Using Foursquare information to help assess a new location for a hotel

1. INTRODUCTION

A boutique hotel located in Madrid, Spain would like to open a new hotel in Paris, France. One of the key aspects that their clientele values is the various types of services nearby the hotel area - restaurants, bars, cafes, gyms etc. Knowing that, the hotel owners would like to see if there's a similar type of area in Paris to settle down to.

A scenario like the one described in the above paragraph can be very likely in a business environment and it provides a good opportunity to explore how data can be used to explore unknown waters. Naturally there are a lot of other areas to take into consideration when establishing a new venue such as real estate situation, legislation in other countries and so forth, but to keep the topic compact, only the "what services are nearby" dimension is explored. Nevertheless, it is easy to relate how this type of information would be valuable in decision-making for entrepreneurs.

2. DATA

For comparing two different areas in two different cities from two different countries there are a couple of items that need to be resolved.

- Firstly, a list of neighborhoods needs to be found. Wikipedia is often a good source for this, however the format the information is provided can be a bit different between different pages. Python requests module can scrape the tables listing the areas for future reference.
- Secondly, to determine the coordinates, Geopy module can be used to fetch this information based on the names of the areas.
- Thirdly, the Foursquare API can be used to find the venues in each area and then k-means clustering can be used to identify similar areas.
- Finally, the areas can be visualized by using Folium so that the stakeholders can review the outcome in a sensible format.

3. METHODOLOGY

From a methodology point of view some time was spent to figure out a proper source of information regarding the neighborhoods listed over the internet. The official Madrid city sites contained the information mainly in Spanish and in a format that would have been difficult to scrape (easy to download though) but for the sake of this exercise the Wikipedia source was chosen instead to be able to include scraping to this exercise.

The Foursquare approach was straightforward to apply based on the previous exercises in the course – naturally there are other factors that could have been included into the study but that would have increased the amount of background work substantially.

The statistical part of this study comes in the form of using K-means clustering to identify similar areas after the data from Foursquare has been normalized so that the areas that belong to the same cluster group as the location in Madrid can be identified in Paris. The number of clusters used was tweaked a bit to segment the data in a meaningful way (not pooling the majority of areas as similar to the one in Madrid but also not making everything seem different from Madrid either).

4. RESULTS

As an outcome, based on the k-means clustering there were two different areas in Paris that were in the same cluster group with Atocha, Madrid. One was Hôtel-de-Ville and the other Batignolles-Monceau. After comparing the two, it seemed that Batignolles-Monceau would suit as a potential target location. After plotting Batignolles-Monceau venues on a map, coincidentally it was noticeable that it is nearby the train station, which coincidentally is in line with Atocha – where the main train station of Madrid is located. Notably no train-related venues were a part of the venue listing.

5. DISCUSSION

Based on the outcome of the results the stakeholders can be presented with the suggestion to explore one specific area as a potential site to establish a new hotel. Also, the likeliness of two train station areas could lead to further study checking if the services nearby train stations in major cities in Europe are similar. Evaluating the venue categories between the sites shows that both locations have an abundance of different restaurants nearby. A subsequent study would study the behavior of the hotel clientele more in detail – for example checking only the users that have checked in the hotel and see if there's any evidence of venues visited available in Foursquare or similar apps available. As the hotel was an imaginary stakeholder, that option was not available for exploration in this current assignment.

In general, the approach taken in this study has proven to be scalable, quick and low-cost in case further locations were to be explored instead of going on-site and doing the assessment in person or with the aid of a local consulting company. It should be a significant contribution to the decision-making process, but not the only factor as discussed in the introduction of this report already.

6. APPENDIX

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In [59]:    1  atocha['Venue Category'].unique()

