Where to Open a Pizza Restaurant in Seattle

Capstone Project for IBM Data Science Professional Certificate

Background

1.1 Background

Opening a restaurant is a long and difficult process. The process of determining a location to open a restaurant can take place at any point in the process. There are multiple different variables that a business owner may need to consider when deciding where to open a restaurant. The goal of this report is to identify neighborhoods in the Seattle, Washington area as potential candidates for the most successful pizza business. Seattle is a largely populated area with many diverse options in terms of dining. This report will utilize data from different neighborhoods to cluster and identify potential neighborhoods to open a pizza restaurant.

Problem

1.2 Problem

Neighborhood similarities and differences can be a key contributor in predicting the success of a business within that neighborhood. Surrounding venues within a neighborhood are ca key factor into determining the success of a potential new business. The key problem that this report addresses is “Which neighborhood (or set of neighborhoods) in the Seattle Washington area would be the best to open the most successful pizza restaurant?”

Interest

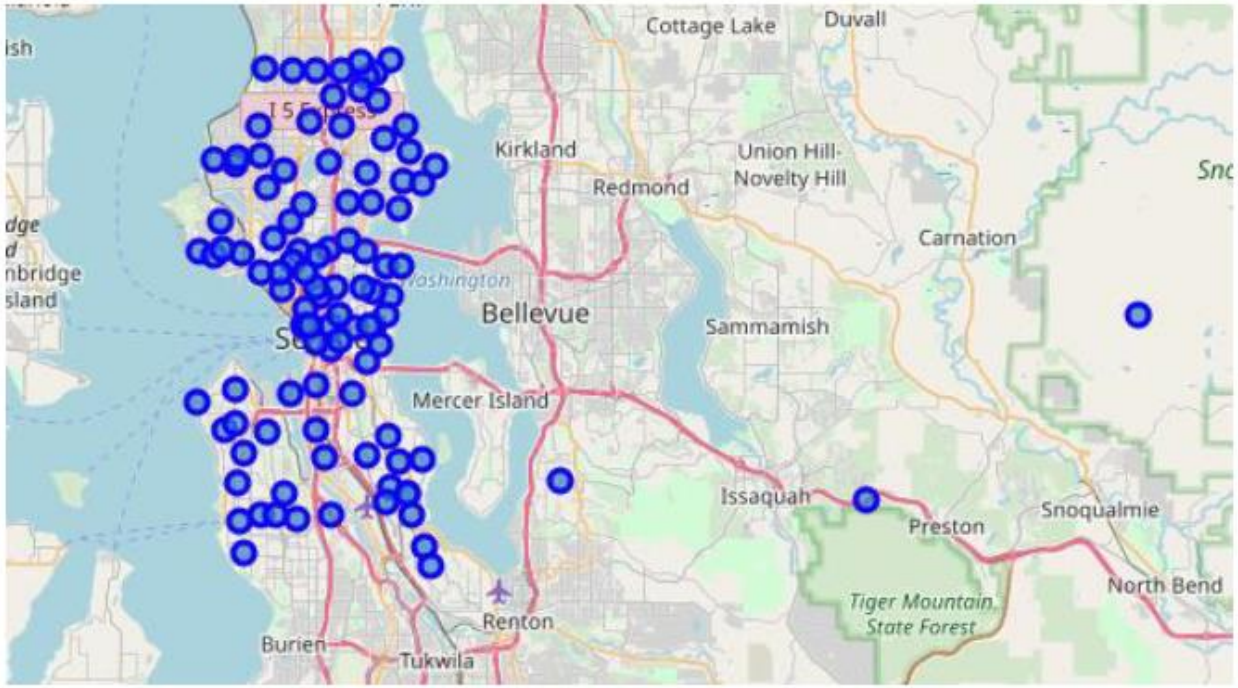
1.3 Interest

Any aspiring business owner would be interested to see neighborhood segmentation of how a certain business would perform. Anybody who is looking to open a pizza restaurant would find the results of this report valuable and would likely look to dive deeper into the neighborhood that result.

Data Cleaning and Preparation

2.2 Data Cleaning and Preparation

Once the data was loaded into the Jupyter notebook, a Folium map was created to visualize the locations of each neighborhood. From there, a client link was utilized to establish a connection to the Foursquare API. The Foursquare API was used to gather venues for each neighborhood. Once the venues were gathered, frequencies for the types of venue for each neighborhood were gathered and put into a Pandas dataframe. After that, each neighborhood was analyzed to list the top 10 venues in terms of frequency.



Most Common Venues

3.1 Most Common Venues

In order to prepare the neighborhoods for K-Means clustering, most common venues had to be pulled from the Foursquare API.

