Perth Restaurant Location Study

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Introduction

The City
Perth, Western Australia

The Client
 New immigrant from Singapore seeking to open a new Asian restaurant

Location Strategy
Open the restaurant in a suburb with similar existing businesses:
- Allows tapping into an existing market
- Establishing near competitors increases choice, raises customer interest and enlarges overall market

Business Problem
Compare suburbs and identify the best candidate(s) for locating the new restaurant
(assume inner city within ~3 km of Central Business District)

Data

Suburb Coordinates

Online geocoding tool https://geocode.xyz/AU

	Suburb	Latitude	Longitude
1	Perth	-31.956000	115.859000
	Original values:	*-31.95057*	*115.85866*
2	Northbridge	-31.946537	115.856594
3	Nedlands	-31.979600	115.806140
4	Subiaco	-31.949560	115.823210
5	West Perth	-31.950000	115.843000
	Original values:	*-31.9452*	*115.8467*
6	East Perth	-31.953490	115.876810
7	Crawley	-31.977330	115.820730
8	North Perth	-31.927160	115.853230
9	Victoria Park	-31.975820	115.894760
10	South Perth	-31.979360	115.865460
11	Burswood	-31.959800	115.896370
12	Highgate	-31.939989	115.870257
13	Maylands	-31.933093	115.898772
14	Lathlain	-31.967610	115.906320
15	West Leederville	-31.938620	115.833620
16	Leederville	-31.931690	115.842390

Shifted south to better reflect suburb centres

Venue Information

Foursquare API

Sample data

Venue	Venue Latitude	Venue Longitude	Venue Category
COMO The Treasury	-31.955622	115.860350	Hotel
Alfred's Pizzeria & Smallbar	-31.954890	115.859901	Pizza Place
Petition Beer Corner	-31.955622	115.859919	Beer Bar
Petition Kitchen	-31.955222	115.860066	Bistro
Telegram Coffee	-31.955811	115.860185	Coffee Shop

Perth City Map

Folium (Python library)

Methodology

1. Build list of suburbs within ~3 km of Perth CBD and pass to the geocoding tool https://geocode.xyz/AU to get suburb centre coordinates

2. Load as .csv file into a Jupyter notebook (Python) and store as Pandas dataframe

3. For each suburb, send GET request to the Foursquare API for venue information (500 m radius)

4. Remove suburbs with < 10 venues (small markets)

5. Perform one-hot encoding to separate venue categories

6. Group venues by suburb and calculate fractional splits

7. Identify the 3 most frequent venue categories for each suburb

8. Use k-means clustering (scikit-learn Python library) to divide suburbs into 4 clusters based on splits

9. Assess clusters and identify those to include in further analysis

10. For the identified clusters, calculate the total split belonging to all Asian-type restaurants and produce bubble plot

Results

Total of 388 venues from Foursquare

	Suburb	Suburb Latitude	Suburb Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Perth	-31.95600	115.85900	COMO The Treasury	-31.955622	115.860350	Hotel
1	Perth	-31.95600	115.85900	Alfred's Pizzeria & Smallbar	-31.954890	115.859901	Pizza Place
2	Perth	-31.95600	115.85900	Petition Beer Corner	-31.955622	115.859919	Beer Bar
3	Perth	-31.95600	115.85900	Petition Kitchen	-31.955222	115.860066	Bistro
4	Perth	-31.95600	115.85900	Telegram Coffee	-31.955811	115.860185	Coffee Shop
...	...	...	...	...	...	...	...
383	Leederville	-31.93169	115.84239	Oxford Yard	-31.934660	115.841700	Café
384	Leederville	-31.93169	115.84239	Domino's Pizza	-31.933310	115.841590	Pizza Place
385	Leederville	-31.93169	115.84239	The Sweet Remedy	-31.932110	115.841412	Café
386	Leederville	-31.93169	115.84239	Loftus Recreation Centre	-31.935180	115.845488	Gym / Fitness Center
387	Leederville	-31.93169	115.84239	Amani	-31.936086	115.841395	Wine Bar

	No. of Venues
Suburb	
Burswood	26
Crawley	11
East Perth	26
Highgate	23
Lathlain	6
Leederville	10
Maylands	7
Nedlands	8
North Perth	20
Northbridge	40
Perth	100
South Perth	11
Subiaco	37
Victoria Park	27
West Leederville	11
West Perth	25

