

Suggesting Restaurant Location in Vancouver

Data Science Capstone Project – The Battle of Neighborhoods

SILVIA ESPERANZA ÁLVAREZ ZÚÑIGA

Suggesting Restaurant Location in Vancouver for a group of investors

- A group of investors is interested on supporting a business of a new authentic Mexican cuisine restaurant
- They need to find a convenient region (or regions) to establish this restaurant in Vancouver.
- Finding the optimum place will increase their probabilities of success.
- They are asking for a recommendation based on machine learning.

Obtaining the dataset

★ Dataset required:

- Neighborhoods in Vancouver

- a) Postal code

- b) Neighborhood

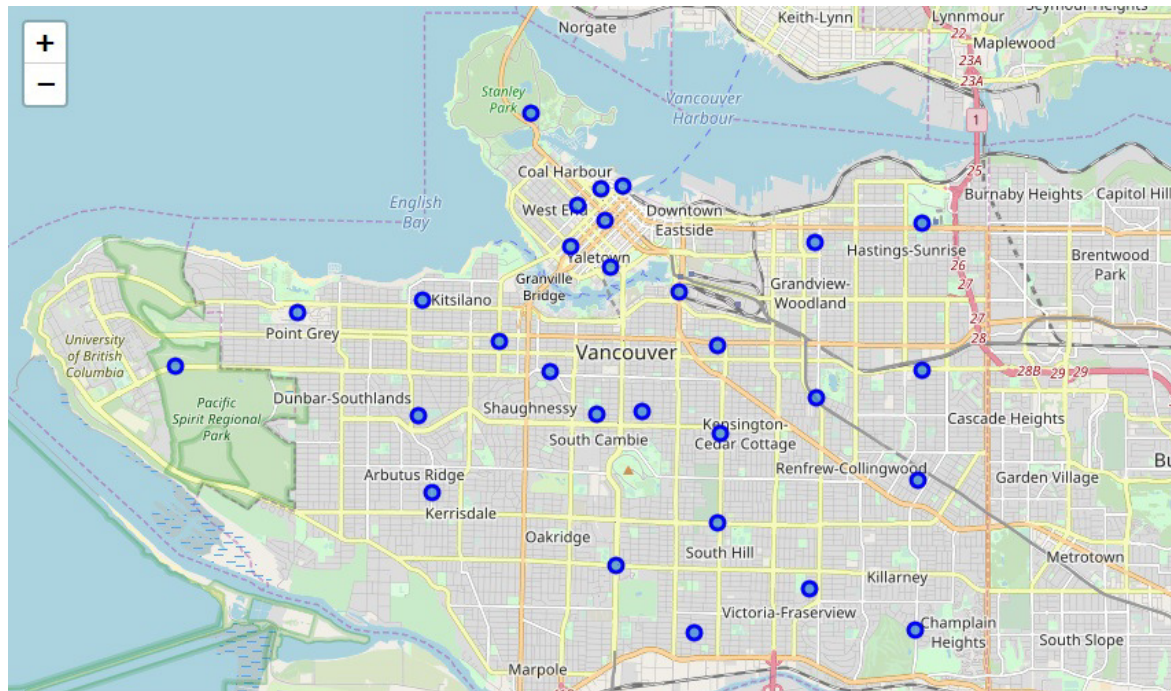
This data was obtained by scrapping a Wikipedia page using Beautiful Soup :

https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_V

- Latitude and longitude for each neighborhood
 - Obtained using Nominatim from Geopy
- Final dataset with 29 rows containig Postal Code, Neighborhood, Latitude and Longitude. Only considered Postal codes for Vancouver and grouped neighborhoods with the same postal code by row.

Vancouver region

- Each point is one neighborhood in Vancouver.
- All points together conform Vancouver region.