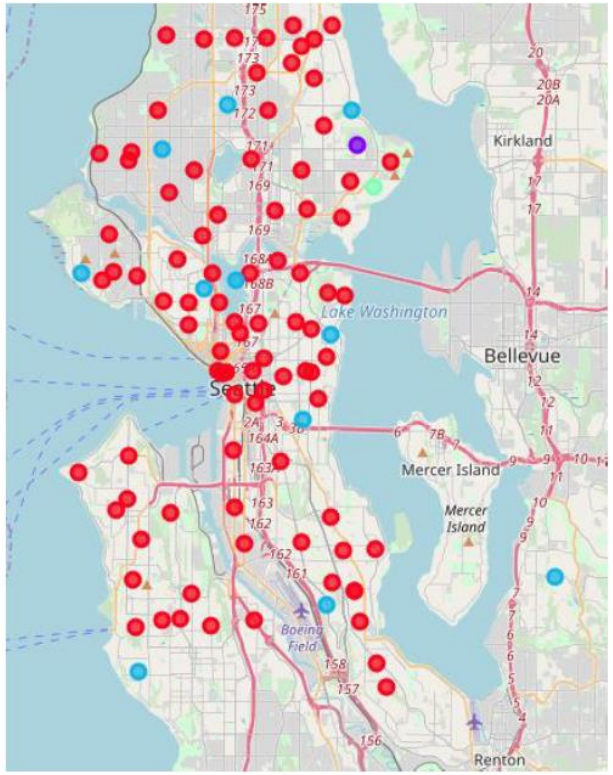
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Alki Point	Coffee Shop	Restaurant	Park	Art Gallery	Beach	Italian Restaurant	Baseball Field	Baseball Stadium	French Restaurant	Donut Shop
1	Arbor Heights	Music Venue	Park	Event Space	Drugstore	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant	Women's Store
2	Ballard	French Restaurant	Bus Stop	Park	Jewelry Store	Coffee Shop	Women's Store	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store
3	Beacon Hill	Bus Station	Light Rail Station	Women's Store	Eye Doctor	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant	Event Space	Fair
4	Belltown	Bus Stop	Harbor / Marina	Boat or Ferry	Intersection	Deli / Bodega	Dive Shop	Bus Line	Park	Trail	Grocery Store

Now that the neighborhoods each had a list of most common venues, the data was ready for K-Means clustering.

K-Means Clustering

3.2 K-Means Clustering

K-Means clustering was used to cluster similar neighborhoods together. After these clusters were determined, Folium was used again to create a visualization of the data. See the below image for a visualization of the different clusters of Seattle neighborhoods.



Data Assumptions

3.3 Data Assumptions

After clustering the neighborhoods, it was clear that "Cluster 1" contained venues like that of a pizza restaurant. Based on the most common venues, this cluster was chosen for further analysis.

After deciding to continue with "Cluster 1", 91 neighborhoods remained. It was then decided that any neighborhood with 'Pizza Place' in it's top 10 venues should be dropped from the dataset. This decision as made to consider competition of pizza restaurants. If there were already established pizza restaurants within the area, it would be unlikely for a new pizza restaurant to succeed. After removing these neighborhoods, 66 neighborhoods remained.

To narrow down the lists of neighborhoods further, the rest of the venue types were analyzed. It was determined that similar types of restaurants would provide more competition, so neighborhoods with these venue types should be eliminated from consideration. These venue types were 'American Restaurant', 'BBQ Joint', 'Burger Joint', 'Chinese Restaurant', 'Italian Restaurant', 'Latin American Restaurant', 'New American Restaurant', 'Sandwich Place', 'Sports Bar', and 'Steakhouse'.

Conclusions

4. Conclusion

After segmenting these neighborhoods and removing neighborhoods likely to be too competitive, 32 neighborhoods remain (see figure below):

