1. Introduction

Real Estate Promoter promoting the new apartments/villa around the city to sell and for rent. As an investor firm, I will be advising the people whether to invest on the property looking around the neighborhood based on the amenities around the place. When it is coming to living, People always looks for some essential amenities that facilitates the living so as an investor firm it is their job to see the growth of the place over years and amenities near the location that helps the investment firm to take proper decision and help the customer in decision making.

The following methodology could be used by the people who needs help in decision making on the investment in the unknown area of the city or if people gets relocated to new city who seeks assistance for rental places & for buying new properties.

2.Data

2.1 Source of Data:

1) Foursquare API endpoint
2) URL used https://api.foursquare.com/v2/venues/explore
3) Parameters passed
    - Client_ID
    - Client_Secret
    - Version
    - Latitude, Longitude
    - Radius
    - Limit

2.2 Data Fields:

- Venue - Name of the Venue
- Venue Distance - Distance between the Location (Interested Location) & the Venue
- Venue Latitude – Latitude of the venue
- Venue Longitude – Longitude of the venue
- Venue Category - Category of the venue

3.Methodology

Result or Goal of the project is to give overview of the property location within the radius of 2000 Meters / 2 Km. For a living or to rent a house/apartment, People required essential things such as Hospital, School, Bus station, Train station etc. and additional things such as Shopping mall, Theatre, Gym, Pub, Hotel & Restaurant etc. From the list of details retrieved from 4 square API, generate data frame that are required for the data analysis (Please refer fields from above section). Perform EDA from the response received from foursquare API.

3.1 Exploratory Data Analysis

1) Retrieve the response using the Foursquare API and Extract the field Name from Venue and Distance, Latitude & Longitude and Category that venue belongs to.
2) Foursquare API does not have general category field of the venue For Example: Mexican Restaurant, Italian Restaurant, Indian Restaurant all belongs to Restaurant category, but common category is not present in the Foursquare API result so grouping with common category is not possible. To overcome this situation following steps are followed
    - Introduce Dictionary (List) where common categories are specified under 3 categories such as Essential amenities (Must require amenities), Good to have (Required but less important), Entertainment (Time pass factors)
    - Define a function that takes actual data frame and the categories as parameter and returns new frame that matches the categories
3) Introduce acceptable % of amenities for above categories so that it will help in showing the result and that gives better perception in visualization format
4) Use the distance column and category extracted for showing box plot on each categories
5) Get the property location to show it in the map and group the amenities by region to show how many amenities present on a given area on association with property location. Introduce marker color for categories to show the more visual representation of the amenities around the property location.