Foursquare

★ To get the venues for each neighborhood:

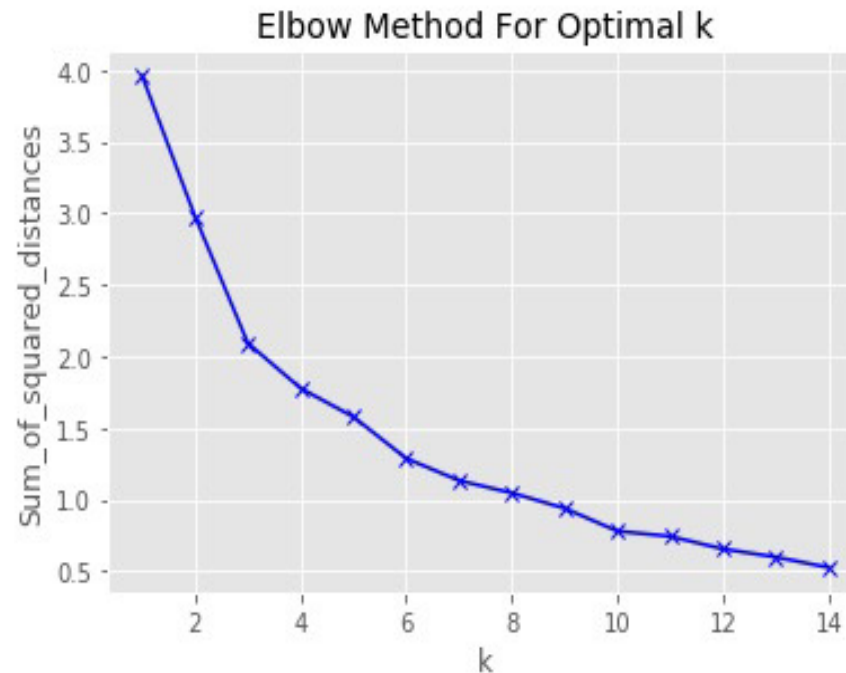
- Radius = 500m
- Limit = 100 venues

★ Obtained:

- 971 venues in all
- 187 categories

K-means algorithm

- K-means used for create clusters of neighborhoods based on kind of venues.
- Elbow method used to find best k value ($k = 6$)



Clusters

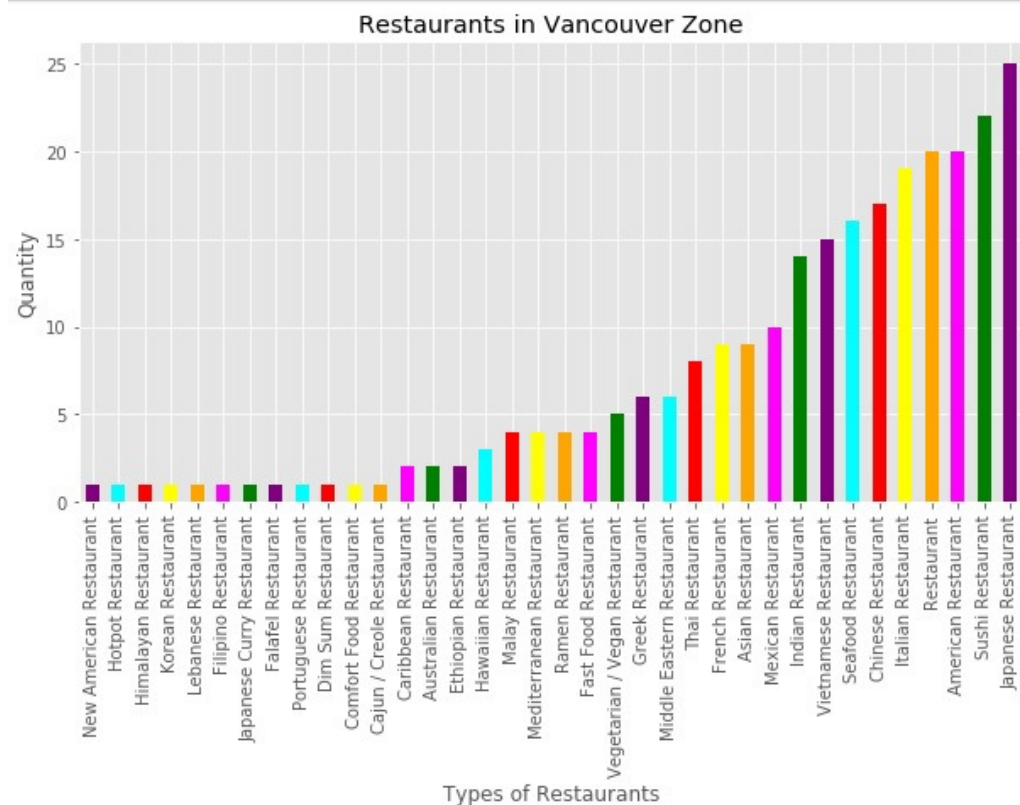
★ Names of the clusters related to the prevailing type of venues on each cluster.

