

Perth Hospitality Investment Opportunity

Introduction

The year 2020 has been overshadowed by the Covid-19 pandemic. One of the hardest hit areas is the tourism industry, in Particular for Perth City, Australia. However, with news of covid-19 vaccines rolling out across the word. It is anticipated that the demand for tourism will increase and likely surpass pre Covid 19 levels.

Over 4.7 million visitors travelled to Perth in the year ending June 2020. The vast majority of visitors to Perth come from domestic overnight visitors, which have grown significantly over the last decade. These tourists will typically stay in the Perth CBD area and surrounding suburbs of North, South, East and West Perth.

Based on our forecasting, we anticipate we will observe an exponential increase in tourist numbers at the beginning of 2022. In order to seize this opportunity, we believe now is the time to start investing in the hospitality industry, in particular, focusing on the Perth CBD and surrounding suburbs.

Business Problem

As part of the business case evaluation, we need to know which of the Perth CBD and surrounding suburbs is lagging behind the others in terms of the different types of hospitality. e.g. restaurant type venues available. The suburb with the least variety will be the focus of our investment going forward.

Data Required

Longitude and Latitude data for Perth CBD and surrounding suburbs of East Perth, West Perth, South Perth and North Perth.

- Data Source: https://en.wikipedia.org/wiki/List_of_Perth_suburbs
- Description: We will scrape Perth Suburb data from the Wikipedia Table. We will then use the Geopy client to get coordinates for the relevant suburbs. Using the geocoder class of Geopy client.

Existing hospitality venue data Perth CBD and surrounding suburbs of East Perth, West Perth, South Perth and North Perth.

- Using the foursquare api, initially, all venues in the relevant locations will be extracted.
- Based on the venue types, the Venue categories will be limited to those of interest, for the purposes of this exercise, these are 'Restaurants, Cafes, Coffee Shops, Breakfast spots, Pizza places and Bars'.

Data Analysis

- We will use K-means clustering to group the suburbs into 3 categories based on the variety of Hospitality venues.

The information provided will be incorporated into a business case that is outside of the scope of this exercise.

Methodology

Extracting Data From Wikipedia

Extract Data from the Wikipedia page.

```
[2]: # Site URL
url="https://en.wikipedia.org/wiki/List_of_Perth_suburbs"

# Make a GET request to fetch the raw HTML content
html_content = requests.get(url).text

# Parse HTML code for the entire site
soup = BeautifulSoup(html_content, "lxml")
#print(soup.prettify()) # print the parsed data of html
```

Dataset of Suburbs in Perth

[5]:

| | Suburb | Local government area |
|--|--------|-----------------------|
|--|--------|-----------------------|

| | | |
|----|-------------------|------------|
| 0 | Alexander Heights | Wanneroo |
| 1 | Alfred Cove | Melville |
| 2 | Alkimos | Wanneroo |
| 3 | Anketell | Kwinana |
| 4 | Applecross | Melville |
| 5 | Ardross | Melville |
| 6 | Armadale | Armadale |
| 7 | Ascot | Belmont |
| 8 | Ashby | Wanneroo |
| 9 | Ashendon | Armadale |
| 10 | Ashfield | Bassendean |
| 11 | Attadale | Melville |

[7]: `df.shape`

[7]: (355, 2)