	Neighborhood name	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
2	Ballard	French Restaurant	Bus Stop	Park	Jewelry Store	Coffee Shop	Women's Store	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store
3	Beacon Hill	Bus Station	Light Rail Station	Women's Store	Eye Doctor	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant	Event Space	Pet
4	Belltown	Bus Stop	Harbor / Marina	Boat or Ferry	Intersection	Deli / Bodega	Dive Shop	Bus Line	Park	Trail	Grocery Store
8	Broadmoor	Soccer Field	Playground	Garden	Golf Course	Ethiopian Restaurant	Drugstore	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store
9	Broadview	Concert Hall	Trail	Dog Run	Drugstore	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant	Event Space
10	Bryant	Trail	Farm	Baseball Field	Women's Store	Event Space	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant
13	Cedar Park	Supermarket	Vietnamese Restaurant	Women's Store	Eye Doctor	Drugstore	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant
14	Central Seattle	Ethiopian Restaurant	Thai Restaurant	Asian Restaurant	Bar	Playground	Baseball Field	Gym Pool	Deli / Bodega	Bus Stop	Grocery Store
15	Central Waterfront	Coffee Shop	Seafood Restaurant	Hotel	Bakery	French Restaurant	Cocktail Bar	Brewery	Breakfast Spot	Hobby Shop	Herbs & Spices Store
25	Fauntleroy	Fish & Chips Shop	Botanical Garden	Pilates Studio	Coffee Shop	Cupcake Shop	Deli / Bodega	Park	Cosmetics Shop	Gym / Fitness Center	Eastern European Restaurant
32	Haller Lake	Lake	Playground	Coffee Shop	Park	Dance Studio	Event Space	Drugstore	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant
41	Interbay	Bus Stop	Golf Course	Café	Arts & Crafts Store	Wine Shop	Baseball Field	Miscellaneous Shop	Basketball Court	Gymnastics Gym	Bike Shop
47	Laurelhurst	Park	Thai Restaurant	Pharmacy	Coffee Shop	Salon / Barbershop	Gym	Juice Bar	Café	Food Truck	Gift Shop
48	Lawton Park	Dog Run	Grocery Store	Coffee Shop	Breakfast Spot	Drugstore	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant
52	Madison Park	Bar	Bank	Soccer Field	Flower Shop	Bakery	Beach	Korean Restaurant	Café	Food & Drink Shop	Track
57	Maple Leaf	Coffee Shop	Video Store	Toy / Game Store	Gourmet Shop	Convenience Store	Bus Station	Bus Stop	School	Restaurant	Theater
61	North Admiral[152] / Admiral District	Coffee Shop	Grocery Store	Gym / Fitness Center	Yoga Studio	Convenience Store	Spa	Shoe Repair	Salon / Barbershop	Pub	Post Office
62	North Beacon Hill	Café	Mexican Restaurant	Yoga Studio	Gas Station	Coffee Shop	Pub	Scenic Lookout	Brewery	Mediterranean Restaurant	Taco Place
64	North Delridge	Bus Station	Soccer Field	Coffee Shop	Women's Store	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant	Event Space
69	Olympic Hills	Bar	Gymnastics Gym	Women's Store	Event Space	Drugstore	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant
75	Portage Bay[92] / Roanoke	Harbor / Marina	Pier	Deli / Bodega	Women's Store	Eye Doctor	Drugstore	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store
77	Rainier Beach / Atlantic City Beach	Garden	Baseball Field	Vacation Rental	Women's Store	Donut Shop	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant
79	Rainier View / Lakeridge	Gun Range	Lounge	Gym / Fitness Center	Women's Store	Drugstore	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant
88	Ravenna	Mediterranean Restaurant	Greek Restaurant	Southern / Soul Food Restaurant	Bookstore	Sushi Restaurant	New American Restaurant	Bakery	Bagel Shop	Clothing Store	Pub
92	Rexhill	Spa	Liquor Store	Pool	Jewelry Store	Pharmacy	Eye Doctor	Soccer Field	Other Repair Shop	Furniture / Home Store	Department Store
93	Sand Point	Tennis Court	Soccer Field	Dog Run	Theater	Park	Amphitheater	Rugby Pitch	Food Truck	Indie Movie Theater	Donut Shop
94	Seward Park	Music Venue	Scenic Lookout	Event Space	Drugstore	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant	Women's Store
95	SoDo	Food Truck	Coffee Shop	Donut Shop	Korean Restaurant	Furniture / Home Store	Taco Place	Caribbean Restaurant	Museum	Arts & Crafts Store	Sporting Goods Shop
97	South Delridge	Bus Stop	Spa	Women's Store	Eye Doctor	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant	Event Space
99	South Park	Brewery	Park	Bar	Women's Store	Event Space	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant
91	Stevens	Bakery	Bus Stop	Greek Restaurant	Bar	Furniture / Home Store	Taco Place	Gourmet Shop	Sporting Goods Shop	Vietnamese Restaurant	Coffee Shop
92	Sunset Hill	Harbor / Marina	Boat or Ferry	Coffee Shop	Playground	Board Shop	Food Truck	Outdoor Sculpture	Park	Gas Station	Construction & Landscaping

In conclusion, these 32 neighborhoods qualify as potential spots for a new successful pizza restaurant. This analysis provides a solid baseline for any entrepreneur looking to jumpstart a potential pizza business. This data also provides an opportunity for any potential opportunity to break the neighborhoods down even more based on individual priorities.

Thank you for taking the time to read this report.