Capstone – Neighbourhoods (Seattle, Washington)

1. Project Description:

The objective of this capstone is to collects various data points from Seattle, Washington as the requirements and main idea to help the stake holders to achieve the desired results, so as to help them spend their valuable time and money in some other productive means rather keep them trapped in an infinite loop of extensive search engines unnecessarily.

This project would help them to take the decision on choosing the best neighbourhood from out of many neighbourhoods. Like: build/buy their houses in the city based on the distribution of various facilities.

We're using K-mean clustering unsupervised machine learning algorithm to cluster the venues based on the place category

- Restaurants
- Park
- Coffee Shop
- Gym etc.

This would give a better understanding of the similarities and dissimilarities between the two chosen neighbourhoods to retrieve more insights and to conclude with ease which neighbourhood wins over other.

Here we're going to compare two neighbourhoods to choose one that best matches based on the below factors

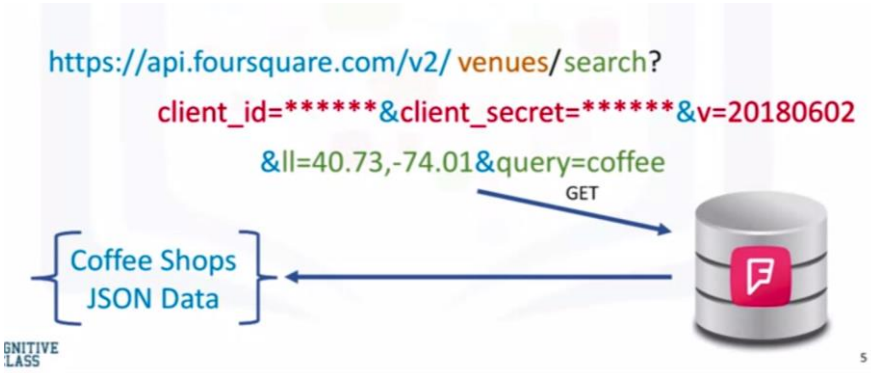
- Housing Price
- Population
- School Rating
- Comfortable Neighbourhoods

2. Foursquare Data Sets and APIs:

Foursquare API: We're going to use in project Four-square API as, prime data gathering source as it has a huge database.

- Its API provides the ability to perform location search, location sharing and details about a Business. Photos, Restaurants, Coffee Shop and etc.,

3. Work Flow:



4. Components used in this Analysis

Foursquare API: Search feature would be enabled to collect the nearby places of the neighbourhoods.

Folium-Python Visualization Library: would be used to visualize the neighbourhoods cluster distribution of Seattle city over an interactive leaflet map.

Pandas, NumPy and Scikit-learn: Python's scientific libraries are used to drive the desirable insights in the data

K-mean clustering: K-Mean machine learning algorithm would be applied to form the clusters of different categories of places residing in and around the neighbourhoods.

These clusters from each of those two chosen neighbourhoods would be analysed individually collectively and comparatively to derive the conclusions.

5. Key Packages and Dependencies for the implementation:

- Geopy – To retrieve Location Data
- Requests – Library to handle http requests
- JSON – Library to handle JSON files
- Folium – Map rendering Library
- Pandas
    - Library for Data Analysis
    - NumPy – Library to handle data in a visualization
    - Matplotlib – Python Plotting Module
    - Sklearn – Python machine learning Library

