Opening a French Restaurant in Wellington, New Zealand

IBM Data Science Capstone

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Introduction

CONTEXT

- Wellington is New Zealand's capital
- Third-largest city by population in New Zealand
- Community of foodies in Wellington and a demand for European cuisine.
- French restaurant highly appreciated but pricy and fancy

Challenges : Find the best suburbs to open the restaurant in out of the 57 of Wellington

Challenge 1

Challenge 2

Challenge 3

Find areas where people have sufficient incomes and standard of living to frequent the restaurant regularly

Find areas not overcrowded with restaurants, but still lively, having enough venues around

Find areas where the housing price is not too expensive since one want to reduce the initial cost of the acquisition of the restaurant building thus reducing the risk of the investment.

Data acquired

- **Wellington's Wards and Suburbs Dataset** scraped from the Wikipedia Page of Wellington (https://en.wikipedia.org/wiki/Wellington). With coordinates of Wellington's suburbs collected with GeoPy.
- **Median house price per Suburb of the Wellington Region as of September 2019 Dataset** from https://blog.homes.co.nz/wellington-median-house-price-by-suburb
- **Victimisations Numbers for Wellington City per Area Unit (7/1/2014 to 3/1/2020) Dataset** found on the New Zealand police website (https://www.police.govt.nz/about-us/publications-statistics/data-and-statistics/policedatanz /victimisation-time-and-place).
- **Census - Median household income per Area Unit 2001, 2006, 2013 Dataset** for all Area Unit of New Zealand. The data is provided by Stats NZ and can be found on the following website: https://figure.nz/table/SSkBckhaaTU3hRqA.

Data acquired

- **Area Unit 2013** provided by Stats NZ and available at https://datafinder.stats.govt.nz/layer/25743-area-unit-2013/.

- **Wellington Venues**, obtained using the **Foursquare API**. Foursquare API is used to get the common venues of the different areas, including the restaurants and their numbers.

- **Wellington French Restaurants**, obtained using the **Foursquare API**. Foursquare API is used to get the French Restaurants of the different areas.

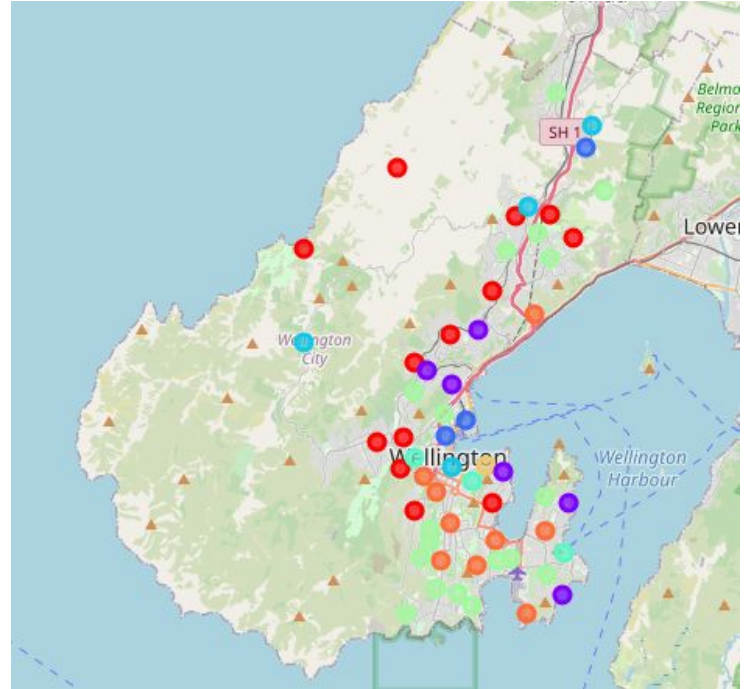# Using the Data to solve to find the best suburbs to open a French restaurant

