

Coursera Capstone Project

Food Multiculturalism in Melbourne

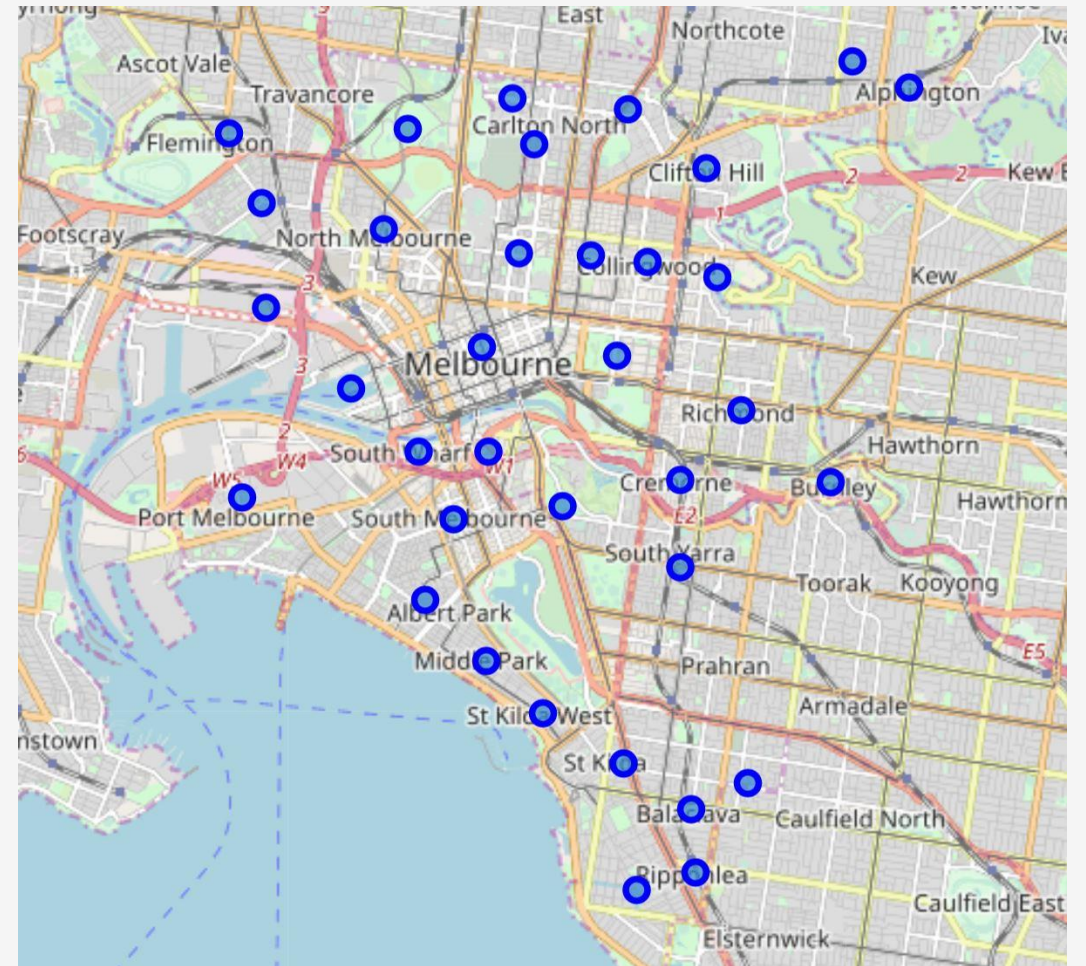
Swathi Rayapu

Introduction

According to City of Melbourne resident and ethnicity profiles, "56% of people who live in inner city suburbs are overseas born and 48% of people speak a language other than English at home". Melbourne is a multi-cultural city with almost 140 cultures represented.

This analysis focuses on examining Melbourne's suburbs restaurants distribution and how similar they are to other suburbs in Inner Melbourne in terms of food offerings. To validate whether Melbourne is truly a multicultural food city.

This analysis can be leveraged by food business companies to get the statistics of which areas yield as positive to open a new restaurant and by public for general awareness



Data

1 Data acquisition is done from open source data for cities and suburbs, Google geocoding API for location coordinates, Foursquare Places API for venues in the suburbs

```
: print('There are {} unique FOOD categories.'
```

There are 55 unique FOOD categories.

```
: print('There are {} uniques venues.'.format
```

There are 349 uniques venues.