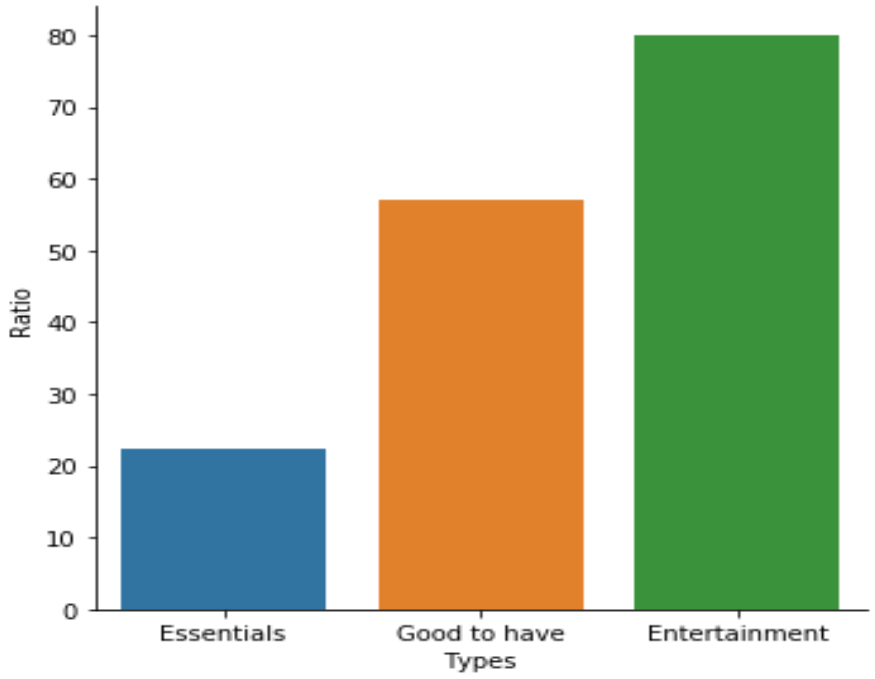
4 Results

Whole analysis is split into 3 different ways of visualization

4.1 Acceptable Chart

Once EDA is completed and extracting the information. We need to club the amenities available in all categories and depicting in the visualization format for easier understanding. This chart gives the visualization on percentage ratio on each category. General Bar chart visualization on category vs Percentage on amenities.

Fig 1 – Acceptable chart without condition color code



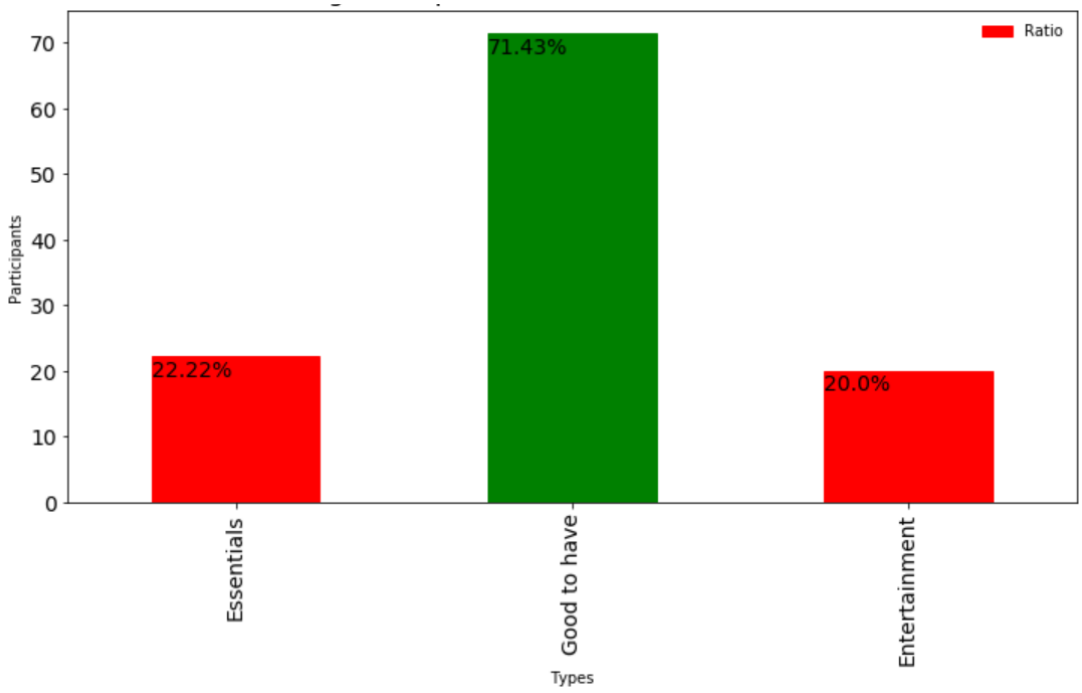
But in this case, we are more align towards whether the values are in the acceptable range or not.

For example:

Category	**Acceptable range (%)**
Essentials	60% and Above
Good to have	40% and Above
Entertainment	30% and Above

Then the bar chart should have some conditional format and the above result will be transformed as shown below

Fig 2 – Acceptable chart with condition color code for different location



This gives easier interpretation for the customer to see how these locations fared with respect to the amenities around the area. Green indicates it has crossed the minimal acceptable level where as red indicates it fails the acceptable range.

