Recommending Neighborhoods in Seattle, Washington for Opening a Restaurant

Surbhi Bector

Goal

The goal of this project is to recommend the best area in Seattle for aspiring restaurant owners to open a restaurant based on existing data available. By using multiple data mining and machine learning algorithms, clusters in Seattle will be evaluated based on existing attractions.

Data

Data on Seattle neighborhoods was initially scraped through wikipedia's page on Seattle, Washington.

Data

Foursquare API was utilized to extract information on attractions in different neighborhoods in Seattle.
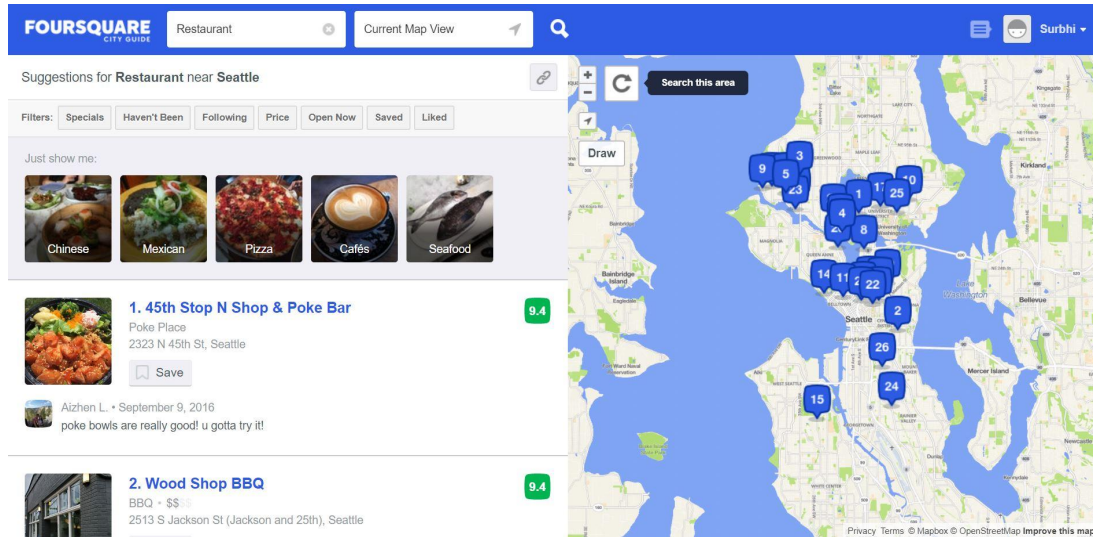
Methodology - Visualization

The GeoPy library was used to obtain latitude and longitude for neighborhoods in Seattle to visualize the maps of the locations using Folium.
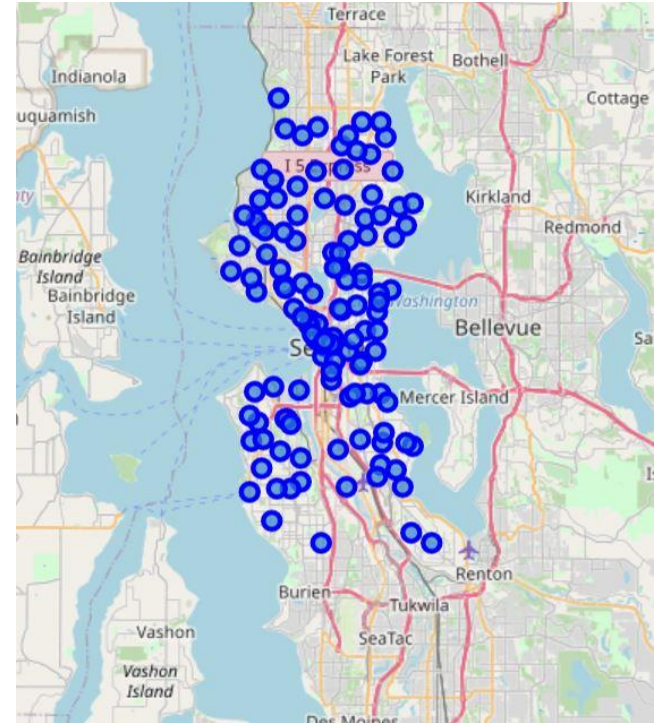
Methodology - K Means Algorithm

To be able to group neighborhoods into areas based on similarities, the K-means algorithm was used to create clusters. This algorithm is an unsupervised learning technique, which is used to find patterns in grouping data.