2 Data selection is done on venues data. Irrelevant and common for all suburbs venues are removed. Only venues which are relevant for analysis to focus on multi cultural cuisines are selected.

(1720, 7)

| | Suburb | Suburb Latitude | Suburb Longitude | Venue | Venue Latitude | Venue Longitude | Venue Category |
|---|--------|-----------------|------------------|---------------------|----------------|-----------------|---------------------|
| 0 | CBD | -37.812245 | 144.962164 | Xing Fu Tang | -37.812206 | 144.962066 | Bubble Tea Shop |
| 1 | CBD | -37.812245 | 144.962164 | Brother Baba Budan | -37.813445 | 144.962137 | Coffee Shop |
| 2 | CBD | -37.812245 | 144.962164 | Emporium Café Court | -37.811925 | 144.963785 | Food Court |
| 3 | CBD | -37.812245 | 144.962164 | Calia | -37.812724 | 144.963930 | Japanese Restaurant |

Methodology – Exploratory Analysis

After the final dataset is prepared. Top 10 venue categories are calculated by counting the occurrence frequency of the type of restaurants in the data. Below image shows are Vietnamese, Australian and Thai restaurants are the top occurring restaurants.

| | count | mean | std | min | 25% | 50% | 75% | max |
|-------------------------------|-------|----------|----------|-----|-----|-----|-----|------|
| Vietnamese Restaurant | 35.0 | 1.228571 | 1.848461 | 0.0 | 0.0 | 1.0 | 2.0 | 10.0 |
| Australian Restaurant | 35.0 | 1.342857 | 1.454058 | 0.0 | 0.0 | 1.0 | 2.0 | 5.0 |
| Thai Restaurant | 35.0 | 0.971429 | 1.124218 | 0.0 | 0.0 | 1.0 | 1.0 | 5.0 |
| Japanese Restaurant | 35.0 | 0.942857 | 1.083102 | 0.0 | 0.0 | 1.0 | 1.0 | 5.0 |
| Vegetarian / Vegan Restaurant | 35.0 | 0.685714 | 0.963188 | 0.0 | 0.0 | 0.0 | 1.0 | 4.0 |
| Italian Restaurant | 35.0 | 1.428571 | 1.266903 | 0.0 | 1.0 | 1.0 | 2.0 | 4.0 |
| Korean Restaurant | 35.0 | 0.228571 | 0.598317 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 |
| Asian Restaurant | 35.0 | 0.428571 | 0.698137 | 0.0 | 0.0 | 0.0 | 1.0 | 3.0 |
| Mexican Restaurant | 35.0 | 0.514286 | 0.742469 | 0.0 | 0.0 | 0.0 | 1.0 | 3.0 |
| Indian Restaurant | 35.0 | 0.857143 | 0.943799 | 0.0 | 0.0 | 1.0 | 1.5 | 3.0 |