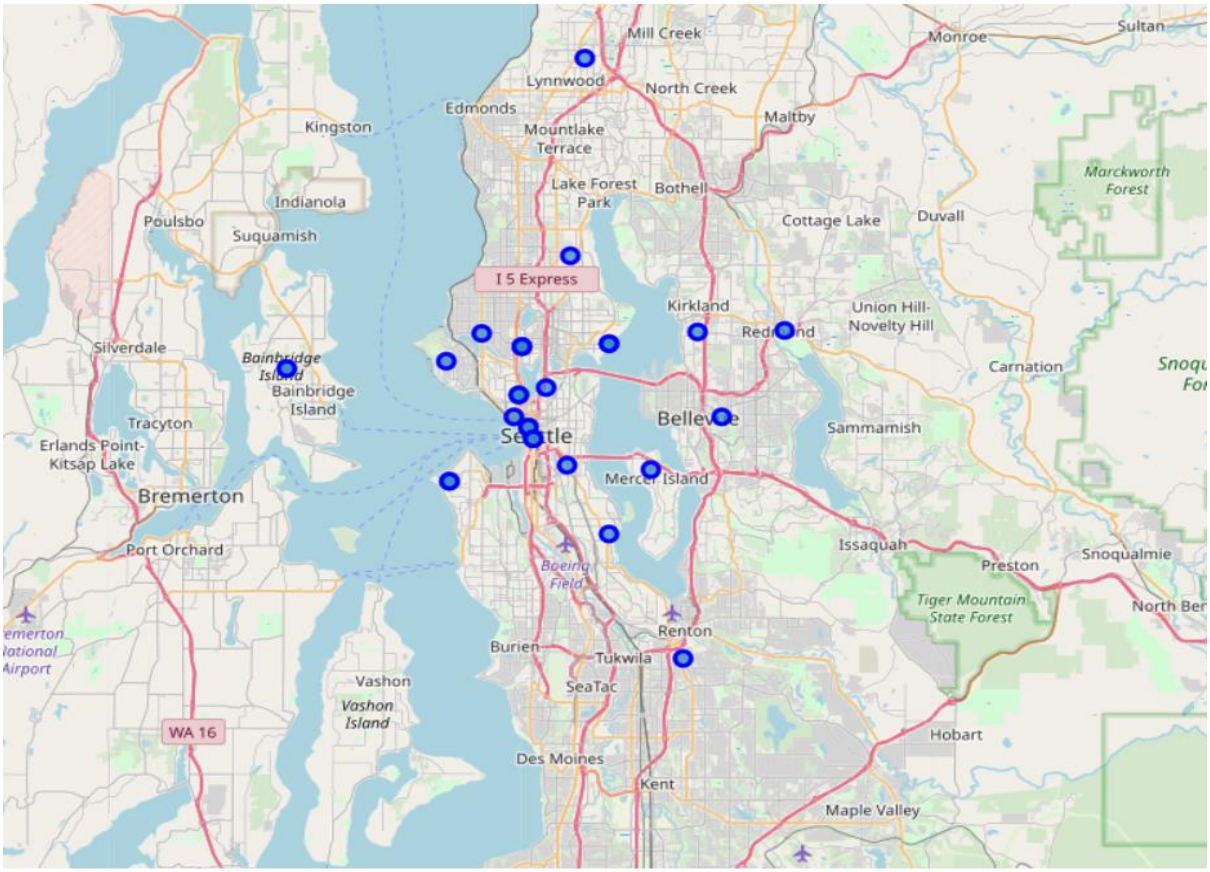
6. Comparison analysis between neighbourhoods

Population Comparison(Indian)	
Bellevue	157
Kirkland	366
School Rating Comparison	
Bellevue	9
Kirkland	9
Avg Housing Price Comparison	
Bellevue	343500.0
Kirkland	297900.0

7. Seattle, Washington - Neighbourhoods along with Latitude and Longitude:

	Neighborhood	PostalCode	Latitude	Longitude
0	Federal Way	98003	47.316504	-122.322397
1	Bellevue	98005	47.615044	-122.171758
2	Kirkland	98033	47.668830	-122.192387
3	Lynnwood	98037	47.841952	-122.288181
4	Mercer Island	98040	47.582423	-122.233123
5	Redmond	98052	47.670119	-122.118237
6	Renton	98055	47.462337	-122.205506
7	Seattle	98101	47.608492	-122.336407
8	Downtown	98101	47.608492	-122.336407
9	Capital Hill	98102	47.633822	-122.321545
10	Greenwood	98103	47.660009	-122.342557
11	Freemont	98103	47.660009	-122.342557
12	Greenlake	98103	47.660009	-122.342557
13	International District	98104	47.601557	-122.332335
14	Pioneer Square	98104	47.601557	-122.332335
15	University District	98105	47.661424	-122.268374
16	Laurelhurst	98105	47.661424	-122.268374
17	Ballard	98107	47.668360	-122.376958
18	South	98109	47.628859	-122.345692
19	Queen Anne	98109	47.628859	-122.345692
20	Bainbridge Island	98110	47.645833	-122.543441
21	Madrona	98110	47.645833	-122.543441
22	West Seattle	98116	47.574580	-122.404784
23	Alki Beach	98116	47.574580	-122.404784
24	Columbia City	98118	47.541202	-122.267563
25	Belltown	98121	47.615247	-122.349745
26	Northgate	98125	47.717020	-122.300934
27	Mount Baker	98144	47.584576	-122.303649
28	Magnolia	98199	47.650708	-122.406786