Merging Suburban data with Geospatial Coordinates

Merge the Suburban Data with the geospatial coordinate data

```
[7]: from geopy.geocoders import Nominatim # module to convert an address into Latitude and Longitude values
      geolocator = Nominatim(user_agent="Perth_explorer")

      df['Major_Dist_Coord'] = df['Suburb'].apply(geolocator.geocode).apply(lambda x: (x.latitude, x.longitude))
      df[['Latitude', 'Longitude']] = df['Major_Dist_Coord'].apply(pd.Series)

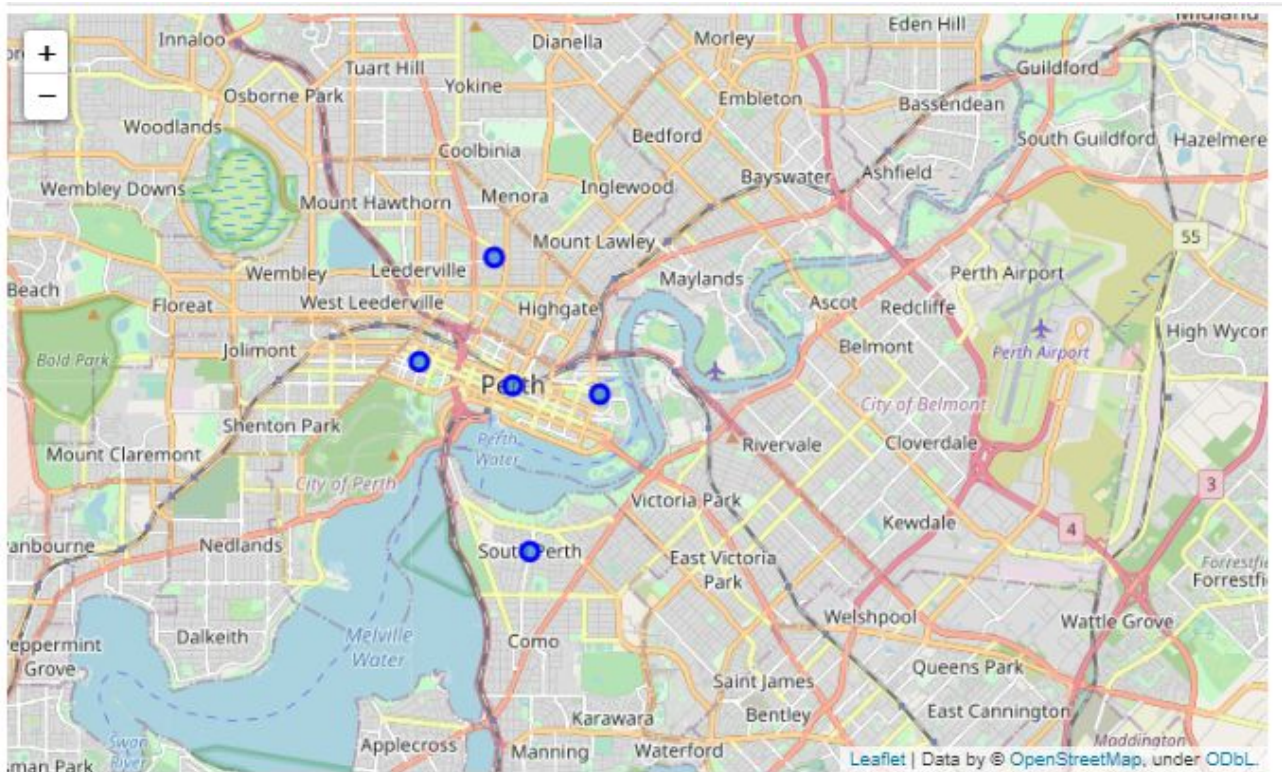
      df.drop(['Major_Dist_Coord'], axis=1, inplace=True)
      df
      df.to_csv('perth_locations.csv')
```

Focus on Perth CBD and surrounding Suburbs

| [9]: | Local government area | Latitude | Longitude |
|-------------|-----------------------|----------|-----------|
| Suburb | | | |
| East Perth | 1 | 1 | 1 |
| North Perth | 1 | 1 | 1 |
| Perth City | 1 | 1 | 1 |
| South Perth | 1 | 1 | 1 |
| West Perth | 1 | 1 | 1 |

Superimpose Dataset onto a Map of Perth

[11]:



Hospitality Venues in the area

| | | |
|-------|---------------------------|----|
| [65]: | Café | 26 |
| | Coffee Shop | 12 |
| | Bar | 6 |
| | Italian Restaurant | 4 |
| | Restaurant | 3 |
| | Pizza Place | 3 |
| | Indian Restaurant | 3 |
| | Australian Restaurant | 3 |
| | Wine Bar | 3 |
| | Asian Restaurant | 3 |
| | Thai Restaurant | 3 |
| | Vietnamese Restaurant | 2 |
| | Middle Eastern Restaurant | 2 |
| | Sushi Restaurant | 2 |
| | Korean Restaurant | 2 |
| | Cocktail Bar | 1 |
| | Korean BBQ Restaurant | 1 |
| | Beer Bar | 1 |
| | Breakfast Spot | 1 |
| | Mediterranean Restaurant | 1 |
| | Mexican Restaurant | 1 |
| | Portuguese Restaurant | 1 |
| | Ramen Restaurant | 1 |

Number of venues in each area

[66]:

| | Neighborhood Latitude | Neighborhood Longitude | Venue | Venue Latitude | Venue Longitude | Venue Category |
|--------------|--------------------------|---------------------------|-------|-------------------|--------------------|----------------|
| Neighborhood | | | | | | |
| East Perth | 14 | 14 | 14 | 14 | 14 | 14 |
| North Perth | 11 | 11 | 11 | 11 | 11 | 11 |
| Perth City | 39 | 39 | 39 | 39 | 39 | 39 |
| South Perth | 5 | 5 | 5 | 5 | 5 | 5 |
| West Perth | 16 | 16 | 16 | 16 | 16 | 16 |

Top 10 Venue types by Perth CBD Suburb

----East Perth----

| | venue | freq |
|---|---------------------------|------|
| 0 | Café | 0.43 |
| 1 | Italian Restaurant | 0.14 |
| 2 | Asian Restaurant | 0.07 |
| 3 | Breakfast Spot | 0.07 |
| 4 | Coffee Shop | 0.07 |
| 5 | Restaurant | 0.07 |
| 6 | Korean BBQ Restaurant | 0.07 |
| 7 | Pizza Place | 0.07 |
| 8 | Middle Eastern Restaurant | 0.00 |
| 9 | Vietnamese Restaurant | 0.00 |

----North Perth----

| | venue | freq |
|---|---------------------------|------|
| 0 | Café | 0.36 |
| 1 | Coffee Shop | 0.18 |
| 2 | Middle Eastern Restaurant | 0.09 |
| 3 | Bar | 0.09 |
| 4 | Thai Restaurant | 0.09 |
| 5 | Indian Restaurant | 0.09 |
| 6 | Pizza Place | 0.09 |
| 7 | Asian Restaurant | 0.00 |
| 8 | Vietnamese Restaurant | 0.00 |
| 9 | Sushi Restaurant | 0.00 |

----Perth City----

| | venue | freq |
|---|-----------------------|------|
| 0 | Coffee Shop | 0.15 |
| 1 | Bar | 0.10 |
| 2 | Café | 0.10 |
| 3 | Wine Bar | 0.08 |
| 4 | Australian Restaurant | 0.05 |
| 5 | Vietnamese Restaurant | 0.05 |
| 6 | Sushi Restaurant | 0.05 |
| 7 | Restaurant | 0.05 |
| 8 | Korean Restaurant | 0.05 |
| 9 | Indian Restaurant | 0.05 |

----South Perth----

| | venue | freq |
|---|-----------------------|------|
| 0 | Café | 0.8 |
| 1 | Coffee Shop | 0.2 |
| 2 | Asian Restaurant | 0.0 |
| 3 | Mexican Restaurant | 0.0 |
| 4 | Vietnamese Restaurant | 0.0 |
| 5 | Thai Restaurant | 0.0 |
| 6 | Sushi Restaurant | 0.0 |
| 7 | Restaurant | 0.0 |
| 8 | Ramen Restaurant | 0.0 |
| 9 | Portuguese Restaurant | 0.0 |