- **Cluster 1:** Coffee and Asian Food Venues (11 neighborhoods)
- **Cluster 2:** Park Venues (1 neighborhood)
- **Cluster 3:** Trail Venues (1 neighborhood)
- **Cluster 4:** Domestic Venues (1 neighborhood)
- **Cluster 5:** Restaurant and Bakery Venues (1 neighborhood)
- **Cluster 6:** Hotel and All World Cuisine Restaurants Venues (15 neighborhoods)

Restaurants in Vancouver

★ There are only 10 Mexican restaurants on the analyzed region, vs 25 Japanese restaurants.

★ The market is not saturated for Mexican restaurants.



Mexican restaurants

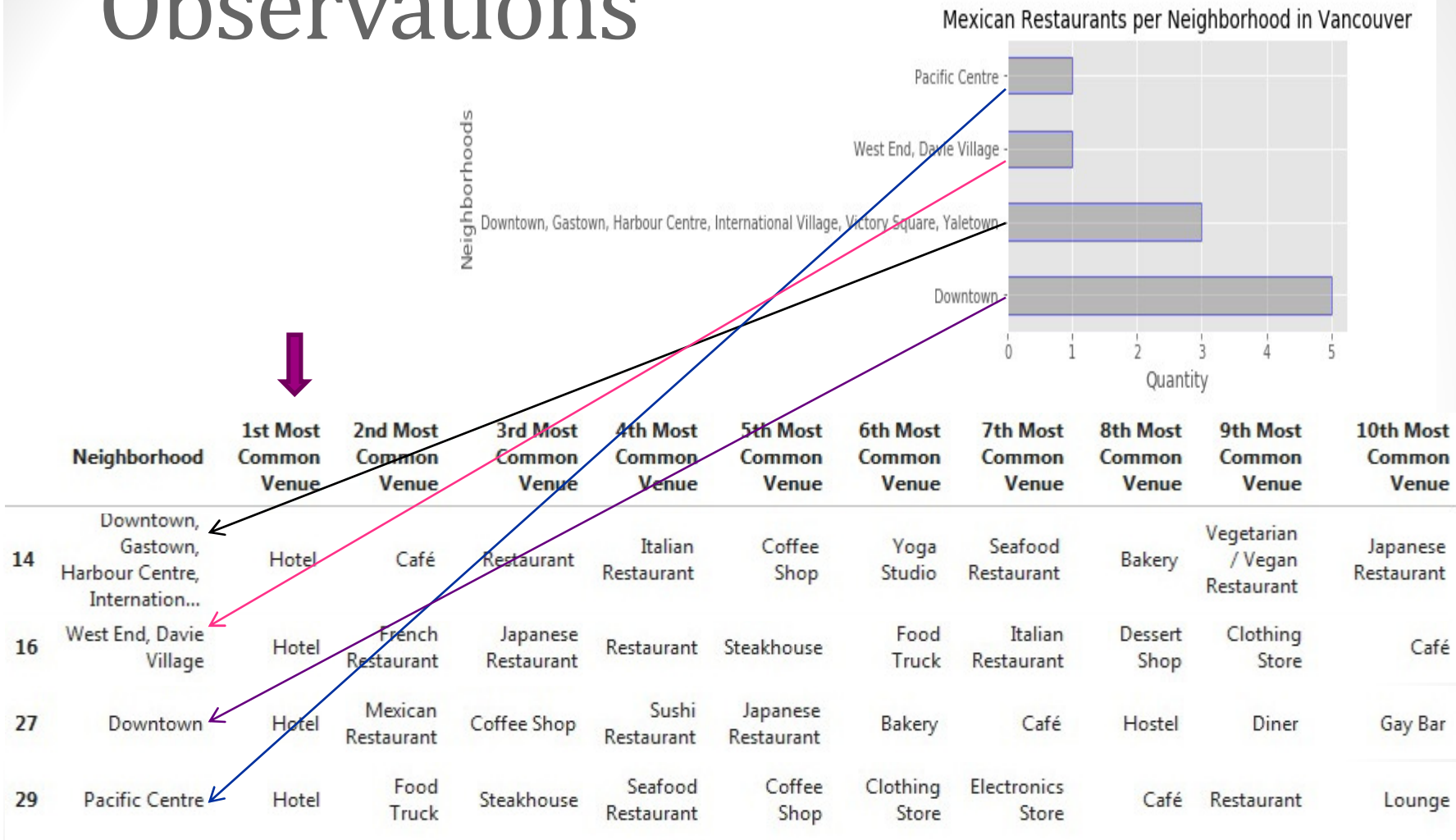


★ Important when analyzing clusters.