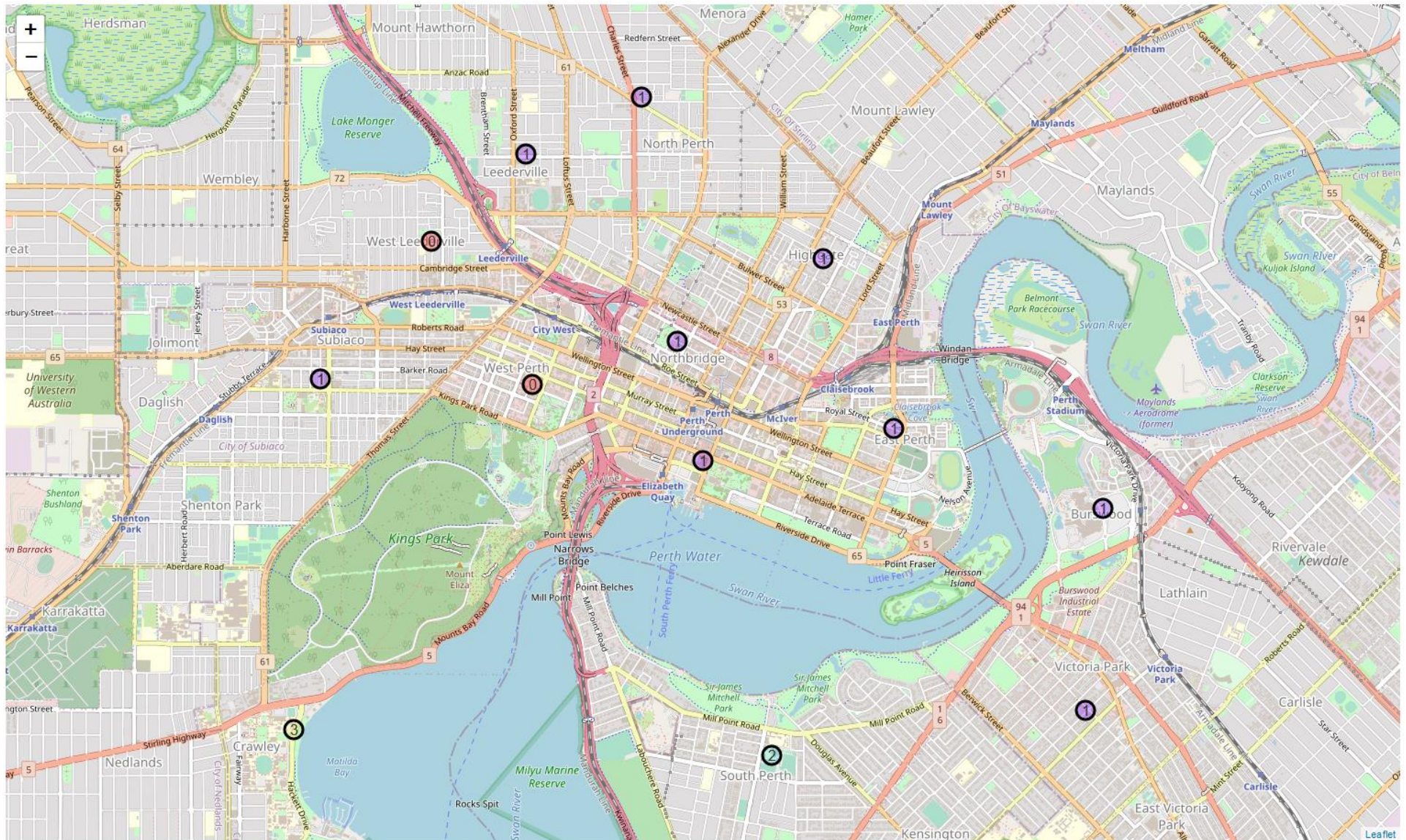*Remove Lathlain, Maylands and Nedlands (small markets)*