----West Perth----

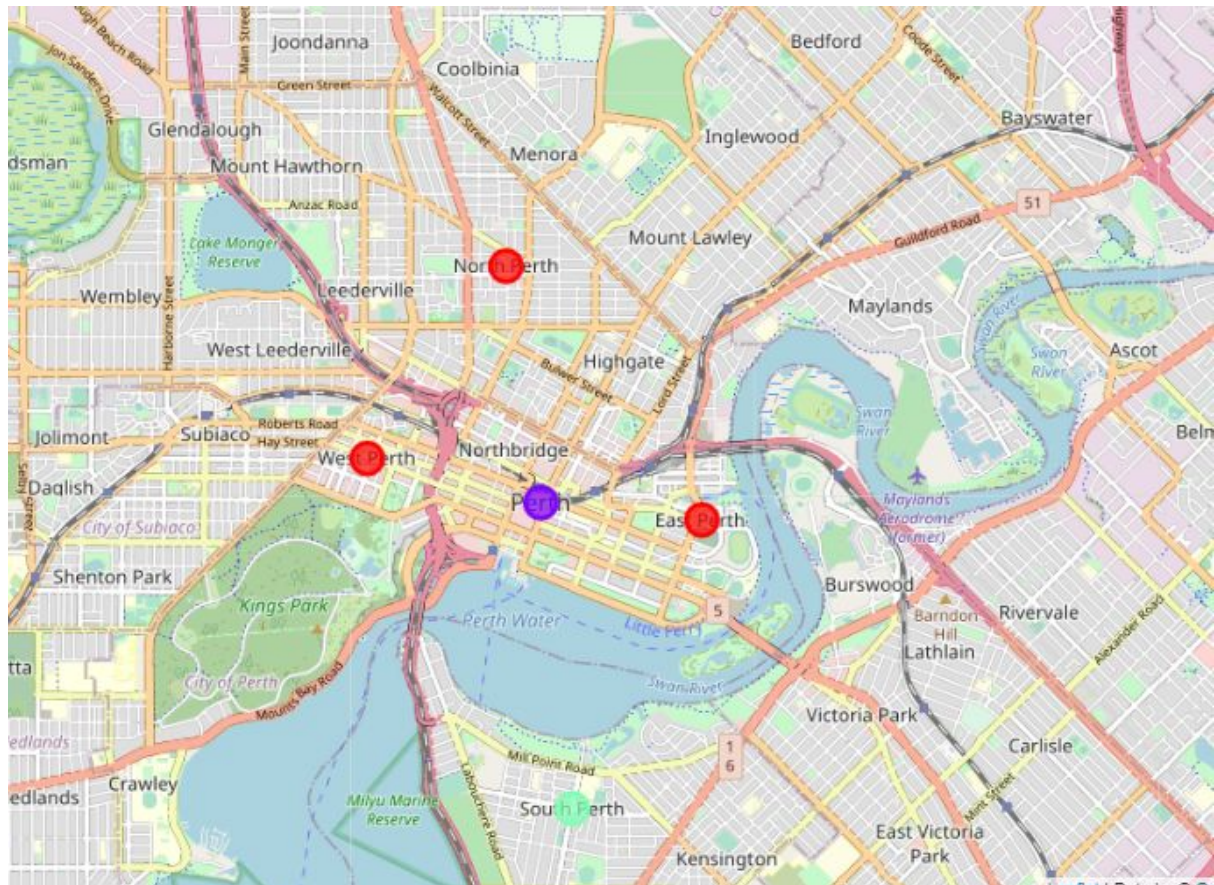
| | venue | freq |
|---|---------------------------|------|
| 0 | Café | 0.50 |
| 1 | Coffee Shop | 0.12 |
| 2 | Italian Restaurant | 0.12 |
| 3 | Asian Restaurant | 0.06 |
| 4 | Bar | 0.06 |
| 5 | Thai Restaurant | 0.06 |
| 6 | Australian Restaurant | 0.06 |
| 7 | Middle Eastern Restaurant | 0.00 |
| 8 | Vietnamese Restaurant | 0.00 |
| 9 | Sushi Restaurant | 0.00 |