Best option: Cluster 6

	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	Hastings-Sunrise	Event Space	Theme Park	Hockey Arena	Stadium	Theme Park Ride / Attraction	Sandwich Place	Market	Farm	Fair	Beer Garden
	3	Grandview-Woodland, Kensington-Cedar Cottage	Café	Dog Run	Gym / Fitness Center	Child Care Service	Church	Lake	Bookstore	Concert Hall	Beach	Gym
	5	Renfrew-Collingwood	Hotel	Asian Restaurant	Fish & Chips Shop	Bus Stop	Bar	Park	-	-	-	-
	7	Mount Pleasant	Ethiopian Restaurant	Sushi Restaurant	Grocery Store	Pizza Place	Liquor Store	Market	Sandwich Place	Sports Bar	Japanese Restaurant	Pub
	10	Oakridge, Marpole, Sunset	Park	History Museum	Indian Restaurant	Electronics Store	Bus Stop	-	-	-	-	-
	13	Strathcona, Chinatown, Downtown Eastside	Brewery	Bakery	Ice Cream Shop	Gastropub	Coffee Shop	Beer Bar	Liquor Store	Café	Salad Place	Food Truck
	14	Downtown, Gastown, Harbour Centre, International...	Hotel	Café	Restaurant	Italian Restaurant	Coffee Shop	Yoga Studio	Seafood Restaurant	Bakery	Vegetarian / Vegan Restaurant	Japanese Restaurant
	15	Waterfront, Coal Harbour, Canada Place	Coffee Shop	Boat or Ferry	Café	Hotel	American Restaurant	Food Truck	Japanese Restaurant	Bar	Pizza Place	Seafood Restaurant
	16	West End, Davie Village	Hotel	French Restaurant	Japanese Restaurant	Restaurant	Steakhouse	Food Truck	Italian Restaurant	Dessert Shop	Clothing Store	Café
	17	West End, Stanley Park	Aquarium	Park	Theme Park Ride / Attraction	Zoo Exhibit	Bus Station	Garden	Exhibit	Event Space	Music Venue	Other Great Outdoors
★	18	Fairview, Granville Island, Shaughnessy	Breakfast Spot	Coffee Shop	Furniture / Home Store	Bakery	Bus Stop	Gourmet Shop	Lingerie Store	Cajun / Creole Restaurant	Café	Burger Joint
	24	Kerrisdale, Oakridge, Marpole	Park	Bubble Tea Shop	Construction & Landscaping	Track	Golf Course	Bus Stop	-	-	-	-
	27	Downtown	Hotel	Mexican Restaurant	Coffee Shop	Sushi Restaurant	Japanese Restaurant	Bakery	Café	Hostel	Diner	Gay Bar
★	28	Bentall Centre	Hotel	American Restaurant	Coffee Shop	Dessert Shop	Café	Restaurant	Steakhouse	Seafood Restaurant	Cosmetics Shop	Miscellaneous Shop
	29	Pacific Centre	Hotel	Food Truck	Steakhouse	Seafood Restaurant	Coffee Shop	Clothing Store	Electronics Store	Café	Restaurant	Lounge

Observations



- ★ All Mexican restaurants are in Cluster 6
- ★ All these neighborhoods (Mexican restaurants) have Hotel in 1st Common Venue

