

**Finding the Most Suitable Location in Seattle, WA  
for UNO Pizzeria**

**IBM - Coursera Final Capstone Project**

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## INTRODUCTION

Uno Pizzeria & Grill (formerly Pizzeria Uno and Uno Chicago Grill), or more informally as UNO's, is a franchised pizzeria restaurant chain under the parent company Uno Restaurant Holdings Corporation. Currently, UNO has more than 100 locations covering 20 states in the USA.

## BUSINESS CASE

This case study is to find a suitable location in Seattle, WA area to open a new branch of UNO Pizzeria. Finding a most suitable location is one of the hardest decisions which has to be made at the beginning of the business. Therefore, UNO management wants to use the new technologies to find an appropriate location in Seattle to open an UNO Pizzeria.

In general, restaurants are located in high traffic areas in order to attract more customers and provide convenient service to the people. Among most of the venues, UNO management has identified Boston, MA has been one of the high revenue locations during the past few years. Therefore, this study will try to find a similar location as Boston, MA.

## DATA

In order to compete the task, I need location-based data and need to pull venues and attraction in Boston and Seattle areas. The following sources will be used to gather the required data.

- Location based data: Foursquare - <https://foursquare.com/>

Foursquare is one of the leading providers of location-based information. I will be using this service to gather the venue data related to Boston and Seattle area.

- Seattle Neighborhood Data:

To find the most suitable neighborhood, first I need the data about the districts and related neighborhood data. To gather that data, I will be using

- i. Wikipedia

[https://en.wikipedia.org/wiki/List\\_of\\_neighborhoods\\_in\\_Seattle](https://en.wikipedia.org/wiki/List_of_neighborhoods_in_Seattle)

- ii. Seattle Geo Data - <http://data-seattlecitygis.opendata.arcgis.com/datasets/city-clerk-neighborhoods/data>

[seattlecitygis.opendata.arcgis.com/datasets/city-clerk-neighborhoods/data](http://data-seattlecitygis.opendata.arcgis.com/datasets/city-clerk-neighborhoods/data)

## METHODOLOGY

### Step 01:

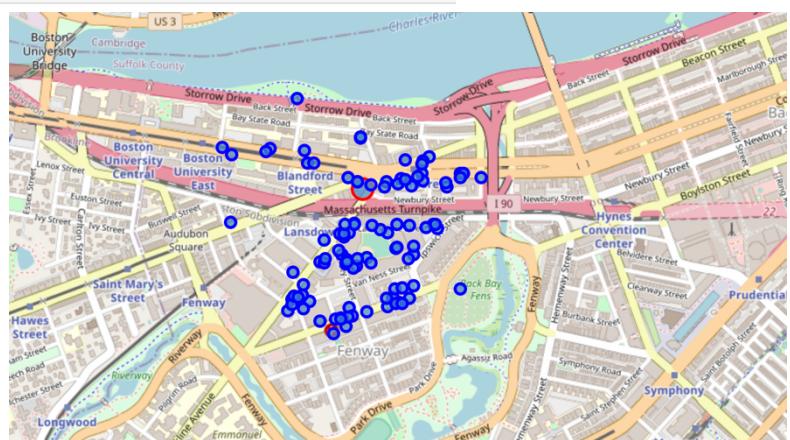
As the first stage of the analysis, the study will be focused on the Boston venue to identify the key attributes in that location. The study will use Foursquare, to gather 100 nearby venues with in 500 meters radius and identify the top 10 customer attraction venues.

Once the venue data is pulled, one-hot encoding was used to find the most frequent venues around Boston.

```
In [17]: num_top_venues = 10

for hood in uno_grouped['Neighborhood']:
    print("----"+hood+"----")
    temp = uno_grouped[uno_grouped['Neighborhood'] == hood].T.reset_index()
    temp.columns = ['venue','freq']
    temp = temp.iloc[1:]
    temp['freq'] = temp['freq'].astype(float)
    temp = temp.round({'freq': 2})
    print(temp.sort_values('freq', ascending=False).reset_index(drop=True).head(num_top_venues))
    print('\n')
```

	venue	freq
0	Sports Bar	0.07
1	American Restaurant	0.06
2	Pizza Place	0.05
3	Coffee Shop	0.05
4	Lounge	0.04
5	Hotel	0.03
6	Café	0.03
7	Burger Joint	0.03
8	Japanese Restaurant	0.03
9	Sushi Restaurant	0.02



## Step 02:

Analyze the neighborhoods in Seattle, WA and find the most frequent venues in the area.