Results – Clusters

	Suburb	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	1st Venue Frac.	2nd Venue Frac.	3rd Venue Frac.
0	Perth	-31.956000	115.859000	1	Coffee Shop	Bar	Asian Restaurant	0.1	0.06	0.05
1	Northbridge	-31.946537	115.856594	1	Café	BBQ Joint	Chinese Restaurant	0.15	0.05	0.05
2	Subiaco	-31.949560	115.823210	1	Café	Coffee Shop	Japanese Restaurant	0.162162	0.135135	0.0810811
3	West Perth	-31.950000	115.843000	0	Café	Coffee Shop	Hotel	0.32	0.12	0.04
4	East Perth	-31.953490	115.876810	1	Café	Park	Pizza Place	0.230769	0.115385	0.0769231
5	Crawley	-31.977330	115.820730	3	Café	College Cafeteria	College Gym	0.272727	0.0909091	0.0909091
6	North Perth	-31.927160	115.853230	1	Café	Italian Restaurant	Indian Restaurant	0.15	0.1	0.1
7	Victoria Park	-31.975820	115.894760	1	Café	Japanese Restaurant	Korean BBQ Restaurant	0.148148	0.0740741	0.0740741
8	South Perth	-31.979360	115.865460	2	Café	Bakery	Coffee Shop	0.545455	0.0909091	0.0909091
9	Burswood	-31.959800	115.896370	1	Hotel	Buffet	Casino	0.115385	0.115385	0.0769231
10	Highgate	-31.9339989	115.870257	1	Café	Bakery	Mexican Restaurant	0.130435	0.130435	0.0869565
11	West Leederville	-31.938620	115.833620	0	Café	Coffee Shop	Train Station	0.363636	0.0909091	0.0909091
12	Leederville	-31.931690	115.842390	1	Café	Coffee Shop	Beer Store	0.2	0.1	0.1

Only Cluster 1 includes suburbs with Asian restaurants featuring in top 3 categories

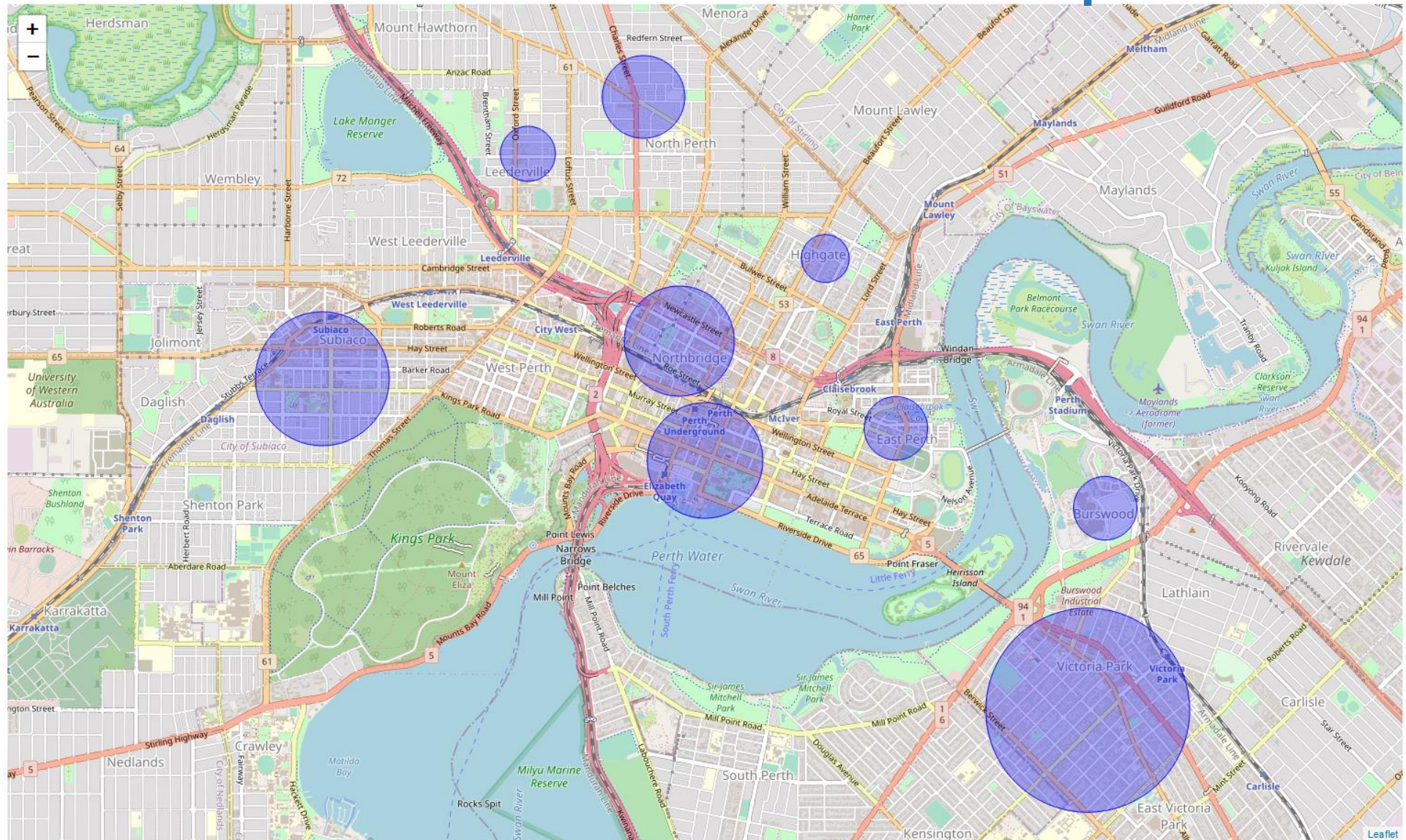*Remove other clusters from further analysis*