4.2 Distance chart

Acceptable chart groups the value per category. More intuitive information is not present in the above chart. To fetch more details about the category below box plot are illustrated to give information

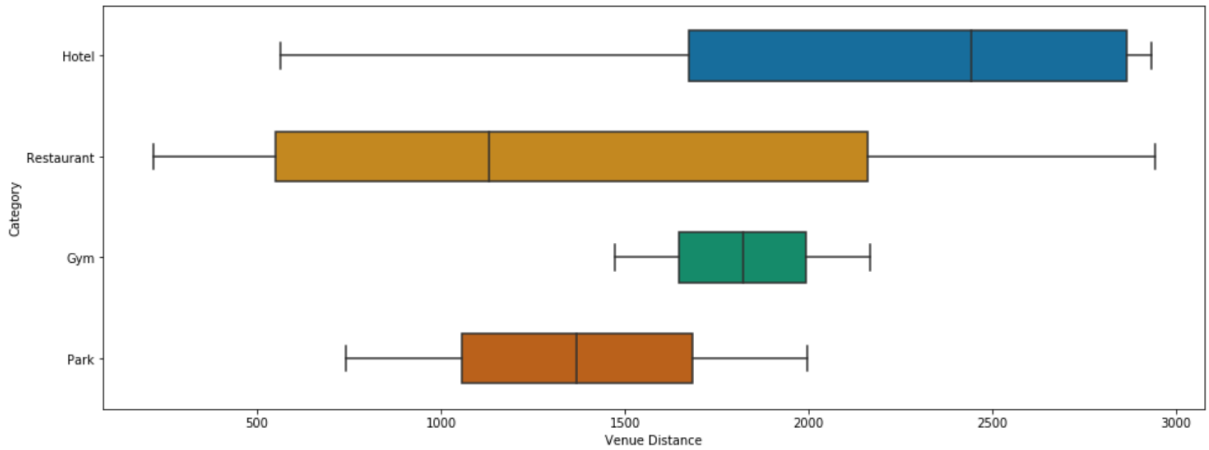


Fig 3 – Distance chart by amenities with respect to a category

Above is a sample for the category “Good to have”. This chart shows what is the minimum, maximum & median distance to reach amenities in respective category from the location of the property.

4.3 Cluster & Category Indicator Map

Acceptable and Distance chart are informative but more interactive and much visual representation of these amenities on maps.

4.3.1 Amenities Cluster

Distance chart tells how far these amenities are from the enquired property, but it does not say are these amenities are in the same area or in the different direction. To know these Amenities cluster map will be helpful. Red icon with i indicates the location of the property and amenities & groups of amenities in the region, zoom in or Zoom out divides the cluster or increase the amenities added to the cluster.

Fig 4– Zoom in cluster map with Property location (Red Icon)