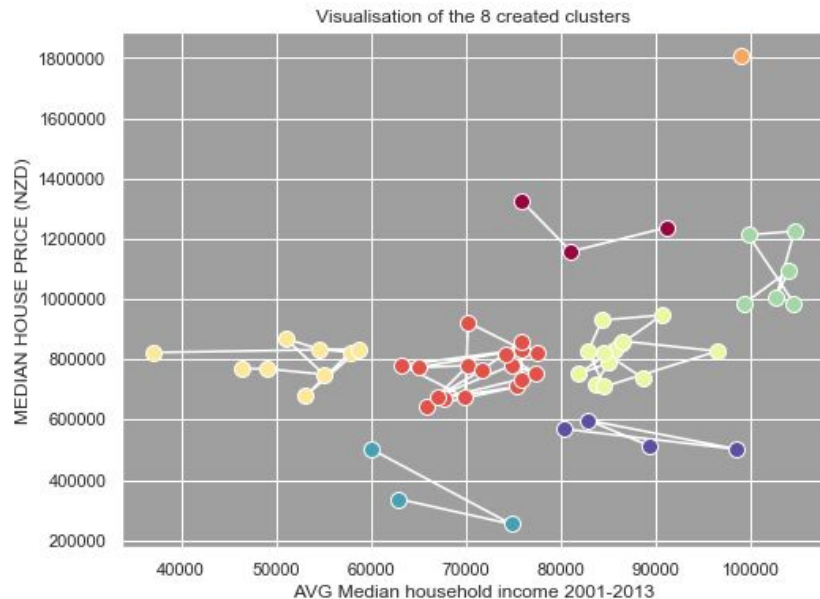# Clustering the suburbs using their median household income and median house price
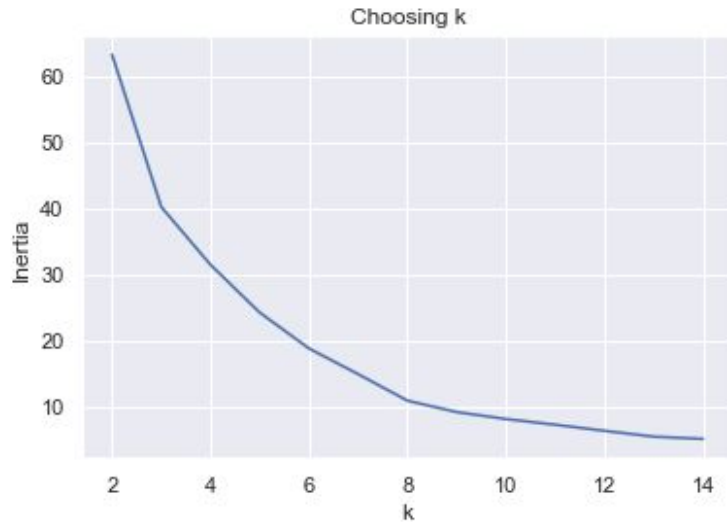
K-Means Clustering ➡ 8 Clusters created

Clustering the suburbs using their median household income and median house price

Visualisation of the 8 created clusters

	Household Income	House Price
Cluster 0	HIGH	MODERATE - HIGH
Cluster 1	MODERATE	LOW - MODERATE
Cluster 2	VERY HIGH	VERY HIGH
Cluster 3	VERY LOW	LOW
Cluster 4	HIGH	LOW - MODERATE
Cluster 5	VERY HIGH	MODERATE - HIGH
Cluster 6	LOW - MODERATE	VERY LOW
Cluster 7	HIGH	VERY LOW - LOW

Clusters selected : 0, 4, 5 & 7 = 26/57 suburbs

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Eliminating suburbs using Victimisations Data
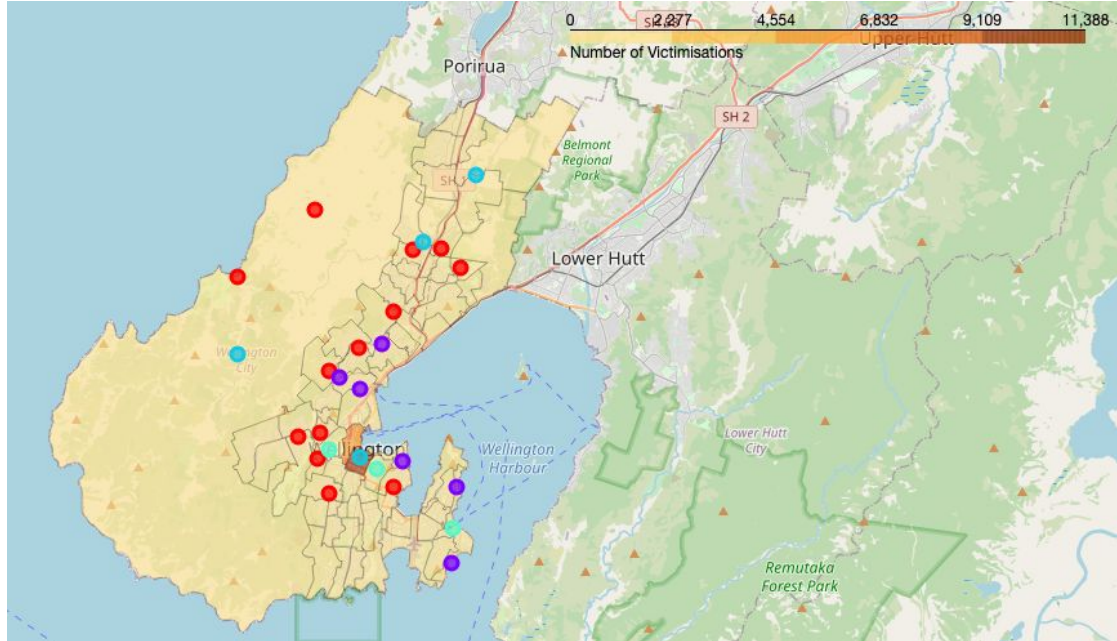
Dropping the suburb with a high number of victimisations
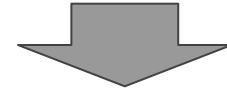
25/57 suburbs selected

