**Opening a bar in Monterrey Metropolitan Area**

Description of the problem and a discussion of the background. (**15 marks**)

Monterrey Metropolitan area is currently the third largest city in México, behind México City and Guadalajara. Monterrey is a modern city growing a fast pace, it is home of Tec de Monterrey, the best university in Mexico(I work there) also has automotive and manufacturing clusters, cement and construction clusters, IT cluster, tourism clusters, restaurant and mall plazas. Due to particular cultural aspects of society, people love to go out to restaurants and bars, from Wednesday nights to Sunday afternoon. Hence, it represents an attractive place for investors, particularly for in the restaurant/bar industry. Now, due to the current pandemic, confinement restrictions and physical distancing, it doesn’t seem like a good idea to open a restaurant or a bar, however, it is clear to see that people is eager to go out to these kind of places, now even more than ever.  
  
Therefore, the intention of this project is make a recommendation of a place to open a restaurant or bar in Monterrey Metropolitan area which is integrated by 12 boroughs. To achieve this, the project will have particular objectives: explore the Monterrey Metropolitan area neighborhoods looking up for zones of interest like universities or plazas. Search for common venues and explore its surroundings. Segment and cluster neighborhoods and particular venues to find those with restaurants or bars. And finally, try to find the current trends in restaurants or bars. (This may or may not be possible given that most of these venues are closed and people is not going out)

Description of the data and how it will be used to solve the problem. (**15 marks**)

For this particular project, geographical information about the Monterrey metropolitan area is needed in the first place. Given that there is no budget to buy this information, it is obtained for free from a page called, GeoNames, a geographical database which covers all countries and contains over eleven million placenames that are available for download free of charge.

The dataset contains México’s geographical information of all states, including the following attributes: 'Country', 'Postal Code', 'Neighborhood', 'State', 'State\_No', 'Borough', 'Borough\_No', 'City', 'City\_No', 'Latitude', 'Longitude', 'Coo\_No'.

From this dataset now all information is useful and needs to be discarded, but the attributes to be analyzed are: 'Country', 'Neighborhood', 'State', 'Borough', 'Latitude', 'Longitude'. First it’s important to make sure to get the right Country, Mexico in this case, then the State of Nuevo León, which is where Monterrey is located. All of these attributes are *object or string* except for the Postal Code and coordinates which area *int* and *float*. Getting the right information is key but it is also essential to perform a quick check for null values, and drop if any.  
The main attributes 'Neighborhood', 'Borough' are needed to filter the three most important of the metropolitan area, and 'Latitude', 'Longitude' to make the Foursquare queries. It is important to note that some neighborhoods may have the same Postal Code, therefore all duplicates needs to be eliminated.

The next piece of information required regarding the location is extracted from a Wikipedia page containing information about Monterrey Metropolitan Area. The main table has: 12 Boroughs, population, total area, human development index, etc. From here it is easy to identify the 3 most important Boroughs by human development index: 'San Pedro Garza García', 'Monterrey', 'San Nicolás de los Garza'

Finally, the venue information is obtained from the Foursquare API using queries with the selected and cleaned information before. The attributes needed for this are 'Neighborhood', 'Latitude', 'Longitude'.   
For example: use coordinates to search particular venues like bars near a university, students love to drink and dance.  
Segment and cluster neighborhoods with restaurants and bars downtown Monterrey.  
Or find the most common venues in a residential area in Monterrey.

All the data and additional information for the project is generated based on these datesets, pages and queries. This may be more than enough data to analyze and achieve the defined objectives: explore the Monterrey metropolitan area neighborhoods looking up for zones of interest like universities or plazas. Search for common venues and explore its surroundings. Segment and cluster neighborhoods and particular venues to find those with restaurants or bars. And finally, try to find the current trends in restaurants or bars.