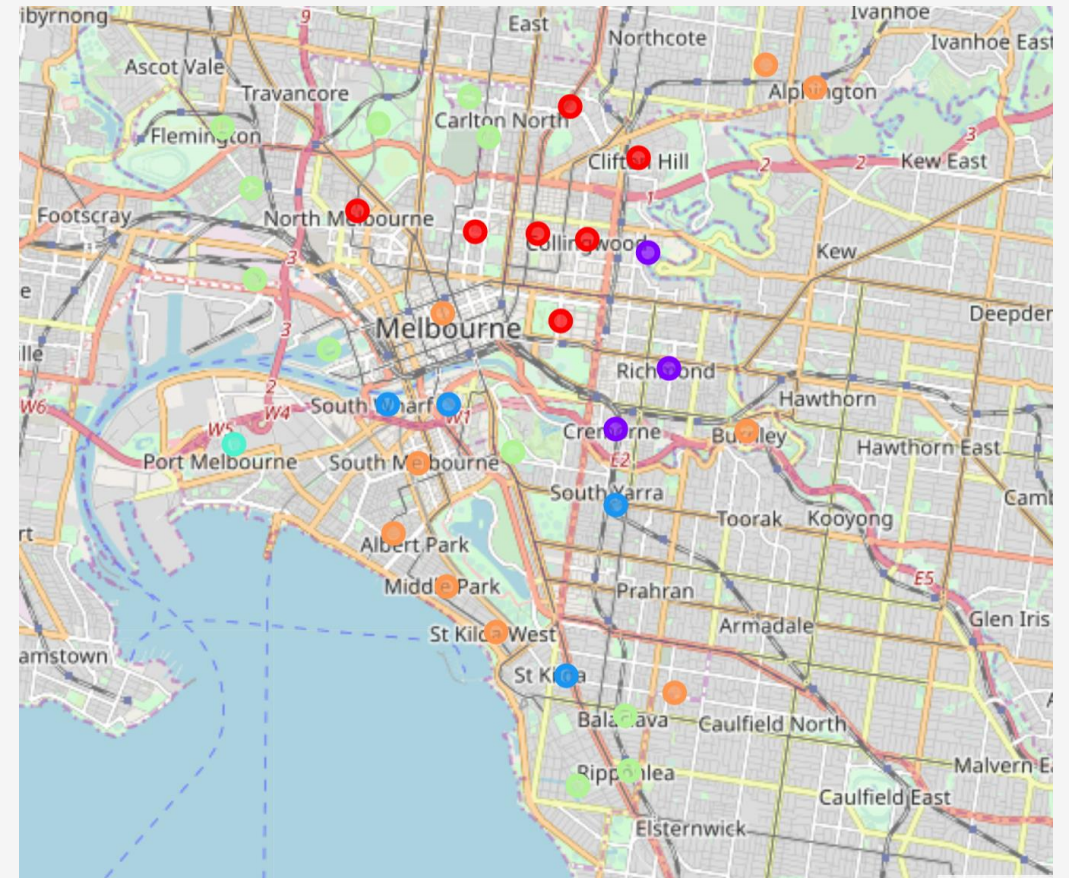
A suburb’s cuisine preference can be defined by top 5 venues in its vicinity, this table shows top 5 most common venues for each Suburb.

| | Suburb | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue |
|---|-------------|-------------------------------|-----------------------|-----------------------|-------------------------------|-----------------------|
| 0 | Abbotsford | Vietnamese Restaurant | Thai Restaurant | Chinese Restaurant | Ramen Restaurant | Asian Restaurant |
| 1 | Albert Park | Japanese Restaurant | Italian Restaurant | Indian Restaurant | Vegetarian / Vegan Restaurant | Thai Restaurant |
| 2 | Alphington | Italian Restaurant | Thai Restaurant | Japanese Restaurant | Greek Restaurant | Lebanese Restaurant |
| 3 | Balaclava | Vegetarian / Vegan Restaurant | Turkish Restaurant | Sushi Restaurant | Malay Restaurant | Italian Restaurant |
| 4 | Burnley | Asian Restaurant | Indian Restaurant | Australian Restaurant | Sushi Restaurant | Vietnamese Restaurant |

Methodology – kmeans Cluster Analysis

For the clustering analysis k-means algorithm has been used. K-means is especially useful to discover insights from unlabelled data. Choosing optimal k-value is very important to do a meaning analysis.

- 4 For $k = 4$. There is no clear distinction between resultant cluster segments. Every cluster seems similar to the other.
- 8 For $k = 8$, there are too many clusters with few members in them. It is difficult to interpret clusters with just 1 or 2 suburbs in them
- 6 For this analysis, optimal k value is 6. Clusters look meaningful and manageable at the same time when $k = 6$. There is equal division of dominance and mixed clusters. Few clusters are dominated by 1 cuisine whereas others are offering 2 or 3 major cuisines



Results of Clusters 0, 1 and 2

| cluster_1 | | | | | | |
|-----------|------------|-----------------------|-----------------------|-----------------------|-------------------------------|-----------------------|
| | Suburb | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue |
| 0 | Abbotsford | Vietnamese Restaurant | Thai Restaurant | Chinese Restaurant | Ramen Restaurant | Asian Restaurant |
| 8 | Cremorne | Thai Restaurant | Sushi Restaurant | Korean Restaurant | Vegetarian / Vegan Restaurant | Italian Restaurant |
| 23 | Richmond | Vietnamese Restaurant | Thai Restaurant | Ramen Restaurant | Dumpling Restaurant | Greek Restaurant |