Results

Cluster 1

```
In [22]: seattle_final.loc[seattle_final['Cluster Labels'] == 0, seattle_final.columns[[1] + list(range(5, seattle_final.shape[1]))]]
```

Out[22]:

	District	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	Seattle	Bus Stop	Coffee Shop	Grocery Store	Park	Library	American Restaurant	Italian Restaurant	Canal	Trail	Bike Shop
2	North Seattle	Marijuana Dispensary	Automotive Shop	Convenience Store	Hardware Store	Food Truck	Fast Food Restaurant	Furniture / Home Store	Steakhouse	Gas Station	Sushi Restaurant
4	North Seattle	Pizza Place	Coffee Shop	Sports Bar	Greek Restaurant	Playground	Pet Store	Rock Club	Park	Sandwich Place	Bus Station
5	North Seattle	Coffee Shop	Mexican Restaurant	Bar	Bookstore	Spa	Pizza Place	Indian Restaurant	Comic Shop	Steakhouse	Sports Bar
6	North Seattle	Arts & Crafts Store	Yoga Studio	Jewelry Store	Sporting Goods Shop	Financial or Legal Service	Supermarket	Taco Place	Greek Restaurant	Pet Service	Kids Store
7	Northgate	Soccer Field	Chinese Restaurant	Vietnamese Restaurant	Bakery	Pool	Tennis Court	Gym	Juice Bar	Track	Athletics & Sports
8	Northgate	Pizza Place	Coffee Shop	Indian Restaurant	Bakery	Grocery Store	Liquor Store	Park	Rock Club	Sandwich Place	Smoke Shop
9	Northgate	Movie Theater	Asian Restaurant	Sandwich Place	Chinese Restaurant	Tanning Salon	Martial Arts School	Bus Station	Thai Restaurant	Coffee Shop	Shipping Store

Cluster 2

```
In [23]: seattle_final.loc[seattle_final['Cluster Labels'] == 1.0, seattle_final.columns[[1] + list(range(5, seattle_final.shape[1]))]]
```

Out[23]:

	District	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
1	North Seattle	Trail	Concert Hall	Women's Store	Filipino Restaurant	Exhibit	Eye Doctor	Fabric Shop	Falafel Restaurant	Farmers Market	Fast Food Restaurant
11	North Seattle	Trail	Women's Store	Ethiopian Restaurant	Exhibit	Eye Doctor	Fabric Shop	Falafel Restaurant	Farmers Market	Fast Food Restaurant	Field

Results

Cluster 3

```
In [24]: seattle_final.loc[seattle_final['Cluster Labels'] == 2, seattle_final.columns[[1] + list(range(5, seattl…
```

Out[24]:

	District	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 M Com Venu
18	North Seattle	Park	Bus Stop	Women's Store	Field	Eye Doctor	Fabric Shop	Falafel Restaurant	Farm Mark
42	Magnolia	Bus Stop	Women's Store	Filipino Restaurant	Eye Doctor	Fabric Shop	Falafel Restaurant	Farmers Market	Fast Rest

Cluster 5

```
In [26]: seattle_final.loc[seattle_final['Cluster Labels'] == 4, seattle_final.columns[[1] + list(range(5, sea…
```

Out[26]:

	District	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	8 C V
76	Downtown	Park	Women's Store	Filipino Restaurant	Eye Doctor	Fabric Shop	Falafel Restaurant	Farmers Market	F

Cluster 4

```
In [25]: seattle_final.loc[seattle_final['Cluster Labels'] == 3, seattle_final.columns[[1] + list(range(5, seattle_final.shape[1]))]]
```

Out[25]:

	District	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
3	North Seattle	Park	Café	Photography Studio	Garden Center	Women's Store	Field	Eye Doctor	Fabric Shop	Falafel Restaurant	Farmers Market
13	Lake City	Park	Trail	Playground	Field	Event Space	Exhibit	Eye Doctor	Fabric Shop	Falafel Restaurant	Farmers Market
16	Lake City	Garden	Marijuana Dispensary	Beach	Playground	Park	Women's Store	Field	Eye Doctor	Fabric Shop	Falafel Restaurant
17	North Seattle	Park	Supermarket	Coffee Shop	Video Store	Steakhouse	Flower Shop	Exhibit	Eye Doctor	Fabric Shop	Falafel Restaurant
24	Windermere / North Seattle	Trail	Arts & Crafts Store	Nature Preserve	Playground	Park	Women's Store	Exhibit	Eye Doctor	Fabric Shop	Falafel Restaurant
28	North Seattle	Park	Seafood Restaurant	Boat or Ferry	Café	Food Truck	Gourmet Shop	Diner	Pizza Place	Bus Line	Tapas Restaurant
31	North Seattle	Park	Spa	Mexican Restaurant	General Travel	Gas Station	Music Store	Grocery Store	Karaoke Bar	Pharmacy	Coffee Shop
40	Central Seattle	Harbor / Marina	Park	Burger Joint	Scenic Lookout	Bus Station	Bus Line	Seafood Restaurant	Sporting Goods Shop	Financial or Legal Service	Fish & Chips Shop

Discussion

Looking at the results we found, clusters one and four have more traffic and seem to be more advantageous for a restaurant owner to look at compared to two, three, and five. Looking further into clusters one and four, cluster four seems to have more green area with the most common nearby venues being parks, gardens, and trails in those neighborhoods. In cluster one there seems to be more entertainment such as cafes, movie theaters, and other restaurants as the most common venues.

Conclusion

Thus, we can conclude it would be most advantageous for a new restaurant owner to open a restaurant up in cluster one of Seattle as there are more attractions to complement a restaurant and high traffic levels in that location.