Out[59]: array(['Peruvian Restaurant', 'Burger Joint', 'Polish Restaurant',
            'Museum', 'Spanish Restaurant', 'Art Gallery', 'Bookstore',
            'Sporting Goods Shop', 'Bar', 'Italian Restaurant',
            'Greek Restaurant', 'Farmers Market', 'Asian Restaurant',
            'Restaurant', 'Gym', 'Dessert Shop', 'Mexican Restaurant',
            'Bakery', 'Breakfast Spot', 'Food & Drink Shop', 'Pizza Place',
            'Tapas Restaurant', 'Gymnastics Gym', 'Gift Shop', 'Brewery',
            'Concert Hall', 'Chinese Restaurant', 'Coffee Shop', 'Café',
            'Diner', 'Train Station', 'Hotel', 'Grocery Store',
            'Mediterranean Restaurant', 'Athletics & Sports', 'Platform',
            'Ice Cream Shop', 'Sandwich Place', 'Multiplex',
            'Sushi Restaurant', 'Beer Garden', 'Cafeteria'], dtype=object)
```

screenshot 1: Venues near Atocha

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In [82]:  1 batignolles['Venue Category'].unique()

Out[82]: array(['Ice Cream Shop', 'Middle Eastern Restaurant', 'French Restaurant',
               'Creperie', 'Bar', 'Farmers Market', 'Pastry Shop', 'Bagel Shop',
               'History Museum', 'Gym / Fitness Center', 'Wine Bar',
               'Liquor Store', 'Thai Restaurant', 'Pub', 'Café', 'Restaurant',
               'Italian Restaurant', 'Modern European Restaurant',
               'Korean Restaurant', 'Theater', 'BBQ Joint', 'Park', 'Steakhouse',
               'Lebanese Restaurant', 'Hotel', 'Vietnamese Restaurant',
               'Gastropub', 'Bookstore', 'Sushi Restaurant', 'Basque Restaurant',
               'Latin American Restaurant', 'Bakery', 'Japanese Restaurant',
               'Burger Joint', 'Dim Sum Restaurant', 'Coffee Shop',
               'Mediterranean Restaurant', 'Corsican Restaurant',
               'Turkish Restaurant', 'Art Museum', 'Pizza Place', 'Art Gallery',
               'Diner', 'Supermarket', 'Indian Restaurant', 'Bistro',
               'Sandwich Place'], dtype=object)
```
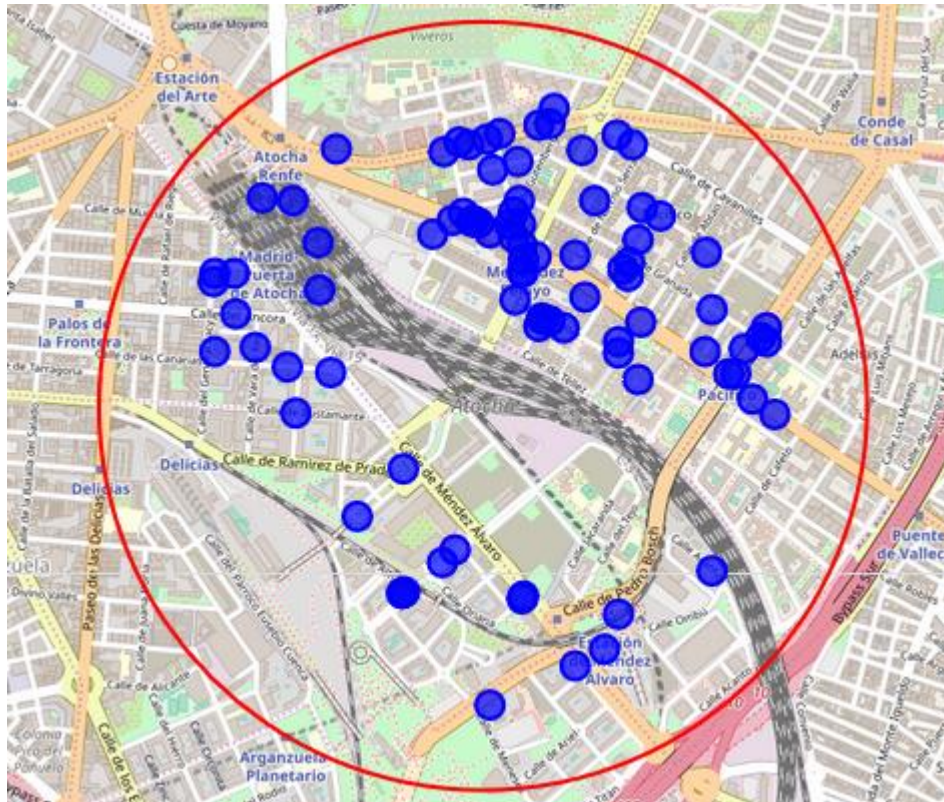
screenshot 2: Venues near Batignolles-Monceau

Out[75]:

District	Neighborhood	lat	lng	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
Arganzuela	Atocha, Madrid, ES	40.400687	-3.682391	1	Spanish Restaurant	Bar	Café	Italian Restaurant	Restaurant	Hotel	Asian Restaurant	Museum	Bakery	Platform
1st (Ie) R	Louvre, Paris, FR	48.861147	2.338028	0	French Restaurant	Hotel	Plaza	Café	Clothing Store	Japanese Restaurant	Restaurant	Historic Site	Cosmetics Shop	Coffee Shop
2nd (IIe) R	Bourse, Paris, FR	48.867684	2.343126	0	French Restaurant	Cocktail Bar	Wine Bar	Bistro	Japanese Restaurant	Italian Restaurant	Bakery	Hotel	Creperie	Bar
3rd (IIIe) R	Temple, Paris, FR	48.862683	2.358685	0	French Restaurant	Coffee Shop	Cocktail Bar	Café	Clothing Store	Sandwich Place	Wine Bar	Bistro	Burger Joint	Italian Restaurant
4th (IVe) R	Hôtel-de-Ville, Paris, FR	48.856426	2.352528	1	French Restaurant	Ice Cream Shop	Art Gallery	Plaza	Wine Bar	Pub	Park	Hotel	Café	Souvenir Shop
5th (Ve) L	Panthéon, Paris, FR	48.846191	2.346079	0	French Restaurant	Hotel	Bar	Pub	Bakery	Café	Indie Movie Theater	Ice Cream Shop	Plaza	Coffee Shop
6th (VIe) L	Luxembourg, Paris, FR	48.849392	2.332260	0	French Restaurant	Italian Restaurant	Hotel	Wine Bar	Bakery	Plaza	Seafood Restaurant	Pastry Shop	Bistro	Sandwich Place
7th (VIIe) L	Palais-Bourbon, Paris, FR	48.861692	2.319031	0	French Restaurant	Garden	Hotel	Plaza	Bookstore	Historic Site	Art Museum	Italian Restaurant	Fountain	Tea Room
8th (VIIIe) R	Élysée, Paris, FR	48.846644	2.369830	0	French Restaurant	Hotel	Italian Restaurant	Bar	Cocktail Bar	Plaza	Pedestrian Plaza	Bakery	Coffee Shop	Beer Bar
9th (IXe) R	Opéra, Paris, FR	48.870645	2.332330	0	Hotel	French Restaurant	Japanese Restaurant	Italian Restaurant	Gourmet Shop	Pastry Shop	Cocktail Bar	Theater	Dessert Shop	Café
10th (Xe) R	Entrepôt, Paris, FR	48.876008	2.360445	0	Coffee Shop	French Restaurant	Pizza Place	Cocktail Bar	Bistro	Japanese Restaurant	Asian Restaurant	Korean Restaurant	Café	Seafood Restaurant
11th (XIe) R	Popincourt, Paris, FR	48.860071	2.378143	0	French Restaurant	Cocktail Bar	Pizza Place	Restaurant	Coffee Shop	Wine Bar	Bistro	Bar	Vegetarian / Vegan Restaurant	Italian Restaurant
12th (XIIe) R	Reuilly, Paris, FR	48.835200	2.445136	0	Theater	Forest	National Park	Comedy Club	Soccer Field	Playground	Fast Food Restaurant	Performing Arts Venue	Bike Trail	Basketball Court
13th (XIIIe) L	Gobelins, Paris, FR	48.829853	2.363026	0	Vietnamese Restaurant	Thai Restaurant	Asian Restaurant	French Restaurant	Chinese Restaurant	Hotel	Japanese Restaurant	Italian Restaurant	Juice Bar	Bar
14th (XIVe) L	Observatoire, Paris, FR	48.829567	2.323962	0	French Restaurant	Hotel	Italian Restaurant	Bar	Bakery	Restaurant	Sushi Restaurant	Vietnamese Restaurant	Pizza Place	Bistro
15th (XVe) L	Vaugirard, Paris, FR	48.841430	2.296165	2	French Restaurant	Italian Restaurant	Hotel	Bakery	Park	Persian Restaurant	Bistro	Lebanese Restaurant	Thai Restaurant	Korean Restaurant
16th (XVIe) R	Passy, Paris, FR	48.857151	2.256731	0	Pool	French Restaurant	Lake	Racecourse	Circus	Park	Boat or Ferry	Basketball Court	Bakery	Plaza
17th (XVIIe) R	Batignolles-Monceau, Paris, FR	48.881312	2.315750	1	French Restaurant	Hotel	Wine Bar	Italian Restaurant	Bar	Thai Restaurant	Pastry Shop	Theater	Coffee Shop	Korean Restaurant
18th (XVIIIe) R	Butte-Montmartre, Paris, FR	48.892126	2.348178	0	French Restaurant	Bar	Bistro	Pizza Place	Café	Italian Restaurant	Bookstore	Gastropub	Bakery	Park
19th (XIXe) R	Buttes-Chaumont, Paris, FR	48.887219	2.383103	0	Bar	French Restaurant	Hotel	Café	Bistro	Restaurant	Supermarket	Pool	Asian Restaurant	Pizza Place
20th (XXe) R	Ménilmontant, Paris, FR	48.861827	2.401073	0	French Restaurant	Bar	Plaza	Bakery	Italian Restaurant	Bistro	Supermarket	Café	Japanese Restaurant	Park

screenshot 3: results of K-means clustering and 10 most common venues per area

screenshot 4: venues near Atocha plotted

screenshot 5: venues near Batignolles-Monceau plotted