Results – Clusters

Results – Asian Restaurant Proportion

	Suburb	Asian Restaurant	Chinese Restaurant	Dim Sum Restaurant	Dumpling Restaurant	Indian Restaurant	Indonesian Restaurant	Japanese Restaurant	Korean BBQ Restaurant	Korean Restaurant	Malay Restaurant	Ramen Restaurant	Sushi Restaurant	Thai Restaurant	Vietnamese Restaurant	Total
0	Burswood	0.038462	0.038462	0.000	0.00	0.000000	0.000000	0.038462	0.000000	0.00	0.000000	0.000	0.000000	0.000000	0.000000	0.115385
1	East Perth	0.000000	0.000000	0.000	0.00	0.000000	0.000000	0.000000	0.038462	0.00	0.000000	0.000	0.038462	0.000000	0.038462	0.115385
2	Highgate	0.000000	0.000000	0.000	0.00	0.043478	0.043478	0.000000	0.000000	0.00	0.000000	0.000	0.000000	0.000000	0.000000	0.086957
3	Leederville	0.100000	0.000000	0.000	0.00	0.000000	0.000000	0.000000	0.000000	0.00	0.000000	0.000	0.000000	0.000000	0.000000	0.100000
4	North Perth	0.050000	0.000000	0.000	0.00	0.100000	0.000000	0.000000	0.000000	0.00	0.000000	0.000	0.000000	0.000000	0.000000	0.150000
5	Northbridge	0.000000	0.050000	0.025	0.00	0.025000	0.000000	0.025000	0.000000	0.00	0.000000	0.025	0.000000	0.000000	0.050000	0.200000
6	Perth	0.050000	0.000000	0.000	0.01	0.010000	0.000000	0.030000	0.010000	0.03	0.000000	0.010	0.020000	0.010000	0.030000	0.210000
7	Subiaco	0.054054	0.000000	0.000	0.00	0.054054	0.000000	0.081081	0.000000	0.00	0.000000	0.000	0.000000	0.027027	0.027027	0.243243
8	Victoria Park	0.037037	0.037037	0.000	0.00	0.037037	0.000000	0.074074	0.074074	0.00	0.037037	0.000	0.000000	0.037037	0.037037	0.370370

Top 4 suburbs highlighted

Results – Asian Restaurant Proportion

Key Findings

Suburbs with the Most Asian-type Restaurants

1. Victoria Park (37% of venues)
2. Subiaco (24% of venues)
3. Perth (21% of venues)
4. Northbridge (20% of venues)

Conclusions/Recommendations

1. Consider the above suburbs as prime candidates for locating the new Asian restaurant:
   a. Proven ability to support such a business
   b. Potential for increased competition to enlarge the market
2. Consideration can also be given to the following subject to further market research:
   a. Suburbs with lesser proportion of Asian restaurants (e.g. North Perth, East Perth and Burswood)
   b. Suburbs with restaurants that are predominantly non-Asian (e.g. Highgate – most common type of restaurant is Mexican)