	36.293330	3.67319

	Neighborhood	Latitude	Longitude
3	Bab Ezzouar	36.725380	3.19035
4	Baba Hassen	36.696080	2.97242
5	Bachdjerrah	36.724740	3.11222
6	Baraki, Algiers	36.711101	3.14322
7	Ben Aknoun	36.757920	3.01405
8	Bouzaréah	36.785750	3.01274
9	Chéraga	36.763960	2.92675
10	Dar El Beïda	36.712600	3.21281
11	Dély Ibrahim	36.754200	2.98040
12	Douéra	36.669170	2.94199
13	Draria	36.714800	3.00275
14	El Achour	36.739270	2.99417
15	El Biar	36.766520	3.03028
16	El Harrach	36.708160	3.14025
17	El Magharia	36.731090	3.10365
18	Djasr Kasentina	36.691140	3.08224
19	Hussein Dey (commune)	36.738860	3.10903
20	Khraïcia	36.665930	2.98312
21	Kouba, Algeria	36.726910	3.07682
22	Les Eucalyptus	36.655390	3.14686
23	Mohammedia, Algiers	36.731240	3.15601
24	Oued Koriche	36.785020	3.04270
25	Oued Smar	36.700760	3.19302
26	Ouled Fayet	36.735590	2.94194
27	Reghaïa	36.738740	3.34390
28	Rouïba	36.736450	3.28289
29	Saoula	36.702020	3.02352
30	Sidi M'Hamed	36.771570	3.05926
31	Sidi Moussa, Algeria	36.605210	3.08868
32	Souidania	36.708490	2.91227
33	Zéralda	36.715020	2.84309

A map of Algiers was created(with the coordinates: 36.7753606, 3.0601882), with the neighbourhoods superimposed on top:



Foursquare API used to get the venue data for the neighbourhoods:

The Foursquare application programming interface (API) was accessed(with my client id and client secret) to obtain the venues in the Algiers neighbourhoods . The interface was used specifically to:

1. Get the top 100 venues with a radius of 2500 metres(this large measurement was used as Algiers has a wide expanse of land, especially desert land).
2. The venues were converted into a dataframe including venue latitude, longitude and category.
3. Unique venues were curated and the results was checked to see if any has 'shopping mall' in their names.
4. Each neighbourhood was analysed and a new dataframe was created to show shopping malls only.

	Neighborhoods	Shopping Mall
0	Aïn Bénian, Algiers	0.000000
1	Aïn Taya	0.000000
2	Bab Ezzouar	0.052632
3	Baba Hassen	0.000000
4	Bachdjerrah	0.000000

The methodology also included exploring the neighbourhoods and segmenting them into clusters. To do this, a machine learning algorithm, K-means clustering was used. Clustering (or cluster analysis) is the task of breaking up a set of objects into groups called clusters. Inside each group, there were similar objects(neighborhoods), and those which were dissimilar, were grouped differently. The k-means algorithm is the simplest of machine learning algorithms. In this project, it was used to show neighbourhoods which had shopping malls and their numbers:

1.k-means clustering was run on a set number of 5 clusters and merged into a new dataframe.
2.The new dataframe was grouped and locations of the neighbourhoods was included:

	Neighborhood	Shopping Mall	Cluster Labels	Latitude	Longitude
0	Aïn Bénian, Algiers	0.000000	0	36.80095	2.91856
1	Aïn Taya	0.000000	0	36.79294	3.28888
2	Bab Ezzouar	0.052632	4	36.72538	3.19035
3	Baba Hassen	0.000000	0	36.69608	2.97242
4	Bachdjerrah	0.000000	0	36.72474	3.11222