In order to complete this step, I used Wikipedia site to pull the districts and neighborhood data of Seattle. After pulling that data I used the geolocator to find the latitude and longitude information for each neighborhood.

Then I used the Foursquare to pull the venues around each of the Seattle neighborhood and again used one hot encoding to find the most frequent venues in each neighborhood.

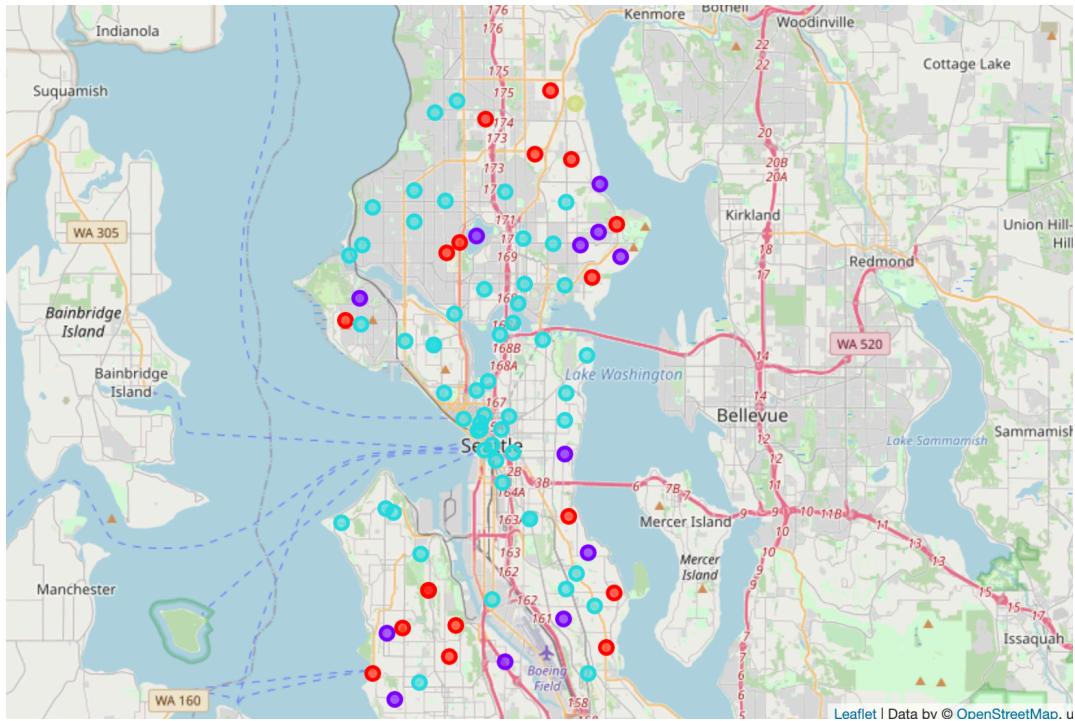
Out[35]:

Neighbourhood	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 Adams	Park	Dog Run	Soccer Field	Dry Cleaner	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant	Event Space	Eye Doctor	Fabric Shop
1 Alki	Ice Cream Shop	Coffee Shop	Mexican Restaurant	Italian Restaurant	Restaurant	Park	Thai Restaurant	Scenic Lookout	Baseball Field	Baseball Stadium
2 Arbor Heights	Park	Hotel	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant	Event Space	Eye Doctor	Fabric Shop	Zoo Exhibit
3 Atlantic	Sporting Goods Shop	Thrift / Vintage Store	Cheese Shop	Food Truck	Marijuana Dispensary	Rental Car Location	Intersection	Electronics Store	Light Rail Station	Grocery Store
4 Belltown	Hotel	Bakery	Sushi Restaurant	Coffee Shop	Gym	Bar	Cocktail Bar	Cruise	Deli / Bodega	New American Restaurant

## Step 03:

Use K-means clustering to identify the similar neighborhoods and finally select the most suitable and matching neighborhood for the new UNO location.

Once I found the top venues around each neighborhood, I used K-mean clustering to group the similar neighborhoods. After a couple of attempts, I figured four clusters are enough for the grouping. Once the clustering is completed, I analyzed the clusters to find the most similar cluster which contain most of the identified venues in Boston area.



## OBSERVATIONS

It is noticed that the third cluster contains similar venues like in Boston area. Therefore, that cluster was selected for further analysis.