Recommendation

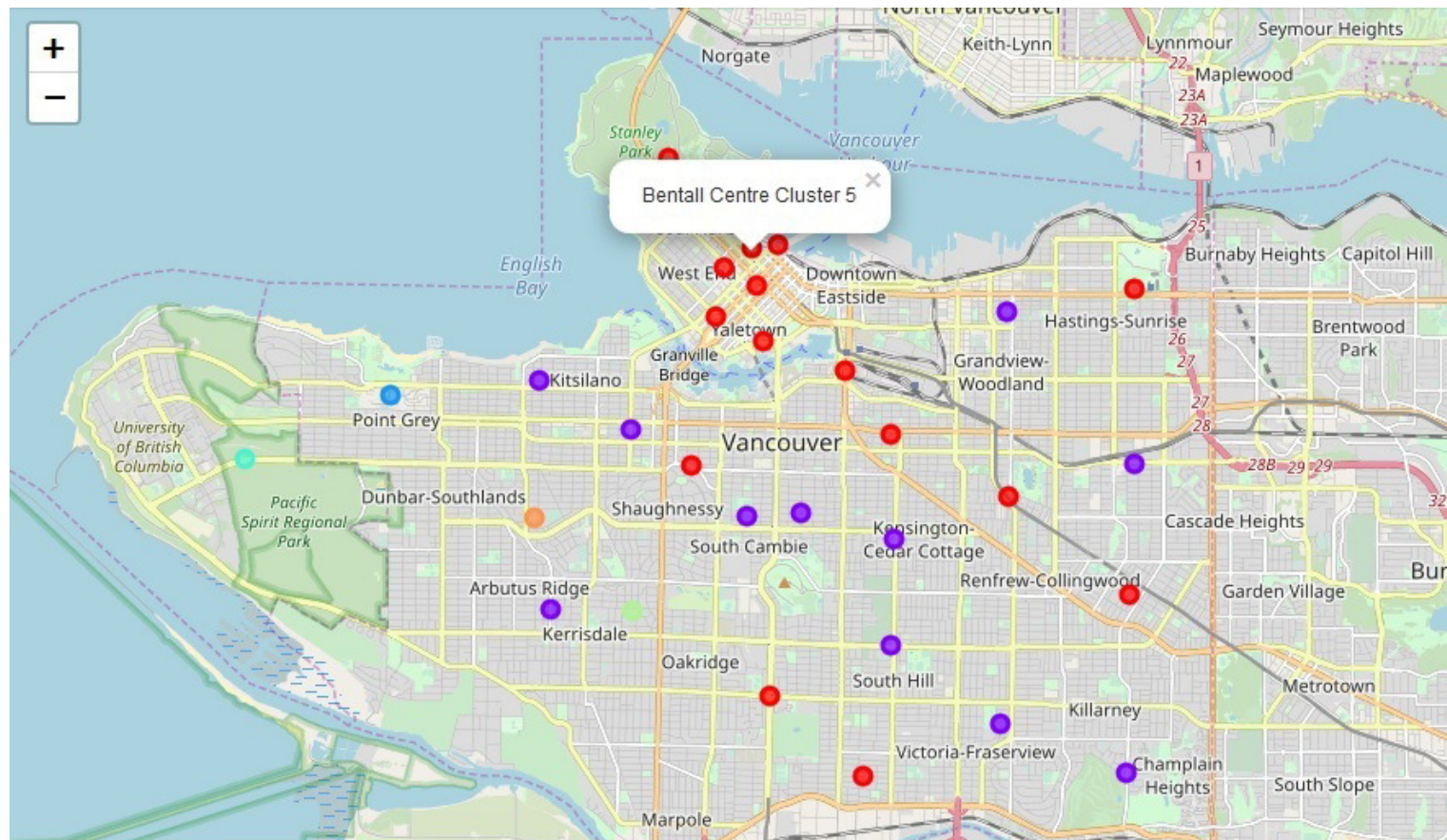
- In accordance with the observations we could consider like optimum a neighborhood from Cluster 6 and, if possible, a neighborhood with “Hotel” as 1st Common Venue.
- Therefore, our advice to the investors is to consider **Bentall Centre** as the optimum neighborhood to locate the new authentic Mexican cuisine restaurant.



	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
28	Bentall Centre	Hotel	American Restaurant	Coffee Shop	Dessert Shop	Café	Restaurant	Steakhouse	Seafood Restaurant	Cosmetics Shop	Miscellaneous Shop

Recommendation

- Bentall Centre



Conclusion

- ★ Applied machine learning (k-means) to a case of the real world.
- ★ The methodology and results can be improved by the use of more accurate and complete data.
- ★ Consider the final result as a fairly good one.

References

[1] Wikipedia: <https://en.wikipedia.org/wiki/Vancouver>

[2] Wikipedia:
https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_V

[3] https://en.wikipedia.org/wiki/Postal_codes_in_Canada

[4] <https://es.foursquare.com/>