3. The result was sorted by cluster labels and was then viewed as a map:

	Neighborhood	Shopping Mall	Cluster Labels	Latitude	Longitude
0	Aïn Bénian, Algiers	0.000000	0	36.800950	2.91856
26	Saoula	0.000000	0	36.702020	3.02352
25	Roulba	0.000000	0	36.736450	3.28289
24	Reghaïa	0.000000	0	36.738740	3.34390
23	Ouled Fayet	0.000000	0	36.735590	2.94194
21	Oued Koriche	0.000000	0	36.765020	3.04270
19	Kouba, Algeria	0.000000	0	36.726910	3.07682
18	Hussein Dey (commune)	0.000000	0	36.738860	3.10903
17	El Magharia	0.000000	0	36.731090	3.10365
16	El Harrach	0.000000	0	36.708160	3.14025
15	El Biar	0.000000	0	36.766520	3.03028
27	Sidi M'Hamed	0.000000	0	36.771570	3.05926
13	Dély Ibrahim	0.000000	0	36.754200	2.98040
14	El Achour	0.000000	0	36.739270	2.99417
11	Douéra	0.000000	0	36.669170	2.94199
10	Djasr Kasentina	0.000000	0	36.691140	3.08224
8	Chéraga	0.000000	0	36.763960	2.92675
7	Bouzaréah	0.000000	0	36.785750	3.01274
6	Ben Aknoun	0.000000	0	36.757920	3.01405
5	Baraki, Algiers	0.000000	0	36.711101	3.14322
4	Bachdjerrah	0.000000	0	36.724740	3.11222
3	Baba Hassen	0.000000	0	36.696080	2.97242
1	Aïn Taya	0.000000	0	36.792940	3.28888
12	Draria	0.000000	0	36.714800	3.00275
28	Zéralda	0.000000	0	36.715020	2.84309
20	Mohammedia, Algiers	0.200000	1	36.731240	3.15601
22	Oued Smar	0.043478	2	36.700760	3.19302
9	Dar El Beïda	0.071429	3	36.712600	3.21281
2	Bab Ezzouar	0.052632	4	36.725380	3.19035

These were the resulting clusters in tables:

Cluster 0:

	Neighborhood	Shopping Mall	Cluster Labels	Latitude	Longitude
0	Ain Benian, Algiers	0.0	0	36.800950	2.91856
26	Saoula	0.0	0	36.702020	3.02352
25	Roulba	0.0	0	36.736450	3.28289
24	Reghaia	0.0	0	36.738740	3.34390
23	Ouled Fayet	0.0	0	36.735590	2.94194
21	Oued Koriche	0.0	0	36.785020	3.04270
19	Kouba, Algeria	0.0	0	36.726910	3.07682
18	Hussein Dey (commune)	0.0	0	36.738660	3.10903
17	El Magharia	0.0	0	36.731090	3.10365
16	El Harrach	0.0	0	36.708160	3.14025
15	El Biar	0.0	0	36.766520	3.03028
27	Sidi M'Hamed	0.0	0	36.771570	3.05926
13	Dély Ibrahim	0.0	0	36.754200	2.98040
14	El Achour	0.0	0	36.739270	2.99417
11	Douéra	0.0	0	36.669170	2.94199
10	Djasr Kasentina	0.0	0	36.691140	3.08224
8	Chéraga	0.0	0	36.763960	2.92675
7	Bouzaréah	0.0	0	36.785750	3.01274
6	Ben Aknoun	0.0	0	36.757920	3.01405
5	Baraki, Algiers	0.0	0	36.711101	3.14322
4	Bachdjerrah	0.0	0	36.724740	3.11222
3	Baba Hassen	0.0	0	36.696080	2.97242
1	Ain Taya	0.0	0	36.792940	3.28888
12	Draria	0.0	0	36.714800	3.00275
28	Zéralda	0.0	0	36.715020	2.84309

Cluster 1:

	Neighborhood	Shopping Mall	Cluster Labels	Latitude	Longitude
20	Mohammedia, Algiers	0.2	1	36.73124	3.15601

Cluster 2:

	Neighborhood	Shopping Mall	Cluster Labels	Latitude	Longitude
22	Oued Smar	0.043478	2	36.70076	3.19302

Cluster 3:

	Neighborhood	Shopping Mall	Cluster Labels	Latitude	Longitude
9	Dar El Beida	0.071429	3	36.7126	3.21281

Cluster 4:

	Neighborhood	Shopping Mall	Cluster Labels	Latitude	Longitude
2	Bab Ezzouar	0.052632	4	36.72538	3.19035

RESULTS

This results section provides an overview of the outcomes of the methodology and their relevance to the original problem of identifying the best Neighborhoods to build a new shopping mall in the city of Algiers.

Majority of the shopping malls in Algiers is concentrated in the Neighborhood of Mohammedia, Algiers as shown in cluster 1 with Dar El Beida Neighborhood following it behind,having the next highest number of malls, in cluster 3. These two Neighborhoods would not be best for opening a new shopping mall as there is a huge likelihood it would not thrive and grow due to competition. Also more of the initial capital would have to be expended on promos and paid adverts to drive in

customers. This would not help a new mall's overall profitability in such Neighborhoods. In cluster 0, we can see the large number of Neighborhoods which have no shopping mall whatsoever. Shopping malls can be opened in Draria,Saoula,El Bria, Baba Hassen and other Neighborhoods in the cluster. Such areas are best for developers or investors to open a shopping mall as there would be no competition and so turnover on investment is feasible. Neighborhoods in cluster 2 and cluster 5, might not be best for opening a shopping mall as they already have shopping malls present, though not as many as clusters 1 and 3. Overall, this data analysis of the city of Algiers in Algeria as regards the best areas to open a new shopping mall, shows that Neighborhoods in cluster 0 are ideal for opening a new shopping mall and it is highly recommended especially as it has no shopping malls therein.