District	Neighbourhood	Latitude	Longitude	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
Ballard	Loyal Heights	47.688709	-122.392907	2.0	Pizza Place	General College & University	Fish Market	Music Store	Convenience Store	Bakery	Middle Eastern Restaurant	Mexican Restaurant
Ballard	Sunset Hill	47.675217	-122.398448	2.0	Bakery	Ice Cream Shop	Weight Loss Center	Cocktail Bar	Italian Restaurant	Fair	Eastern European Restaurant	Electronics Store
Ballard	Whittier Heights	47.683297	-122.371449	2.0	Bar	Breakfast Spot	Bus Stop	Furniture / Home Store	Bakery	Karaoke Bar	Park	Cocktail Bar
Beacon Hill	North Beacon Hill	47.577586	-122.309960	2.0	Mexican Restaurant	Pub	Coffee Shop	Café	Trail	Pizza Place	Dance Studio	Peking Duck Restaurant
Beacon Hill	South Beacon Hill	47.577586	-122.309960	2.0	Mexican Restaurant	Pub	Coffee Shop	Café	Trail	Pizza Place	Dance Studio	Peking Duck Restaurant

```
s1: Cluster 4 = seattle_merged.loc[seattle_merged['Cluster Labels']==3].seattle_merged.columns[[11+list(range(0, seatt
```

After selecting the most suitable cluster, it is important to filter the neighborhoods to include only the urban areas. That will help with more foot traffic and it will be easier for deliveries, transportation and advertising.

```

]: Cluster_3_Central = Cluster_3[Cluster_3.District == 'Central Area']
Cluster_3_downtown = Cluster_3[Cluster_3.District == 'Downtown']

cluster_3_filtered = Cluster_3_Central.append(Cluster_3_downtown)

Cluster_3_filtered = Cluster_3_filtered[['Neighbourhood', 'District', 'Latitude', 'Longitude']].copy()
Cluster_3_filtered = Cluster_3_filtered.loc[:,~Cluster_3_filtered.columns.duplicated()]
Cluster_3_filtered.shape

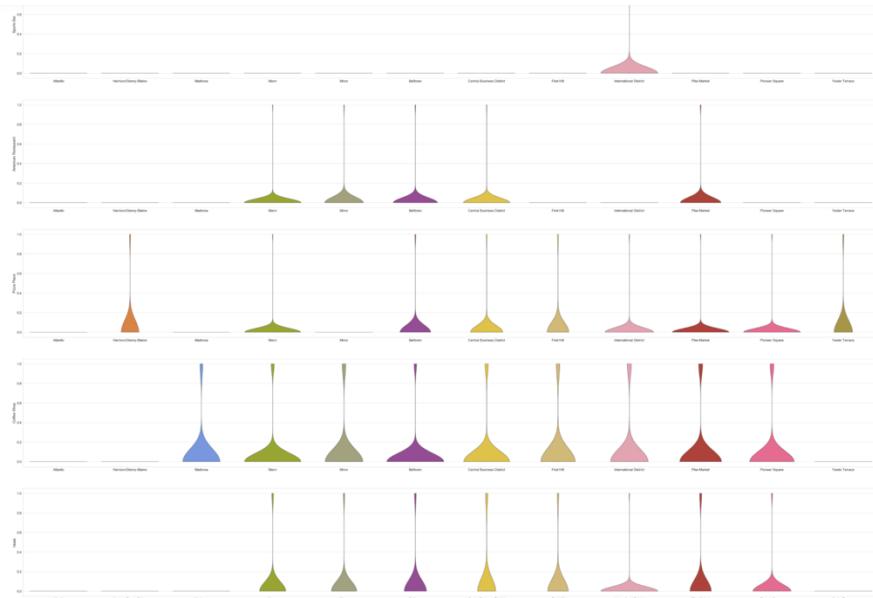
]: (12, 4)

]: downtown_venues = getNearbyVenues(names=Cluster_3_filtered['Neighbourhood'],
                                     latitudes=Cluster_3_filtered['Latitude'],
                                     longitudes=Cluster_3_filtered['Longitude'])

Atlantic
Harrison/Denny-Blaine
Madrona
Mann
Minor
Belltown
Central Business District
First Hill
International District
Pike-Market
Pioneer Square
Yesler Terrace

```

Once I have filtered the urban neighborhoods, the next step is finding the most suitable neighborhood. In order to do that, I used categorial plot to visualize top 5 venues in each neighborhood.



## CONCLUSION

After looking at the categorical plot, most of the neighborhoods have considerable amount of venues which are matching to Boston neighborhood. However, we will select the "international District" among the other neighborhoods. It contains Sports bars which is the top venue in Boston, and it has four out of five of other venues as well.