1 Asian cuisine cluster. In Cluster 1 all restaurants in this cluster and areas are offering Asian cuisines. It has Vietnamese, Thai, Chinese, Sushi etc

| cluster_2 | | | | | | |
|-----------|----------------|-----------------------|-----------------------|-------------------------------|-----------------------|-----------------------|
| | Suburb | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue |
| 27 | South Wharf | Australian Restaurant | Japanese Restaurant | American Restaurant | Italian Restaurant | Caucasian Restaurant |
| 28 | South Yarra | Australian Restaurant | Korean Restaurant | Szechuan Restaurant | Vietnamese Restaurant | French Restaurant |
| 29 | Southbank | Australian Restaurant | Japanese Restaurant | Italian Restaurant | American Restaurant | Thai Restaurant |
| 33 | St Kilda South | Australian Restaurant | Italian Restaurant | Vegetarian / Vegan Restaurant | Japanese Restaurant | Taco Place |

| cluster_0 | | | | | | |
|-----------|-----------------|-----------------------|-----------------------|-------------------------------|------------------------|-------------------------------|
| | Suburb | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue |
| 6 | Clifton Hill | Indian Restaurant | Italian Restaurant | Mexican Restaurant | Moroccan Restaurant | Mediterranean Restaurant |
| 7 | Collingwood | Mexican Restaurant | Ramen Restaurant | Sushi Restaurant | Chinese Restaurant | French Restaurant |
| 10 | East Melbourne | Mexican Restaurant | Australian Restaurant | Italian Restaurant | Argentinian Restaurant | Thai Restaurant |
| 13 | Fitzroy | Korean Restaurant | Australian Restaurant | Indian Restaurant | Mexican Restaurant | Brazilian Restaurant |
| 14 | Fitzroy North | Italian Restaurant | Indian Restaurant | Vegetarian / Vegan Restaurant | Mexican Restaurant | Turkish Restaurant |
| 19 | North Melbourne | Korean Restaurant | Indian Restaurant | Italian Restaurant | Persian Restaurant | Vegetarian / Vegan Restaurant |
| 25 | South Carlton | Italian Restaurant | Korean Restaurant | Australian Restaurant | Persian Restaurant | Indian Restaurant |

2 Australian cuisine cluster. In cluster 2 it is all about local Australian restaurants as it is the same 1st most common venue for all 4 locations

0 Indian, Mexican and Italian. We can see that Italian is the 1st common venue in South Carlton which is a known observation.

Results of Clusters 3, 4 and 5

cluster_3

| | Suburb | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue |
|----|----------------|-----------------------|-----------------------|-----------------------|-----------------------------|-----------------------|
| 21 | Port Melbourne | Japanese Restaurant | Mexican Restaurant | Chinese Restaurant | Eastern European Restaurant | Italian Restaurant |

cluster_5

| | Suburb | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue |
|----|-----------------|-----------------------|-----------------------|-----------------------|-------------------------------|-------------------------------|
| 1 | Albert Park | Japanese Restaurant | Italian Restaurant | Indian Restaurant | Vegetarian / Vegan Restaurant | Thai Restaurant |
| 2 | Alphington | Italian Restaurant | Thai Restaurant | Japanese Restaurant | Greek Restaurant | Lebanese Restaurant |
| 4 | Burnley | Asian Restaurant | Indian Restaurant | Australian Restaurant | Sushi Restaurant | Vietnamese Restaurant |
| 5 | CBD | Ramen Restaurant | Australian Restaurant | Vietnamese Restaurant | Greek Restaurant | Persian Restaurant |
| 12 | Fairfield | Italian Restaurant | Japanese Restaurant | Thai Restaurant | Greek Restaurant | Australian Restaurant |
| 17 | Middle Park | Italian Restaurant | Australian Restaurant | Thai Restaurant | Indian Restaurant | Japanese Restaurant |
| 26 | South Melbourne | Japanese Restaurant | Indonesian Restaurant | Thai Restaurant | Caucasian Restaurant | Vegetarian / Vegan Restaurant |
| 30 | St Kilda East | Australian Restaurant | Sushi Restaurant | African Restaurant | Vietnamese Restaurant | German Restaurant |
| 32 | St Kilda West | Australian Restaurant | Italian Restaurant | Japanese Restaurant | Thai Restaurant | Vietnamese Restaurant |