Consideration was made for identifying top venues in the Neighborhoods of Algiers where there were venues well-visited like Beaches, restaurants, Electronics store, Theatre and so on. These places would make any of the neighbourhoods identified, ideal for a shopping mall. As they have:

a. Foot-traffic: enough people visit these Neighborhoods often.
b. Potential customers who are the people and staff operating the businesses.
c. Supply of food and other items which would be needed by both those patronising those top venues and the staff operating the businesses.

Discussion

The result above shows the importance of quality in depth data analysis before setting up a business in an area. Algiers is a well-populated city, however shopping malls are scarce. According to the resulting clusters, shopping malls are even scarce in some areas where there are top venues like gyms, restaurants, beach, piers and so on. This is an unexpected development as it shows the city has not been explored by mall chains which have branches spread around the world. Algiers has relatively been untapped by the retail industry considering the increased income of the populace, which is reflected by the top 100 venues seen in the neighbourhoods. For those businesses to exist as top venues, then there is every reason for investors and business people to explore the neighbourhoods in cluster 0 and in fact all the other clusters(with consideration for possible competition) for opening new malls.

The coordinates (obtained by using the Foursquare API)also show that distance to the top venues is close enough to each other and can encourage heavy traffic from those places to a new shopping mall. Someone can go from the beach ,to the pier, to the new mall for a drink, or from the restaurant to the new mall for luxury goods. This is another important factor investors and business people can factor in, when it comes to opening a new mall in Algiers.

Conclusion

The question of which Neighborhoods in Algiers would be best for establishing a new shopping mall is very important to any investor or business person, looking to invest in the retail industry in Algeria. Algiers is the capital of Algeria and for this reason, would be the best to open a new shopping mall. The rising incomes and stability of the country as a whole, is very much reflected in the attraction for retail operations and international luxury brands. The importance of an in depth data analysis of the Neighborhoods in Algiers, therefore, cannot be overemphasized when it comes to opening a shopping mall. The city has the population(3.416 million (2011)) and also has the land(Algeria is the largest country in Africa at 2,381,741 square kilometres: source https://en.wikipedia.org/wiki/Algeria).These features should be good news to any investor in the retail industry. Hence, back to the question of the best areas or Neighborhoods to open an new shopping mall in Algiers, certain analysis was done by segmenting Neighborhoods into clusters which showed the presence and numbers of shopping malls present in the top 100 venues. Map of these clusters was obtained by importing the folium package. It showed Neighborhoods like Oued Smar(in blue cluster)and Bab Ezzouar(in orange cluster) as having shopping malls. Clusters of Neighborhoods which had shopping malls were compared to clusters which had few or no shopping malls. This provided the relevant information of areas best to open a shopping mall wherein profitability thru huge sales could be guaranteed. The areas which had no shopping malls could be seen in cluster 0. These are highly recommended to investors and business owners alike as being best to open a shopping mall in Algiers. Areas like El Bria, Baba Hassen, Draria. But areas like Oued Smar and Bab Ezzouar in clusters 1 and 4 should not be considered for a new shopping mall as they already have thriving malls. Same also for areas in clusters 2 and 3.

Future Direction

One factor to be considered by individuals and government in Algiers alike, is that Neighbourhood demographics, especially ones that can be used to ascertain viable potential areas for new establishments in the retail industry, like shopping malls. The addition of information resources pertinent to these neighbourhood dimensions can aid additional analysis and visualization to complement this project. These additional analysis would advance this research and aid in other areas like marketability and spending habits and so on. Another factor to consider is the popular venues of the unique categories. It showed how industrious the city is and can still be. For the purpose of this project, focus was on popular venues, unique categories of the venues and what they were and their locations, before the clusters were created. However, additional research and a more rigorous analysis may enhance the objectivity around this rating scale and further help to validate the decision framework. A future consideration for building on the above data analysis would go a long way in showing where shopping malls can be opened in Algiers and how profitable it would be for the individual investors or business owners or the government. It could also show how it would

increase tourism to those areas focused on for the new shopping malls. There is so much that can be done in the future thru more data analysis and more data from relevant sources when available.