Most Common Venue Types

[69]:

| | 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 | East Perth | Café | Italian Restaurant | Asian Restaurant | Restaurant | Breakfast Spot | Pizza Place | Coffee Shop | Korean BBQ Restaurant | Australian Restaurant | Bar |
| 1 | North Perth | Café | Coffee Shop | Thai Restaurant | Bar | Pizza Place | Middle Eastern Restaurant | Indian Restaurant | Wine Bar | Italian Restaurant | Australian Restaurant |
| 2 | Perth City | Coffee Shop | Bar | Café | Wine Bar | Vietnamese Restaurant | Australian Restaurant | Indian Restaurant | Korean Restaurant | Restaurant | Sushi Restaurant |
| 3 | South Perth | Café | Coffee Shop | Wine Bar | Korean BBQ Restaurant | Australian Restaurant | Bar | Beer Bar | Breakfast Spot | Cocktail Bar | Indian Restaurant |
| 4 | West Perth | Café | Coffee Shop | Italian Restaurant | Asian Restaurant | Thai Restaurant | Australian Restaurant | Bar | Korean BBQ Restaurant | Beer Bar | Breakfast Spot |

Using K means to Cluster Suburbs based on Hospitality venue types



Classification of the Clusters

Cluster 1 - Moderate variety of restaurant types

```
[74]: perth_merged.loc[perth_merged['Cluster Labels'] == 0, perth_merged.columns[[0] + list(range(4, perth_merged.shape[1]))]]
```

| | 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 | Cluster Labels |
|---|-------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|-----------------------|-----------------------|-----------------------|------------------------|----------------|
| 0 | East Perth | Café | Italian Restaurant | Asian Restaurant | Restaurant | Breakfast Spot | Pizza Place | Coffee Shop | Korean BBQ Restaurant | Australian Restaurant | Bar | 0 |
| 1 | North Perth | Café | Coffee Shop | Thai Restaurant | Bar | Pizza Place | Middle Eastern Restaurant | Indian Restaurant | Wine Bar | Italian Restaurant | Australian Restaurant | 0 |
| 4 | West Perth | Café | Coffee Shop | Italian Restaurant | Asian Restaurant | Thai Restaurant | Australian Restaurant | Bar | Korean BBQ Restaurant | Beer Bar | Breakfast Spot | 0 |

Cluster 2: Highest variety of restaurant types

```
[75]: perth_merged.loc[perth_merged['Cluster Labels'] == 1, perth_merged.columns[[0] + list(range(4, perth_merged.shape[1]))]]
```

| | 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 | Cluster Labels |
|---|------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|----------------|
| 2 | Perth City | Coffee Shop | Bar | Café | Wine Bar | Vietnamese Restaurant | Australian Restaurant | Indian Restaurant | Korean Restaurant | Restaurant | Sushi Restaurant | 1 |

Cluster 3: Lowest variety of restaurant types

```
[76]: perth_merged.loc[perth_merged['Cluster Labels'] == 2, perth_merged.columns[[0] + list(range(4, perth_merged.shape[1]))]]
```

| | 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 | Cluster Labels |
|---|-------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|----------------|
| 3 | South Perth | Café | Coffee Shop | Wine Bar | Korean BBQ Restaurant | Australian Restaurant | Bar | Beer Bar | Breakfast Spot | Cocktail Bar | Indian Restaurant | 2 |

Based on the above analysis, South Perth should be the focus area for investing in new Hospitality venue types.

The information provided will be incorporated into a business case that is outside of the scope of this exercise.

Results

Based on the information collected, the 5 suburbs surrounding Perth were segregated into 3 clusters based on the variety of Venue types, ranging from High Moderate and Low variety. The most prevalent venue categories were Cafe's, Coffee Shops, Bars and Italian Restaurants.

Discussion

Before the K means Clustering was Undertaken, it was clear that South Perth has the least variety of venues. The K means clustering provided confirmation. The analysis was also able to segregate the remaining suburbs into two distinct groups as per below:

Moderate Variety in relation to hospitality venues - East, North and West perth
High Variety in relation to hospitality venues - Perth City (CBD)

Conclusion

Based on the information in the report, South Perth should be the focus of new hospitality based investment in preparation for the post covid era.