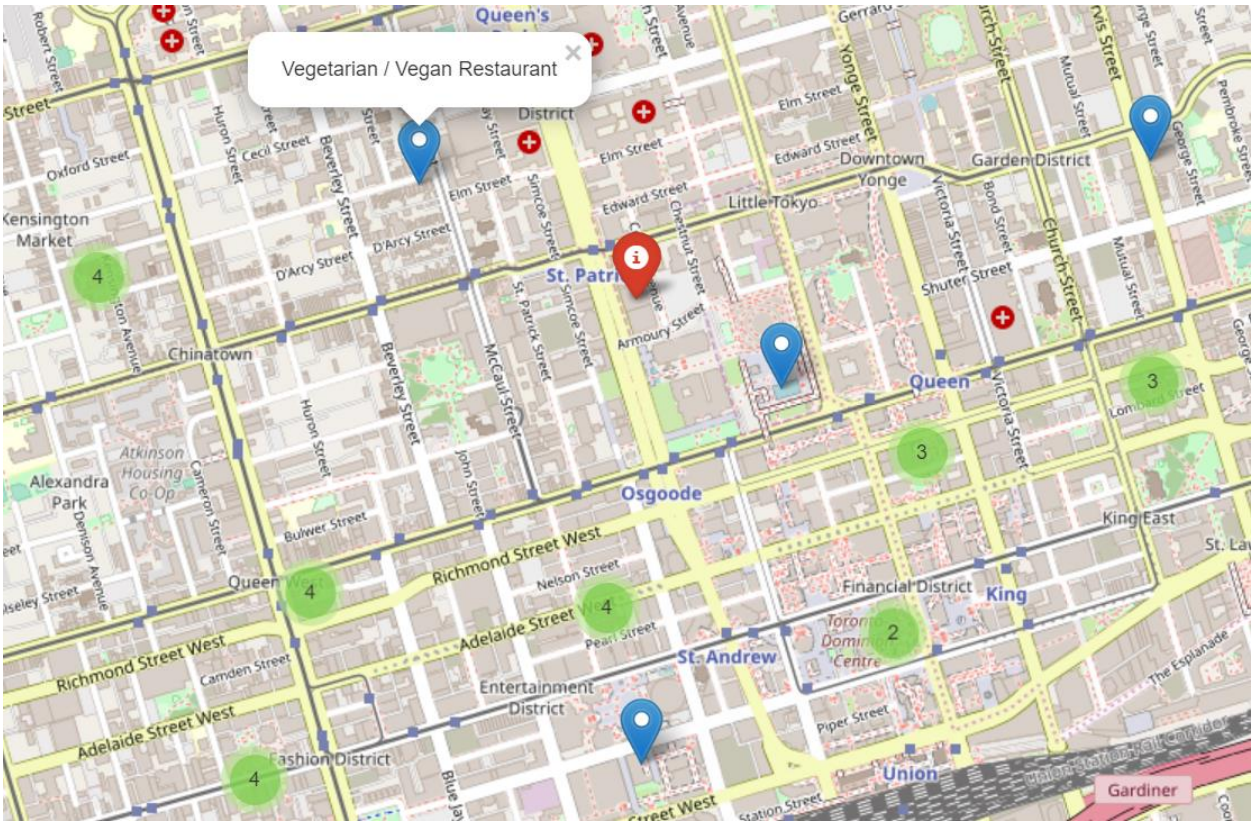
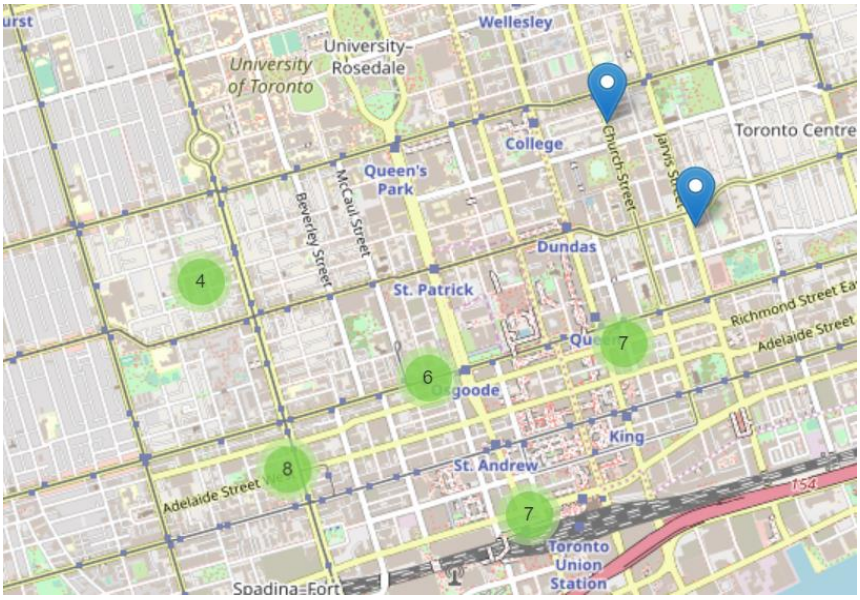


Fig 7– Zoom out cluster map



4.3.2 Categories Indicator Map

Cluster map help in finding how amenities are grouped in an area, but it does not really indicate the which type of amenities are they in a region. To overcome this Categories Indicator map depicted below blue enclosed with yellow indicates the Essential things, Green enclosed with orange indicates the "Good to have" category and Maroon enclosed with cyan indicates the entertain categories.