Filtering the selected suburbs regarding their numbers of venues, restaurants, and French restaurants

All 57 suburb's statistics

	Nb Restaurants	Number of French Restaurants	Nb Venues
count	57.000000	57.00000	57.000000
mean	2.964912	0.54386	16.263158
std	5.728890	0.78080	20.363243
min	0.000000	0.00000	1.000000
25%	0.000000	0.00000	4.000000
50%	1.000000	0.00000	8.000000
75%	3.000000	1.00000	18.000000
max	28.000000	3.00000	100.000000

The 25 selected suburb's statistics

	Nb Restaurants	Number of French Restaurants	Nb Venues
count	25.000000	25.000000	25.000000
mean	1.720000	0.320000	10.720000
std	5.168172	0.627163	14.455449
min	0.000000	0.000000	1.000000
25%	0.000000	0.000000	4.000000
50%	0.000000	0.000000	6.000000
75%	1.000000	0.000000	11.000000
max	26.000000	2.000000	74.000000

Filtering the selected suburbs regarding their numbers of venues, restaurants, and French restaurants

Based on the statistics:

- Eliminate the ones with too many restaurants
- Eliminate the ones having two or more French restaurants
- Eliminate the ones without enough venues

Objective Completed: 6 final suburbs selected

Discussion

3 last criteria to make a further choice depending on the specific need of the prospect owner of the French restaurant:

Criteria 1 : the numbers

	Ward	Suburb	Latitude	Longitude	Number of Victimisations	Household Income Binned	House Price Binned	Nb Venues	Nb Restaurants	Number of French Restaurants
0	Eastern Ward	Hataitai	-41.304278	174.796780	772.000000	High	Moderate	21.0	4.0	0.0
1	Onslow-Western Ward	Karori	-41.284109	174.746052	300.666667	High	Low	21.0	3.0	0.0
2	Onslow-Western Ward	Khandallah	-41.246742	174.790589	226.000000	Very High	Moderate	17.0	2.0	0.0
3	Onslow-Western Ward	Northland	-41.282339	174.757356	276.000000	High	Low	13.0	1.0	1.0
4	Southern Ward	Brooklyn	-41.306574	174.762354	295.000000	High	Low	11.0	1.0	0.0
5	Lambton Ward	Highbury	-41.292798	174.756096	153.000000	High	Moderate	11.0	1.0	0.0

Discussion

3 last criteria to make a further choice depending on the specific need of the prospect owner of the French restaurant:

Criteria 2 : the suburb ambiance

	Suburb	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
4	Brooklyn	Convenience Store	Pie Shop	Fast Food Restaurant	Gastropub	Burger Joint	Park	Pharmacy	Café	Deli / Bodega	Indie Movie Theater
10	Hataitai	Park	Burger Joint	Café	Grocery Store	Indian Restaurant	Fish & Chips Shop	Moroccan Restaurant	Beach	Tennis Court	Thai Restaurant
11	Highbury	Nature Preserve	Café	Pub	Coffee Shop	Fish & Chips Shop	Malay Restaurant	Pizza Place	Tunnel	Bakery	Train
18	Karori	Café	Supermarket	Indian Restaurant	Bakery	Pool	Pub	Photography Studio	Deli / Bodega	Park	Sandwich Place
20	Khandallah	Café	Train Station	Park	Convenience Store	Deli / Bodega	Supermarket	Pizza Place	Asian Restaurant	Video Store	American Restaurant
37	Northland	Pizza Place	Tunnel	Convenience Store	Burger Joint	Thai Restaurant	Tourist Information Center	Park	Botanical Garden	Liquor Store	Playground

Discussion

3 last criteria to make a further choice depending on the specific need of the prospect owner of the French restaurant:

Criteria 3 : the localisation

Conclusion

To find the most suitable suburb of Wellington to open a French restaurant, we:

- Clustered the suburbs into 8 groups depending on their house price and household income,
- Eliminate the suburbs with high victimisations rate,
- Filtered the resulting suburbs on their numbers of venues, restaurants, and French restaurants

Then, we discussed clues and guideline that were regrouped into three categories, numbers, suburb ambience, and location to help the prospect restaurant owners to make a final choice that will depend on his specific needs and desires out of the pre-selected 6 out of 57 suburbs.