5

This cluster has Italian and Japanese restaurants along with few Australian Restaurants

3

Port Melbourne Cluster. This cluster has only 1 location with Japanese and Mexican offerings

4

This cluster is Vegetarian/Vegan and Vietnamese cuisines along with few Middle Eastern and Turkish Restaurants

cluster_4

| | Suburb | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue |
|----|----------------|-------------------------------|-----------------------|---------------------------------|-----------------------|-------------------------------|
| 3 | Balaclava | Vegetarian / Vegan Restaurant | Turkish Restaurant | Sushi Restaurant | Malay Restaurant | Italian Restaurant |
| 9 | Docklands | Middle Eastern Restaurant | Korean Restaurant | Southern / Soul Food Restaurant | Indonesian Restaurant | Italian Restaurant |
| 11 | Elwood | Vegetarian / Vegan Restaurant | Vietnamese Restaurant | Turkish Restaurant | Thai Restaurant | Kebab Restaurant |
| 15 | Flemington | Vietnamese Restaurant | Indian Restaurant | Malay Restaurant | Yemeni Restaurant | Noodle House |
| 16 | Kensington | Indian Restaurant | Vietnamese Restaurant | Malay Restaurant | Yemeni Restaurant | Noodle House |
| 18 | North Carlton | Vegetarian / Vegan Restaurant | Italian Restaurant | Vietnamese Restaurant | Brazilian Restaurant | Japanese Restaurant |
| 20 | Parkville | Australian Restaurant | Asian Restaurant | Kebab Restaurant | Dumpling Restaurant | Italian Restaurant |
| 22 | Princes Hill | Vietnamese Restaurant | Italian Restaurant | Middle Eastern Restaurant | Lebanese Restaurant | Vegetarian / Vegan Restaurant |
| 24 | Ripponlea | Australian Restaurant | Turkish Restaurant | Taco Place | Falafel Restaurant | Mexican Restaurant |
| 31 | St Kilda Road | Australian Restaurant | Sushi Restaurant | Indian Restaurant | Japanese Restaurant | French Restaurant |
| 34 | West Melbourne | Vietnamese Restaurant | Chinese Restaurant | Portuguese Restaurant | Souvlaki Shop | Greek Restaurant |

Discussion

1 From the table we can see that it represents most regions of the world. There is Asian, Mexican, Middle Eastern, Italian and Australian. Therefore, it is safe to say that there is multi-cultural food available in Melbourne.

2 It also reflects the migration trends. There are significant number of Vietnamese, Japanese and Italian restaurants which coincide with the information from Melbourne city website.

3 Cluster 1 i.e. Abbotsford, Cremorne and Richmond suburbs are covered with Asian restaurants making it saturated. Therefore, it might not be a good area of choice for starting a new Asian restaurant if a business wants to distinguish itself from other players

4 Cluster 4 i.e. In Balaclava, Elwood and North Carlton 1st common venue is Vegetarian/Vegan restaurant. With the rise in veganism trend, this could be an interesting business opportunity to start a vegan restaurant in areas surrounding these suburbs where there seems to be demand.

| Cluster Number | Cuisine/Restaurants |
|----------------|---|
| 0 | Indian, Mexican and Italian |
| 1 | Asian |
| 2 | Australian |
| 3 | Japanese and Mexican |
| 4 | Vegetarian/Vegan, Vietnamese and Middle Eastern |
| 5 | Italian, Japanese and Australian |

Conclusion

From all the facts and figures, Melbourne is truly a food multicultural city. It has vast cuisine offerings from across the countries and regions. The analysis also reflects that food scene is going hand in hand with the earlier and current migration trends.

References

<https://www.melbourne.vic.gov.au/about-melbourne/research-and-statistics/city-population/Pages/residents-profiles.aspx>

Thank You!