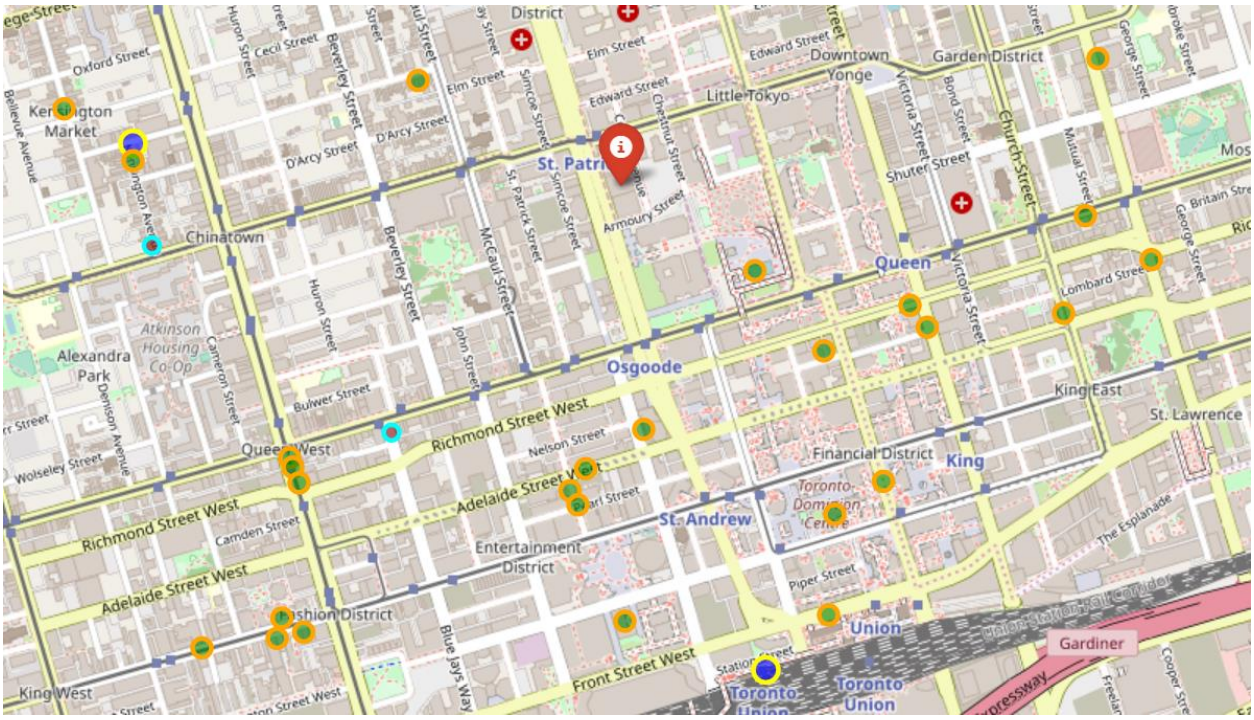


Fig 6– Amenities category indicator with Property location (red Icon)

5 Observation

Acceptable chart is key indicator to evaluate what's their expectation and its value based on that they can take decision on whether to opt or not the property. More the greener agree to the location and use the distance chart & Cluster and Category indicator map to check your preference and decide accordingly.

6 Conclusion

Given the huge competition in Real estate promoting, New property purchase and Rental purpose. Companies/Clients/Customer should come up scientific methodology of analyzing the location that gives more confidence to the them before buying a property and make decision accordingly. The above methodologies will give different indicator and visualization method that convince with the facts available