8. Seattle, Washington - Neighborhoods in Cluster form using folium



9. Seattle, Washington - Neighborhoods Most Common Venues and Population

	Neighborhood	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
0	Alki Beach	Park	Coffee Shop	Ice Cream Shop	Italian Restaurant	Thai Restaurant	Pizza Place	Beach	Beach Bar	Brewery	Seafood Restaurant
1	Bainbridge Island	Tree	Ethiopian Restaurant	Forest	Food Truck	Food Stand	Flower Shop	Fish Market	Fish & Chips Shop	Filipino Restaurant	Fast Food Restaurant
2	Ballard	Coffee Shop	Brewery	New American Restaurant	Sandwich Place	Sushi Restaurant	Mexican Restaurant	Ice Cream Shop	Bar	Pizza Place	Cocktail Bar
3	Bellevue	Insurance Office	Auto Garage	Mexican Restaurant	Other Repair Shop	Deli / Bodega	Coffee Shop	Spa	Bagel Shop	Automotive Shop	Indian Restaurant
4	Belltown	Bar	Sushi Restaurant	Coffee Shop	Pizza Place	Vietnamese Restaurant	Sculpture Garden	Movie Theater	Breakfast Spot	Gym	Italian Restaurant

White	Black	Hispanic	Asian	Hawaiian	Indian
62408	7001	6514	10836	875	783
12065	547	1213	5012	74	157
29436	696	1667	4484	180	366
18512	1642	2544	6040	333	599
18494	407	634	4279	84	169

10.Seattle, Washington - Neighborhoods School Rating

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Neighborhood - School Rating
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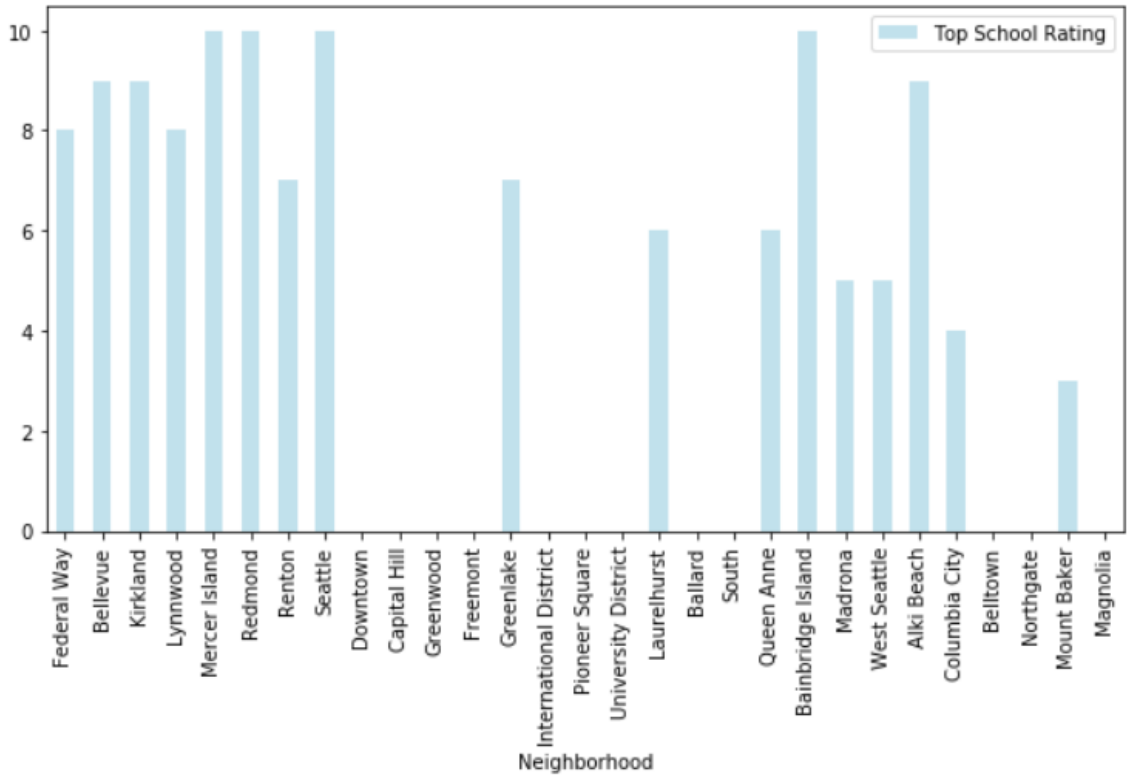
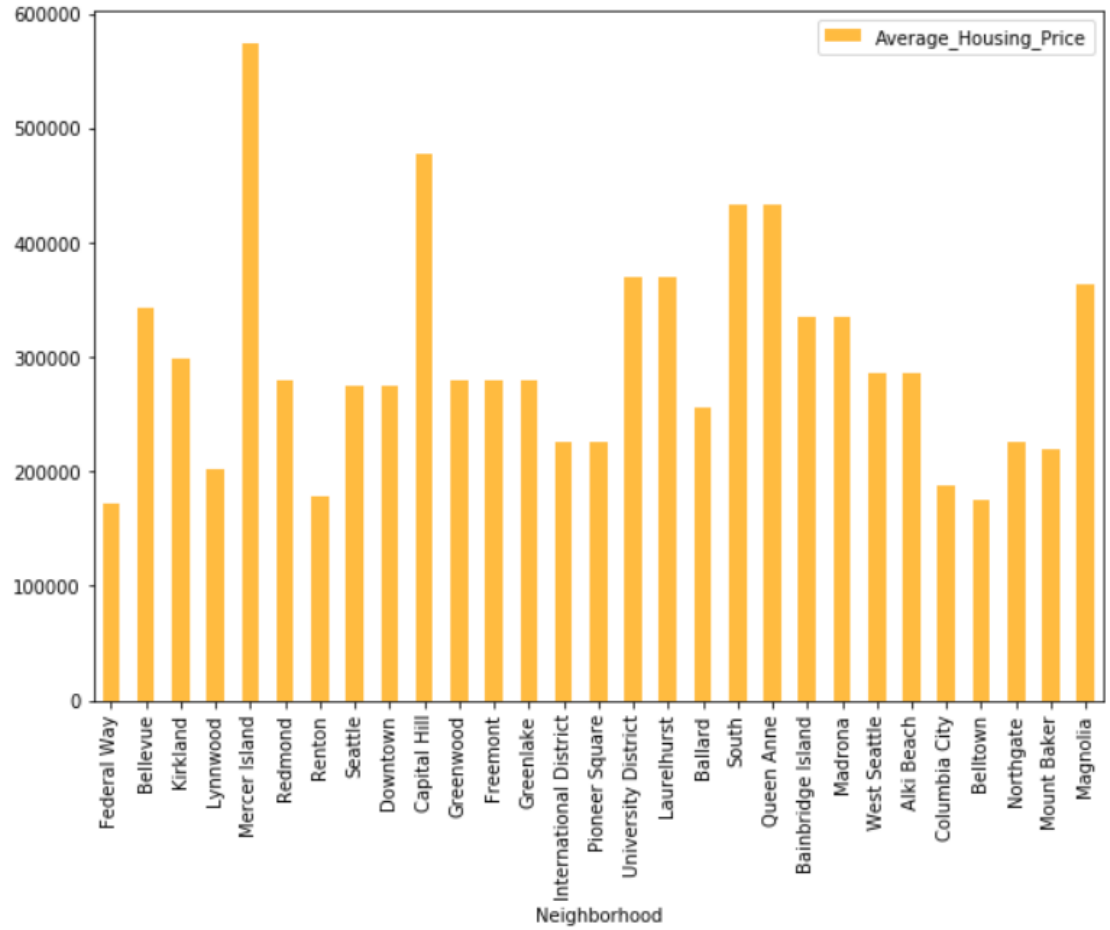


11.Seattle, Washington - Neighborhoods House Pricing

House Pricing



12.Conclusion:

Over all analysis to compare to Bellevue, Kirkland has the higher number of Indian population, good school rating of 9 and a reasonable Avg housing price of around 300k and other reports. So Kirkland is perfect neighbourhoods over Bellevue for Seattle.